ILLINOIS POLLUTION CONTROL BOARD
July 26, 2018

IN THE MATTER OF:	)	
	)	
PUBLIC WATER SUPPLIES: PROPOSED	)	R18-17
NEW 35 ILL. ADM. CODE 604 AND	)	(Rulemaking – Public Water Supplies)
AMENDMENTS TO 35 ILL. ADM. CODE	)	
PARTS 601, 602, 607, AND 611	)	

Proposed Rule. First Notice.

OPINION AND ORDER OF THE BOARD (by C.M. Santos and B.K. Carter):

On August 3, 2017, the Illinois Environmental Protection Agency (IEPA) proposed that the Board amend its public water supplies rules by adopting a new Part 604 entitled "Design, Operation and Maintenance Criteria" and amending Parts 601, 602, 607, and 611.

IEPA adopted rules in Part 653 for designing, operating, and maintaining community water supplies and last updated them in 1985. IEPA now proposes that the Board adopt these rules as Part 604, after which IEPA intends to repeal Parts 651, 653, and 654 of its own rules. IEPA argues that its proposal clarifies the requirements by consolidating them into a single comprehensive Board rule. IEPA characterizes its proposed amendments to Parts 601, 602, 607, and 611 as minor changes that maintain consistency within the public water supplies rules.

After conducting two public hearings, receiving numerous comments, and considering the entire record, the Board proposes amendments to its public water supplies rules for first-notice publication. The proposed rules appear in the addendum to this opinion and order. Publishing the proposed rules in the *Illinois Register* begins a public comment period of at least 45 days. *See* 5 ILCS 100/5-40(b) (2016). At pages 217-18 of this opinion, the Board provides information on submitting a comment and specifically requests comment on four issues.

GUIDE TO TODAY'S OPINION AND ORDER

The Board's opinion begins by summarizing the procedural history of this rulemaking (pages 2-4). It then summarizes the background of the public water supplies rules and the process IEPA followed to develop its proposal (pages 4-6).

Next, the opinion briefly addresses general corrections, clarifications, and other minor changes that the Board proposes for first notice (page 6). The Board then decides the contested issues with IEPA's proposal that remain disputed among the participants and proposes rule text resulting from those decisions (pages 6-36). For the balance of the Board's first-notice rule language – whether based on undisputed aspects of IEPA's proposal or the participants' resolution of disputed aspects of IEPA's proposal - the Board provides a section-by-section summary of the supporting record (pages 36-216).

The Board then addresses the economic reasonableness and technical feasibility of its first-notice proposal (pages 216-17). Next, the Board provides information on filing public comments and specifically seeks comment on four issues (pages 217-18). After concluding to add a new Part 604 and amend Parts 601, 602, 607, and 611 of its public water supplies rules, the Board directs the Clerk to submit its proposal for first-notice publication in the *Illinois Register* (page 218). Finally, the Board sets forth the proposed rules in the addendum following its opinion and order.

PROCEDURAL HISTORY

On August 3, 2017, IEPA filed documents including its Statement of Reasons (SR), its proposed new Part 604 (Prop. 604), and its proposed revisions to Part 601 (Prop. 601), Part 602 (Prop. 602), Part 607 (Prop. 607), and Part 611 (Prop. 611).

In a letter dated August 28, 2017, the Board requested that the Department of Commerce and Economic Opportunity (DCEO) conduct an economic impact study of IEPA's proposal. *See* 415 ILCS 5/27(b) (2016).

On August 31, 2017, IEPA pre-filed testimony by Richard P. Cobb (Cobb Test.), David C. Cook (Cook Test), Stephen Johnson (Johnson Test.), and W. David McMillan (McMillan Test.).

On October 2, 2017, the City of Springfield, Office of Public Utilities d/b/a City Water, Light & Power (CWLP) pre-filed questions for IEPA (CWLP Questions). Also on October 2, 2017, a hearing officer order included the Board's questions for IEPA (Board Questions).

On October 5, 2017, the Board received comments from Beverly Potts, Executive Director of the Illinois Association of Plumbing-Heating-Cooling Contractors (IAPHCC) (PC 1); and Richard Marvel, Chair of the Backflow Committee of the Illinois Section of the American Water Works Association (ISAWWA) (PC 2). The Board also received two comments signed by Michael Body, one as President of the Northern Illinois Chapter of the American Backflow Prevention Association (PC 3); and one as Chair of the Backflow Committee of the ISAWWA. (PC 4). On October 10, 2017, the Board received comments from Thomas Palkon, Executive Director, and Marianne C. Waickman, Professional Qualifications Director, of the American Society of Sanitary Engineers International (ASSE) (PC 5). The Board also received a comment signed by Gary W. Howard, Code and Research, ASSE Illinois Chapter (PC 6). PC 2, PC 3, PC 4, PC 5, and PC 6 are substantially identical to one another. The Board will refer to them collectively as the Backflow Comments and will cite PC 2 to represent them.

On October 12, 2017, IEPA filed responses to the pre-filed questions submitted by CWLP and the Board (IEPA Resp.).

The first hearing took place on October 17, 2017, and the Board received the transcript (Tr.1) on October 30, 2017. During the first hearing, the hearing officer admitted into the record four exhibits (Exhs. 1-4). Tr. 1 at 35, 37, 42, 45.

On November 1, 2017, IEPA filed three documents: its response to questions posed at the first hearing (IEPA Hrg. Resp.); its response to PC 1 – PC 6 (IEPA Resp. 1-6); and its response to the testimony pre-filed on October 19, 2017, by Capt. Curry (Curry Resp.).

On November 2, 2017, the Board received comments from the Water Utility Council of the Illinois Section of the American Water Works Association (ISAWWA) (PC 7). On November 3, 3017, the Board received comments from Mr. William J. Soucie, Operations Director of the Central Lake County Joint Action Water Agency (CLCJAWA) (PC 8). On November 14, 2017, the Board received a second comment from Mr. Soucie for CLCJAWA (PC 12).

For the second hearing, the Board received pre-filed testimony from Capt. Michael D. Curry (Curry Test.) with four attachments (Att. 1-4) on October 19, 2017; Mr. Ted Meckes of CWLP (CWLP Test.) on November 7, 2017; and Mr. Justin DeWitt, Chief of General Engineering for the Illinois Department of Public Health (IDPH) (IDPH Test.) on November 8, 2017. Also on November 8, 2017, the Board received supplemental testimony from Capt. Curry (Curry Supp. Test.).

On November 14, 2017, IEPA filed its response to Capt. Curry's supplemental testimony (Curry Supp. Resp.) and its response to PC 7 and 8 (Resp. 7-8).

On November 15, 2017, the Board pre-filed questions for the second hearing (Board Questions 2), which were directed separately to Capt. Curry, Mr. Meckes, Mr. DeWitt, and IEPA. Also on November 15, 2017, IEPA filed its responses to questions the Board had directed to it (IEPA Resp. 2).

The second hearing took place as scheduled on November 16, 2017, and the Board received the transcript (Tr.2) on November 22, 2017.

Beginning November 7, 2017, the Board received comments from water systems. Some addressed IEPA's proposed minimum free chlorine residual: Jeremy Barkei, Water and Sewer Superintendent for the City of Batavia (PC 9); Keith Alexander, Water Production Manager for the City of Decatur (PC 10); Philip W. Cotter, Interim Director of Public Works for the Village of East Dundee (PC 13); Carl Groth, Utilities Superintendent for the Village of Romeoville (PC 14); Mayor Raymond R. Soliman of the City of Crest Hill (PC 15); Scott Green, Water Superintendent of the City of Lockport (PC 19); and Matthew T. Brolley, Village President of the Village of Montgomery (PC 20). Because these comments are similar to one another, the Board will refer to them collectively as the Free Chlorine Comments and will cite PC 9 to represent them.

Others comments addressed IEPA's proposed minimum combined residual: Paul S. Young, Water Superintendent of the Village of North Aurora (PC 11); Mayor Raymond R. Soliman of the City of Crest Hill (PC 16); Dennis Ross, General Manager of the Otter Lake Water Commission (PC 17); Scott Green, Water Superintendent of the City of Lockport (PC 18); and Steven Ward, Village President of the Village of South Elgin (PC 22). Because these

comments are similar to one another, the Board will refer to them collectively as the Combined Residual Comments and will cite PC 11 to represent them.

On November 29, 2017, the Board received a comment from Matt Overeem, Superintendent of Water & Sewer for the Village of Wilmette (PC 21) addressing IEPA's proposed distribution requirement at Section 604.1435.

On December 13, 2017, the Board received a comment from Randolph Pankiewicz, Director of Water Quality and Environmental Compliance of Illinois American Water (ILAW), which addressed both IEPA's proposed minimum free chlorine residual and minimum combined residual (PC 24).

On December 15, 2017, the Board received ISAWWA's response to the Board's request at the second hearing for additional information (ISAWWA Cmts.).

The Board received post-hearing comments from Capt. Curry (Curry Post-Hrg. Cmts.) on December 6, 2017; from IEPA (IEPA Post-Hrg. Cmts.) on December 19, 2017; and from CWLP (CWLP Post-Hrg. Cmts.) on December 20, 2017.

On January 5, 2018, the Board received IEPA's reply to the post-hearing comments (IEPA Reply) and also received comments from Randy Conner, Commissioner of the Department of Water Management of the City of Chicago (CDWM) (PC 27).

BACKGROUND OF PUBLIC WATER SUPPLIES RULES

The Board first adopted public water supply rules in 1975. SR at 2, citing Public Water Supplies, R73-13 (Jan. 3, 1975). Rule 212 gave IEPA authority to adopt technical policy statements regarding construction and operation of facilities. Public Water Supplies, R73-13, slip op. at 13-14 (Jan. 3, 1975). IEPA first adopted technical policy statements in 1974 and amended them in 1978, 1984, and 1985. SR at 3. IEPA ultimately codified them as Parts 651, 652, 653, and 654 of its rules. *Id*. IEPA "has not updated the design, maintenance and operation rules contained in these technical policy statements for 32 years." *Id*.

After adoption of the Safe Drinking Water Act (SDWA) in 1974, the United States Environmental Protection Agency (USEPA) developed drinking water regulations including maximum contaminant levels. SR at 3. The Board adopted these standards in 1978 and 1979. *Id*., citing Amendments to the Public Water Supply Regulations, R77-13. In 1982, the Board re-codified its public water supply rules as Parts 601-607. SR at 3, citing Proposal for Rulemaking for Chapter 6: Public Water Supply Regulations of the Illinois Pollution Control Board, R81-6, R81-28 (Sept. 21, 1982).

Section 17.5 of the Environmental Protection Act gives the Board authority to adopt regulations that are "identical in substance" to USEPA regulations implementing the SDWA. SR at 4, citing Public Act 85-1048; *see* 415 ILCS 5/17.5 (2016). In exercising this authority, the Board created Part 611, which consists of identical in substance rules and additional state requirements. SR at 4, citing Safe Drinking Water Act Regulations, R88-26 (Aug. 9, 1990).

Although adoption of Part 611 largely superseded Parts 604, 605, 606, and 607, the Board retained some of those parts until Part 611 became fully effective. SR at 4. By 1993, the Board had repealed all of Parts 604, 605, and 606 and all but two sections of Part 607. *Id*.; *see* 35 Ill. Adm. Code 607.103, 607.104; Prop. 6-7 at 1-3 (proposing repeal).

DEVELOPING IEPA'S PROPOSAL

In 2012, IEPA began to review and revise the community water supplies rules. SR at 4. IEPA first addressed Part 602 permitting rules and Part 603 rules on ownership and responsible personnel. *Id*.; Cook Test. at 2; McMillan Test. at 2. The Board amended these Parts in 2016. Public Water Supplies: Proposed Amendments to 35 Ill. Adm. Code Parts 601, 602, and 603, R15-22 (Apr. 7, 2016).

With this proposal, IEPA addresses design, operation, and maintenance standards. To comply with these standards, a community water supply must now refer to numerous Parts of IEPA's and the Board's rules. SR at 5. To simplify compliance, IEPA proposes to consolidate these standards largely into a single new Part 604. *Id*. If the Board adopts Part 604, IEPA intends to repeal Parts 651, 653, and 654, and IEPA proposes to repeal Section 602.115 in this rulemaking. SR at 2, 10; Cook Test. at 2; McMillan Test. at 2; *see* Prop. 602 at 6.

To prepare its proposed Part 604, IEPA first reviewed Parts 653 and 654 of its rules. IEPA's proposal removes obsolete language from these rules and also updates their requirements. SR at 5. IEPA then reviewed the 2012 edition of Recommended Standards for Water Works – Policies for the Review and Approval of Plans and Specifications for Public Water Supplies (Recommended Standards), published by the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (GLUMRB). GLUMRB includes representatives of IEPA, nine other states, and the Province of Ontario. SR at 6. IEPA considered each of the recommended standards and determined whether to propose it as written, revise it, or omit it from its proposal. *Id*. at 6-7.

IEPA states that it did not use a published study or report to develop its proposed rules. SR at 75, citing 5 ILCS 100/5-40(b)(3.5) (2016); 35 Ill. Adm. Code 102.202(e). IEPA elaborates that it neither performed a new study nor contracted with any outside entity to perform such a study. SR at 75. IEPA did consult a USEPA publication, "Guidance Manual for Compliance with Filtration and Disinfection Requirements for Public Water Supplies Using Surface Water Sources." *Id*.

IEPA argues that its proposed Part 604 establishes a comprehensive regulatory program from source to distribution for community water supplies. SR at 8. IEPA asserts that the clarity provided by consolidated rules would help ensure safe and clean supplies of drinking water. *Id*. at 2. IEPA also argues that Part 604 would replace outdated standards and resolve gaps and inconsistencies between IEPA and Board rules and the previous edition of the Recommended Standards. *Id*. Finally, IEPA argues that the structure of its proposal makes it easier to review and update the rules with new methods and technologies. *Id*. at 8-9.

After developing its proposed Part 604, IEPA in the fall of 2016 circulated draft rules to community water supplies, other public agencies, and nongovernmental organizations including the Illinois Society of Professional Engineers, the Illinois Rural Water Association, the Illinois Section of the American Water Works Association, and the Illinois Potable Water Supply Operators Association. SR at 72. IEPA accepted comments and revised the draft rules before it submitted its proposal to the Board. *Id*.

GENERAL CLARIFICATIONS AND CORRECTIONS

The Board revised language in IEPA's proposal in a number of ways that occur throughout it.

As one example, the rules contain numerous references to provisions "of this Part" and "of this section." The Board believes that many of these references are unnecessary and has struck them where they do not clarify the rules.

Where the rules state a deadline as a number of days "of" or "following" a date or event, the Board has clarified the deadline by referring instead to a number of days "after" that occurrence.

Where the rules refer to requirements "pursuant to" a provision, the Board has simplified the rules by referring to requirements "under" a provision.

Where proposed rules include a list "including, but not limited to" various items, the Board has simplified the rules by striking "but not limited to."

The Board also re-organized sections proposed by IEPA. As one example, the Board restructured proposed Section 604.1320 and re-drafted it in the active voice to clarify requirements for level controls. The Board also re-drafted proposed Section 604.1335(a) into the active voice to clarify requirements for clearwell storage. The Board similarly re-drafted Section 604.1105(f).

While this is a non-exhaustive list, it illustrates the Board's revisions. The Board considers these revisions to be non-substantive but believes that they clarify and simplify its rules. The Board does not further discuss these general revisions in the following sections of this opinion.

Also, Capt. Curry's testimony observed that Board regulations generally use "shall" to indicate mandatory action and "should" to indicate a recommendation. He noted that IEPA's proposal generally used "must" to indicate mandatory action. Curry Test. at 1. IEPA responded that it "intends 'must' to be mandatory and 'should' to be a recommendation." Curry Resp. at 1. The Board sought to implement IEPA's intent and proposes to replace "shall" with terms including "must," "will," or "may" as specific provisions require.

DISPUTED ISSUES

The Board commends the participants' willingness to respond to one another, to IEPA, and to the Board during the rulemaking process. In numerous cases, the record shows that comments and questions led to agreed language revising IEPA's original proposal. For a limited number of provisions, however, the record shows that the participants have not agreed to revisions. In the following 28 subsections, the Board addresses these disputed provisions in numerical order by section.

Section 601.101(b)(2): Finished Water Quality Narrative Standard

Section 611.121(b)(2) of the Board's rules provides that "[n]o substance used in treatment should remain in the water at a concentration greater than that required by good practice. A substance that may have a deleterious physiological effect, or one for which physiological effects are not known, must not be used in a manner that would permit it to reach the consumer." 35 Ill. Adm. Code 611.121(b)(2). IEPA proposed to move this narrative standard into a new Section 601.101(b)(2). Prop. 601 at 2; SR at 13, 69.

The Board noted the proposed language that "[n]o substance used in treatment *should remain* in the water at a concentration greater than that required by good practice." Board Questions at 2 (emphasis added). The Board asked IEPA whether a CWS that fails to meet the italicized standard would violate the proposed regulation. *Id*. IEPA responded that this requirement is based on a Board rule. IEPA Resp. at 1. Thus, if a CWS "fails to meet these standards, that failure could violate regulations." *Id*.

The Board asked IEPA to clarify the phrase "at a concentration greater than that required by good practice." Board Questions at 2; *see* Prop. 601 at 2. IEPA responded that, since this term is based on an existing Board rule, IEPA "defers to the Board's interpretation of this phrase." IEPA Resp. at 1. At the first hearing, the Board asked IEPA to provide background for interpretation of the phrase. Tr.1 at 14-15. IEPA responded that some CWSs add chemicals to ensure potability. Adding chemicals is subject to IEPA permitting and third-party standards and review. IEPA Hrg. Resp. at 1. "IEPA believes that a concentration greater than that required by good practice means chemicals should not be applied at a rate greater than needed based upon existing source water quality." *Id*.

CLCJAWA commented that subsection (b)(2) is "confusing." PC 8 at 3. It states that chlorine "may have a deleterious physiological effect." CLCJAWA argued that subsection (b)(2) as drafted must mean that chlorine cannot be permitted to reach consumers. *Id*. CLCJAWA suggested that IEPA clarify this subsection. *Id*. IEPA responded that this proposal is based on an existing requirement and that its response to the Board addresses CLCJAWA's comment. Resp. 7-8 at 9.

Proposed subsection (b)(2) is a narrative standard now part of the Board's rules. IEPA responded to Board questions about interpreting and enforcing the standard. IEPA suggests that no substance such as chlorine that is used to treat water should be applied at a rate greater than that necessitated by source water quality. The Board believes that IEPA's responses clarified this subsection and addressed matters including CLCJAWA's example. The Board is not

persuaded that IEPA's proposed Section 601.101(b)(2) requires additional clarification, and the Board's order includes the language proposed by IEPA.

Section 601.115(b): Incorporations by Reference

Section 601.115(b) incorporates by reference materials used to implement the Board's public water supplies rules. 35 Ill. Adm. Code 601.115(b). IEPA proposes to add incorporations of materials used to implement proposed Part 604. SR at 13, 69, 75-78; Prop. 601 at 8-12.

ISAWWA argues that these references should not list the date of a standard but should refer only to the "latest edition." PC 7 at 1. CLCJAWA suggests that, if IEPA is concerned with revision of standards that it does not control, it could propose to incorporate "the most current edition of the standard at the discretion of the Agency." PC 8 at 3.

IEPA responded that "[t]his is not allowed under the Illinois Administrative Procedure Act" (IAPA). Resp. 7-8 at 1, 9-10. Under the IAPA, the Board may incorporate rules, regulations, standards, and guidelines by reference "without publishing the incorporated material in full." 5 ILCS 100/5-75(a) (2016). However, the reference "must state that the rule, regulation, standard, or guideline does not include any later amendments or editions." *Id.*; *see* 35 Ill. Adm. Code 601.115(c) ("No later amendments to or editions of the materials listed in subsection (b) are incorporated."). Through its rulemaking process, the Board may consider whether to incorporate by reference any subsequent editions of these standards. However, the language suggested by ISAWWA and CLCJAWA is not consistent with the IAPA, and the Board declines to propose that language in its order.

Section 602.105(a)(3): Design Criteria for Community Water Supply Facilities

Section 602.105(a)(3) provides that, when subsection (a)(2) does not establish design criteria for a proposed facility, "the Agency must not issue the construction or operating permit unless the applicant submits proof that the community water supply facility conforms to other design criteria that the applicant proves will produce consistently satisfactory results." 35 Ill. Adm. Code 602.105(a)(3). IEPA proposed to add that it "may require a pilot study." Prop. 602 at 4.

ISAWWA commented that "the term 'pilot study' is vague." PC 7 at 1. ISAWWA suggested that IEPA provide detail on how to develop a study protocol and the elements of a successful study. *Id.*

IEPA first responded that it has used the term "pilot study" since the IEPA was formed and that the Recommended Standards also use it. Resp. 7-8 at 1; *see., e.g.,* Recommended Standards §1.1.8 (Proposed treatment processes). IEPA determines what is needed for a pilot study by reaching consensus with a facility's consulting engineers. Resp. 7-8 at 1. IEPA added that this would not be "a new or changed process." *Id.*

The Board asked IEPA to comment on the factors or standards it would use to determine whether to require a pilot study. Board Questions at 2. IEPA responded that it may require a

pilot study "when the documents listed in subsection [602.105] (a)(2) do not provide design criteria for the proposed CWS facility." IEPA Resp. at 2. IEPA stated that the CWS must submit adequate proof that its proposed facility "conforms to other design criteria that will produce consistently satisfactory results." *Id*. This proof may require a pilot study when the CWS proposes to use new technology, in cases of "various operational characteristics," or to verify compliance. *Id*.

The Board is not persuaded that IEPA's proposed Section 602.105(a)(3) is vague. IEPA indicates that it has long used the term "pilot study." The Board notes that The Water Dictionary, incorporated by reference at 35 Ill. Adm. Code 601.115(b), defines "pilot-plant study" as "[e]valuation on a scale larger than laboratory scale but smaller than full scale, of the amenability of water to treatment by particular operations or processes." The Water Dictionary at 453 (2nd ed. 2010); *see* 35 Ill. Adm. Code 601.105(c). IEPA also stated that it does not intend to change its practice of developing these studies with a facility's consulting engineers. In addition, IEPA listed circumstances in which it may require a pilot study. The Board believes that these responses address matters including ISAWWA's comments. For these reasons, the Board does not agree that the term "pilot study" is vague, and the Board's order includes the language proposed by IEPA.

Section 602.200(c)(5): Construction Permit Requirements

Section 602.200(c) includes examples of "normal work items" that do not require a construction permit. 35 Ill. Adm. Code 602.200(c). Subsection (c)(5) lists "replacement of chemical feeders, pumps, controls, filter media, softener resins, pipes and appurtenances that have the same rated capacity as existing facilities previously permitted by the Agency." 35 Ill. Adm. Code 602.200(c)(5). IEPA proposes that this exception applies to replacement facilities having "the same rated capacity and specification" as existing facilities previously permitted by IEPA. SR at 62; Prop. 602 at 7.

ISAWWA commented that replacing any of the listed items involves changing specifications even if replacing with the same model. PC 7 at 2. ISAWWA argues that IEPA's proposal effectively requires a construction permit for any replacement. *Id*. ISAWWA seeks "clarification on the meaning of the change." *Id*.

IEPA "does not agree with this interpretation." Resp. 7-8 at 1. IEPA does not intend to apply "specification" as ISAWWA describes. *Id*. The Board is not convinced that replacing facilities with the "same rated capacity" necessarily results in a change of specifications that would require a permit. As IEPA stresses, this subsection lists replacements that do not require a permit. The Board believes that IEPA's response clarifies its proposed revision. The Board is not persuaded that IEPA's proposed Section 602.200(c)(5) needs additional clarification. For these reasons, the Board's order includes the language proposed by IEPA.

Section 604.105(a): Design Capacity Requirement

IEPA proposed that "[t]he community water supply must be designed to produce at least 20 percent greater than the maximum average daily demand, as defined in 35 Ill. Adm. Code

601.105." Prop. 604 at 5; *see* SR at 14. IEPA proposed an amended definition of "maximum average daily demand" as the "highest average daily production over seven consecutive days." Prop. 601 at 5. IEPA argued that the 20 percent margin provides time to perform routine repairs and maintenance. SR at 14. It also accounts for seasonal fluctuation in demand, which is generally higher during the summer. *Id.*

The Board asked IEPA to clarify whether the proposed minimum design capacity of "at least 20 percent greater than the maximum average daily demand" is based on the Recommended Standards or other industry standard. Board Questions at 3. IEPA responded that it proposed this minimum capacity "to be consistent with the criteria found in Section 602.107 for placement on the critical review list." IEPA Resp. at 3; *see* 35 Ill. Adm. Code 602.107 (Critical Review). The "Critical Review List" includes "those community water supplies that Agency records indicate exceed 80 percent of the rate of any of the quantity requirements in the Board's or Agency's rules." 35 Ill. Adm. Code 602.107(a).

ISAWWA questioned how this proposed requirement would apply to systems that purchase water. "Does the transmission system from the supplier to the purchaser have to be designed to deliver 20% more flow than the water service contract allows?" PC 7 at 2. IEPA responded that this is what it intends. Resp. 7-8 at 2.

CLCJAWA commented that "[s]atellite communities purchasing water from parent supplies should be exempted from this section." PC 8 at 1. IEPA "does not agree." Resp. 7-8 at 4. Responding to both ISAWWA and CLCJAWA, IEPA argued that all water systems need "to have a greater amount of water available than that used during maximum average daily demand (*e.g.*, should a major leak develop or in the event of a large fire)." *Id.*

IEPA explains that its proposed 20 percent margin of supply manages seasonal demand fluctuations and provides time to perform maintenance and repairs. IEPA also stresses that the margin is a precaution against unforeseeable events such as a major leak or firefighting event. The Board considers each of these to be important factors in determining capacity. The Board believes that they apply to systems that purchase water, as they do to supplying systems. Based on these considerations, the Board declines to propose the exemption proposed by CLCJAWA.

Section 604.135(b)(3): Disinfection of Filters

Under the heading "Disinfection Following Repair," IEPA proposed in subsection (b)(3) that "[f]ilters shall be disinfected." Prop. 604 at 10; *see* 35 Ill. Adm. Code 653.302 (Disinfection Following Repair or Replacement); SR at 16-17.

CLCJAWA commented that "filters containing granulated activated carbon [GAC] cannot be disinfected with sodium hypochlorite because 1) carbon removes chlorine and 2) high levels destroy the chlorine." PC 8 at 1. CLCJAWA argued that Section 602.310(b) [Projects Requiring Disinfection] acknowledges this because it requires disinfecting a filter using GAC before adding the GAC. *Id.*; *see* 35 Ill. Adm. Code 602.310(b). CLCJAWA suggested an exemption from this requirement for filters with GAC "with appropriate flushing and testing to verify bacteriological acceptability." PC 8 at 1.

IEPA recognized "that this is an issue" but argued that "it is addressed in Section 602.310." Resp. 7-8 at 5. After addressing disinfection of the filter, Section 602.310(b) also provides that "[c]are should be taken when handling the GAC . . . to keep the material as clean as possible." 35 Ill. Adm. Code 602.310(b). This care may conceivably include the flushing and testing suggested by CLCJAWA. The Board does not dispute CLCJAWA's comment or discount the care required by these filters. However, the Board agrees that IEPA's proposal addresses this issue, and it is not persuaded to propose the exemption suggested by CLCJAWA.

Section 604.135(c)(3): Emergency Operation – Water Pressure

IEPA proposed in Section 604.135(c)(3) that, "[w]hen the water pressure falls below twenty pounds per square inch on any portion of the distribution system for any amount of time, the owner or official custodian of the community water supply shall issue a boil order to those consumers affected unless the Agency has issued a SEP" and the CWS meets three conditions. Prop. 604 at 11; SR at 17; *see* 35 Ill. Adm. Code 607.103(b).

CLCJAWA commented that the term "any portion of the distribution system" should exclude pump and delivery station yard piping. PC 8 at 1.

IEPA does not believe this exclusion is necessary. IEPA revised its proposed Section 604.1210(e), which addresses pressure in pumps taking suction from ground storage tanks. The revision requires "adequate net positive suction head, but the minimum distribution pressure of 20 psi is not required." Resp. 7-8 at 5. The revision also requires these pumps to be equipped with an automatic shutoff or a low pressure controller as recommended by the manufacturer. Resp. 7-8 at 5; *see* Prop. 604 at 84. Based on IEPA's response and its revised Section 604.1210, which the Board accepts, the Board is not persuaded to propose the exclusion suggested by CLCJAWA.

Section 604.135(c)(3)(C): Emergency Operation – Testing

When water pressure falls below the threshold in Section 604.135(c)(3), subsection (C) provides the third condition allowing a CWS to avoid a boil order. It requires that "[t]ests for residual chlorine and turbidity taken at not more than hourly intervals in the affected area for several hours do not vary significantly from the historical record. If significant decrease in chlorine residual or increase in turbidity occurs, a boil order must be issued." Prop. 604 at 11-12.

CLCJAWA commented that "several hours" should be clarified to specify "four hours." PC 8 at 2. IEPA responded that it "took this language from existing Board regulations and will defer to the Board on this suggested change." Resp. 7-8 at 5; *see* 35 Ill. Adm. Code 607.103(b)(3); Prop. 607 at 2. The Board does not consider CLCJAWA's suggestion of a four-hour duration to be inconsistent with "several hours." The Board also places some weight on IEPA's response that the term "several hours" has been in the Board's rules for emergency operation since at least 1997. The record does not show that this term has impeded

implementation or enforcement of the rules. In light of these factors, the Board declines to propose the revision suggested by CLCJAWA.

The Board asked IEPA what it considers to be a "significant" increase in turbidity or decrease in residual chlorine. Board Questions at 6. IEPA responded that "[a] significant increase in turbidity, or decrease in residual chlorine, are tests results outside the historical record." IEPA Resp. at 8. CLCJAWA commented that "significant" should be clarified by referring to a change that "exceeds the minimum or maximum value in the historic record." PC 8 at 2.

The Board asked whether a CWS is required to establish the range outside of which a change is significant or use an established statistical measure. Tr.1 at 25. Mr. McMillan clarified that IEPA did not intend "to establish a statistical reference. The intent was for the community water supply to establish a normal operating range for both turbidity and disinfectant residual." *Id*. IEPA stressed that its proposed language is based on a Board rule. IEPA Resp. at 8, citing 35 Ill. Adm. Code 607.103(b)(3). IEPA added that it "will defer to the Board on this suggested change." Resp. 7-8 at 5.

CLCJAWA suggests that a change in residual chlorine or turbidity is significant if it is less than the minimum or greater than the maximum recorded value. Through its testimony and responses, IEPA clarified its position that residual chlorine or turbidity vary significantly if tests show that it falls outside the normal operating range in the historical record. The Board believes that a change within the historic record may fall outside a normal operating range and warrant issuing a boil order. Also, IEPA's proposed language has been in the Board's rules for emergency operations since at least 1997. The record does not show that this language has impeded implementation or enforcement of the rules. In light of these factors, the Board declines to re-draft IEPA's proposed subsection (c)(3)(C) as recommended by CLCJAWA.

Section 604.135(d)(1): Emergency Operations Plan

Under the heading "Emergency Operations Plan," IEPA proposes that community water supplies must develop an emergency operations plan addressing alternative supplies of drinking water in the event that the CWS is destroyed, impaired or contaminated. Prop. 604 at 12; SR at 17, citing 42 U.S.C. § 300g-2(a)(5).

CLCJAWA argued that these plans should be confidential and not subject to the Freedom of Information Act (FOIA) (5 ILCS 140) because "they can reveal system weaknesses and vulnerabilities." PC 8 at 2.

IEPA must show that it can "implement an adequate plan for the provision of safe drinking water under emergency circumstances including earthquakes, floods, hurricanes, and other natural disasters." SR at 17, citing 42 U.S.C. § 300g-2(a)(5) (SDWA). "Most, if not all, community water supplies in Illinois have already written emergency operations plans." SR at 17. IEPA "does not require water systems to supply emergency operations plans to the State," an indication that IEPA would not be required to produce a plan in response to a FOIA request. Resp. 7-8 at 6; *see* Prop. 604 at 12 (subsection (d)(2)). The Board does not discount the issues

with safety and security raised by CLCJAWA, but the Board lacks authority to amend statutory language such as FOIA. The Board declines to propose the exemption suggested by CLCJAWA.

Section 604.155(b): Standby Power

IEPA proposed that "[e]ach community water supply must provide on-site, dedicated standby power capable of maintaining continued operation of its water system during power outages to meet the average daily usage determined pursuant to Section 604.115 of this Part." Prop. 604 at 14; *see* Recommended Standards § 2.6; SR at 19.

Capt. Curry stated that, if a CWS must construct a standby power system to comply with this proposed requirement, then the CWS will require time to finance, design, and build it. Curry Test. at 11. He recommended that "[s]ystems that do not have standby power on the date this part is adopted shall install standby power supply within 24 months of the date of adoption of this part." *Id*.

IEPA responded that its proposal "is not a new requirement." Curry Resp. at 4. Through permitting and inspection, it "has been requiring CWSs to install and maintain standby power capable of continued operation of their water supply." *Id*. The Board does not discount the time and the financial resources that may be necessary to supply standby power. However, the required standby power would allow a system to operate during power outages, the occurrence, frequency, and duration of which cannot be predicted. IEPA reports that it has effectively required standby power through its permitting authority. Based on these factors, the Board is not persuaded to delay the implementation of this subsection as Capt. Curry suggests.

Section 604.160(b): Safety Training

IEPA proposed that "[a]ll community water supply personnel involved in the use and maintenance of chemicals shall have periodic safety training." Prop. 604 at 15; SR at 19, citing 35 Ill. Adm. Code 653.601, 653.701.

The Board asked IEPA to comment on where CWS personnel can obtain chemical safety training. Board Questions at 6. IEPA responded that personnel may receive this training through the CWS or third parties. IEPA Resp. at 8.

ISAWWA requested that IEPA clarify the meaning of "periodic safety training." PC 7 at 2; *see* PC 8 at 2. CLCJAWA argued that this proposal does not provide a standard for training. PC 8 at 2. CLCJAWA further argued that this subsection should define training to be "in accordance with applicable IDOL regulation." *Id*.

IEPA responded that this subsection intends to make CWSs aware of this issue. Resp. 7-8 at 2. IEPA emphasized that it "is not attempting to establish a standard." *Id*. at 6. IEPA added that "[s]afety training is regulated by other state and federal regulatory programs." *Id*.

The Board recognizes the importance of the proposed training but also recognizes that chemical safety training falls within the expertise and programs of entities other than IEPA.

Also, IEPA seeks to require "periodic" safety training without prescribing a specific frequency. IEPA indicated that training may be performed "in-house" through the CWS or through a third party, providing flexibility to meet the requirement. Based on these factors, the Board declines to amend subsection (b) as suggested by ISAWWA and CLCJAWA.

Section 604.165(d): Monthly Operating Report

IEPA proposed that, in addition to the report submitted to IEPA, "[a] copy of the operating report records shall be maintained by the official custodian of the community water supply." Prop. 604 at 15; SR at 20; *see* 35 Ill. Adm. Code 653.605(c) (Chlorination Operating Records), 653.704(d) (Fluoride Operating Records).

Capt. Curry questioned how long these records must be maintained. Curry Test. at 11. CLCJAWA argued that this proposed subsection must specify how long the custodian maintains records or provide that they are to be maintained "in perpetuity." PC 8 at 2.

Section 15(c) of the Environmental Protection Act requires that, "[e]xcept as otherwise provided under Board rules, owners and operators of community water systems must maintain all records, reports, and other documents related to the operation of the community water system for a minimum of 10 years." Those documents "must be maintained on the premises of the community water system, or at a convenient location near its premises, and must be made available to the Agency for inspection and copying during normal business hours." 415 ILCS 5/15(c) (2016); *see* Curry Resp. at 5; Resp. 7-8 at 6. Based on the statutory requirement cited by IEPA, the Board is not persuaded to revise this subsection as suggested by CLCJAWA.

Section 604.170(b): Security Fencing

IEPA proposed that "[f]encing, locks on access manholes, or other necessary precautions must be provided to prevent trespassing, vandalism, and sabotage." Prop. 604 at 15; SR at 20, citing Recommended Standards §§ 4.7.5.5.k (Aeration), 5.4.1.d.8 (Specific Chemicals), 6.1.1.d (Pumping Facilities Location), 6.2.7 (Pumping Stations Lighting), 7.0.4 (Finished Water Storage), 7.0.9 (Finished Water Storage Vents), 8.9.1 (Surface Water Crossings); *see also* Recommended Standards at xxv-xxvi (Policy Statement on Infrastructure Security for Public Water Supplies).

Capt. Curry requested that IEPA specify where it will require fencing. Curry Test. at 12. He stated that it is not feasible for fencing to protect either raw water reservoirs or lake or river sources. *Id*. Capt. Curry also recommended that IEPA provide specifications such as height for any required fencing. *Id*.

IEPA responded that its proposal "acknowledges the need for security fencing in certain locations. However, the Agency will defer to the respective water supplies regarding what is reasonable to control trespassing, vandalism, and sabotage." Curry Resp. at 5. IEPA added that it did not have security expertise and that entities including the Department of Homeland Security could "better evaluate fencing options." *Id*.

The Board first notes that IEPA's proposal does not require fencing but lists it as an example of a precaution that may be necessary to provide security. IEPA's response suggests that a CWS must determine how to prevent trespassing, vandalism, and sabotage based on site-specific factors. IEPA's response also indicates that, based on their expertise, other agencies may be able to offer guidance on security. In light of these considerations, the Board is not persuaded to prescribe the location or specifications for security fencing as recommended by Capt. Curry.

Capt. Curry also questioned whether a PWS required to comply with this proposed requirement would have time after the effective date of the rule to construct fencing. Curry Test. at 12. IEPA responded that its inspection reports have made security recommendations "for quite some time," suggesting that a delayed effective date is not necessary for this requirement. Curry Resp. at 5. The Board does not discount the time necessary to construct fencing or other security measures. However, the Board recognizes that security precautions including fencing limit risks faced by water supplies. IEPA reports that it has addressed this issue through its inspection authority, and it did not agree to a delayed effective date. Based on these factors, the Board is not persuaded to delay the implementation of this subsection as Capt. Curry suggested.

Section 604.245(f): Well Construction, Maintenance, and Operation Records

IEPA proposed that "[t]he owner of each well must retain all records pertaining to each well's construction, maintenance, and operation." Prop. 604 at 27; *see* SR at 25; Recommended Standards § 3.2.5.4.

Capt. Curry stated that Illinois State Water Survey (ISWS) and the Illinois State Geological Survey (ISGS) have kept records of wells in the state. Curry Test. at 13. He proposed to add to Section 604.245 the following two subsections requiring a well owner to submit records to those agencies.

(g) The owner of each well shall be responsible for submitting record information for each well to the Illinois State Water Survey and Illinois State Geological Survey, including:

(1) items listed at 604.245(d) [operating permit information].

(2) full description of gravel pack material configuration, if used, including results of gradation tests to identify effective size and uniformity coefficient, thickness, and depth interval, and relationship to screen slot size opening.

(3) well pump, discharge piping, and appurtenances information listed in 604.255.

(h) The owner of each well shall be responsible for submitting driller's log and drill cuttings to the Illinois State Geological Survey. Curry Test. at 12

IEPA responded that the Board adopts public water supplies rules through its authority under the Environmental Protection Act. Curry Resp. at 6. IEPA argued that "[r]eporting requirements to the Illinois EPA are appropriate; however, additional requirements to other Illinois Agencies and Departments are not appropriate as they would not be enforceable." *Id*. IEPA added that reporting under the Act does not diminish the importance of reporting to the surveys under other statutory authorities. *Id*.

The Board agrees with IEPA's proposal to require owners to maintain well records.The Board also agrees with IEPA on the importance of the ISWS and ISGS, but it is not persuaded that a requirement to submit these records to those services would add protection for public water supplies. The Board takes no position on reporting requirements that have been or may be adopted for the ISWS or ISGS. The Board declines to add Capt. Curry's proposed two subsections to its proposal, and they are not reflected in the Board's order.

Section 604.515(h): Sludge Removal Equipment

IEPA proposed that "[m]echanical sludge removal equipment must be provided in the sedimentation basin." Prop. 604 at 42; *see* SR at 32; Recommended Standards § 4.2.4.l.

Capt. Curry referred to plants where sedimentation basins do not have mechanical sludge collectors. Curry Test. at 13. He reported that these plants with "plain" sedimentation basins operate efficiently and produce satisfactory treated water. *Id*. He argued that requiring them to install this equipment would be inefficient and would not improve treated water quality. *Id*. He suggested revising this subsection to provide either that the equipment "may be used" or that it "shall be used in sedimentation basins constructed after the date of adoption of this part." *Id*.

IEPA responded that a CWS operating before the effective date of Part 604 "will not be required to modify or replace components" if it meets the conditions of proposed Section 604.145(a). Curry Resp. at 6. IEPA "does not believe that a change to the proposal is necessary." *Id*. The Board agrees that proposed Section 604.145(a) may provide an exception from modifying or replacing components to satisfy this requirement. The Board declines to make the suggested revision, and it is not reflected in the Board's order.

Section 604.725(a): Residual Chlorine

Existing IEPA Rule

IEPA's rule requires that "[a] minimum free chlorine residual of 0.2 mg/l or a minimum combined residual of 0.5 mg/l shall be maintained in all active parts of the distribution system at all times." 35 Ill. Adm. Code 653.604(a).

IEPA Proposal

IEPA proposes to revise these limits by requiring that "[a] minimum free chlorine residual of 0.5 mg/l or a minimum combined residual of 1.0 mg/l shall be maintained in all active parts of the distribution system at all times." Prop. 604 at 59.

Numerous participants submitted questions and comments on this issue, and IEPA supported its proposal with testimony, comments, and responses. In the following subsections, the Board reviews these arguments before determining to submit IEPA's proposal to first-notice publication.

Best Practices

Based on data collected under the revised total coliform rule, IEPA argues that its proposal is consistent with "best practices already in place at most Illinois water supplies." McMillan Test. at 5; *see* IEPA Resp. at 39; CWLP Questions at 3 (Question 11(a)). IEPA identified practices used to meet the current standard: "properly balancing chemical addition, the looping of water mains, mixers in storage tanks, automatic hydrant flushing, and other means to keep water fresh" in distribution systems. IEPA Resp. at 39; Tr.1 at 52; *see* CWLP Questions at 3 (Question 11b).

IEPA reviewed disinfection data for June 2017, a month in which it "expected warm weather would put a higher demand on the distribution system." IEPA Resp. at 36; Tr.1 at 54; *see* CWLP Questions at 2 (Question 4). "Approximately 80% of samples reported by CWSs with combined chlorine residuals would meet the 1 ppm standard (approximately 10% reported would not meet the existing 0.5 ppm standard). Additionally, approximately 90% of the samples reported by CWSs with a free chlorine residual would meet the 0.5 ppm standard." IEPA Resp. at 36.; *see* Tr.1 at 53; IEPA Post-Hrg. Cmts. at 6-7.

IEPA translated this data based on samples to facilities and their size. *See* Tr.1 at 58-59. IEPA reported that 803 water systems maintained a free chlorine residual. IEPA Hrg. Resp. at 2. Of those, 253 reported less than 0.5 mg/L free residual in at least one sample collected for compliance with the revised total coliform rule. *Id*. Of systems reporting less than 0.5 mg/L free residual in at least one sample, IEPA reported that "51 had a population less than 500; 77 had a population between 501 and 3,500; 42 had a population between 3,501 and 10,000; 71 had a population between 10,001 and 50,000; and 12 had a population greater than 50,001. *Id*.

IEPA reported that 972 water systems used a combined residual. IEPA Hrg. Resp. at 2. Of those, 346 reported less than 1.0 mg/L combined residual in at least one sample collected for compliance with the revised total coliform rule. *Id*. Of systems reporting less than 1.0 mg/L combined residual in at least one sample, IEPA reported that "119 had a population less than 500; 129 had a population between 501 and 3,500; 58 had a population between 3,501 and 10,000; 33 had a population between 10,001 and 50,000; and 7 had a population greater than 50,001. *Id*.

IEPA's residual concentrations are of course a proposal, yet the record shows that large majorities of samples and facilities meet the proposed requirements. The Board considers this persuasive evidence that the proposed residual concentrations are consistent with practices in place at CWSs and that the proposal establishes an attainable standard.

Other States' Requirements

Federal law does not require a numeric minimum chlorine residual. Tr.1 at 36-37; *see* CWLP Post-Hrg. Cmts. at 4. When developing its proposal, IEPA considered requirements in 22 states. IEPA Resp. at 38 (citation omitted); *see* CWLP Questions at 2 (Question 9); Tr.1 at 36. IEPA listed the minimum distribution system residual required in the 22 states. IEPA Resp. at 38; *see* Exh. 1 (Free Chlorine Residual Requirements); Exh. 2 (Total Chlorine Residual Requirements). Five states have a free chlorine residual requirement equivalent to or greater than the Agency's proposal: Iowa, Kansas, North Carolina, Ohio, and Oklahoma. Tr.1 at 36; *see* Exh. 2. Louisiana is the only other state that would require a free chlorine residual of 0.5 mg/L. Exh. 1; *see* CWLP Post-Hrg. Cmt. at 4. The record shows that IEPA's proposed requirements would be more stringent than those in some states but equivalent to those adopted in others.

This comparison by itself does not cause the Board to discount IEPA's proposal. Equivalent or more stringent requirements in these six other states indicate that the proposed requirements can be attained through existing practices.

Compliance

Taste and Odor. CWLP testified that increasing its chlorine residual will "exponentially increase chlorine taste and odor issues." CWLP Test. at 4. ISAWWA raised the same issue. PC 7 at 2; *see* PC 24 at 2. CLCJAWA, the Free Chlorine Comments, and the Combined Residual Comments argued that the chlorine dosage required by IEPA's proposal will lead to more consumer complaints. PC 8 at 2; PC 9 at 2; PC 11 at 2. IEPA "does not agree." Resp. 7-8 at 8. IEPA does not expect its proposal generally to require adding hemicals. IEPA expects enhanced water quality management to improve the aesthetic properties of treated drinking water. IEPA Resp. at 37.

The Board does not discount the possibility of consumer complaints, and it understands that these complaints can undermine confidence in a CWS. However, the factors discussed above provide perspective on these comments and testimony. The record shows that large majorities of samples and facilities already meet the proposed requirements. In those cases, compliance would not generally require increasing the residual or be expected to result in taste and odor issues. Where a CWS is not already complying, the proposal does not automatically require increasing chemical addition. IEPA identifies strategies that can help achieve the proposed standards and avoid aesthetic issues. The Board recognizes that consumer complaints can be a persistent challenge for a CWS. However, this record does not dissuade the Board from proceeding with IEPA's proposal.

Disinfection By-Products. Testimony and comments addressed the issue of disinfection by-products. CDWM urged that the Board fully consider whether increasing the minimum chlorine residual may increase disinfection by-products. PC 27 at 2. ISAWWA suggests that IEPA's proposal could cause higher concentrations of disinfection by-products. PC 7 at 2; *see* PC 24 at 2. CWLP testified that increasing the chlorine residual at its plant "will increase disinfection by-products concentrations throughout the distribution system." CWLP Test. at 4; Tr.2 at 16-17. The Free Chlorine Comments and Combined Residual Comments stated that they

will have to increase their chlorine dose and that "[t]he higher dosage rates will undoubtedly increase the levels of disinfection by-products." PC 9 at 2 PC 11 at 2; *see* PC 8 at 2.

IEPA did not agree that its proposal would result in higher concentrations of disinfection by-products. Resp. 7-8 at 8. IEPA argues that, if a CWS properly manages its distribution systems, there should be no increase in concentrations of disinfection by-products. IEPA Resp. at 37; *see* Tr.1 at 44. The Board recognizes Mr. McMillan's testimony that *overfeeding* chemicals is a factor that may lead to disinfection by-product violations. Tr.1 at 59 (emphasis added). In addition, as IEPA stresses, maximum contaminant levels for disinfection byproducts must continue to be met. IEPA Reply at 36. IEPA proposes no change to those levels. As the Board has stressed above, large majorities of samples and facilities already meet the proposed chlorine residual requirements. The record does not connect the level of these chlorine residuals to increased violation of the disinfection by-products standards. While the Board recognizes concern with disinfection by-products and their applicable standard, this record does not dissuade the Board from proceeding with IEPA's proposal.

Detection Limit. In support of its proposed change in the required minimum free chlorine residual, IEPA stated that test equipment used by water supplies and IEPA staff does not reliably report concentrations of 0.2 mg/L. IEPA Resp. at 35; Tr.1 at 32-33; *see* CWLP Questions at 1 (Question 1a); Tr.2 at 16; *see also* PC 9 at 1. IEPA emphasized that the current requirement of 0.2 mg/l "is the detection limit of many of the testing devices." SR at 38; *see* McMillan Test. at 5; Tr.1 at 38. IEPA argued that its proposed increase provides more certainty that a chlorine residual exists in a distribution system. SR at 38.

CLCJAWA commented that accurately measuring chlorine levels "may be addressed by restricting the use of color wheels or comparators." PC 8 at 3. It argues that "[i]nexpensive monitoring equipment can easily, objectively, and accurately measure chlorine residuals at this level." *Id*. IEPA responded without elaborating that it "does not agree." Resp. 7-8 at 8.

The Free Chlorine Comments later stated that "there are reasonably priced test methods (less than $500) that can reliably report the chlorine residual at 0.2 mg/L." PC 9 at 2. These comments suggest that the rules might establish a minimum test method. If the rules allow a less precise test method, "then perhaps those systems should be subject to the higher minimum chlorine residual." *Id*.

In its order below, the Board submits IEPA's proposed minimum free chlorine residual to first-notice publication. While IEPA did not explain its disagreement with CLCJAWA's comment, that comment did not identify or describe any other monitoring equipment, and the Board is not persuaded that the comment supports using it.

However, the Free Chlorine Comments later offered a different approach under which systems using less precise methods must meet a more stringent standard. The comment did not identify alternative test methods, offer precision standards, or propose chlorine residuals that might apply to various equipment. In the absence of this information and arguments supporting it, the Board declines to submit it to first-notice publication. However, the record does not include IEPA's position on this comment. Addressing comments below at pages 217-18, the

Board seeks IEPA's comment on this proposal, and the Board welcomes comment on it from any of the other participants.

pH. CDWM commented that increased addition of chlorine gas to meet the proposed minimum chlorine residual of 0.5 mg/l would decrease pH. PC 27 at 2. CDWM argued that decreased pH "can increase corrosion of metals including lead" and potentially increase consumer exposure. *Id.*

The Board notes IEPA's general position that complying with its proposal will not automatically require increased chemical addition. IEPA Resp. at 37. However, the record does not include IEPA's position on CDWM's comment on possible consequences of chemical addition. Addressing comments below at pages 217-18, the Board seeks IEPA's response to this comment, and the Board welcomes comment on it from any of the other participants.

Public Health

IEPA believes that increasing the required disinfection residuals provides more effective control of bacteria in a distribution system and better protection of public health. McMillan Test. at 5; *see* SR at 37-38. IEPA stressed that maintaining a residual has three chief benefits: limiting biological growth in the distribution system, reducing risk if pathogens penetrate the system, and indicating an intrusion or other localized event. IEPA Resp. at 38.

As authority for its proposed increase in the free chlorine residual, IEPA cited USEPA's Office of Research and Development (ORD) and Office of Water (OW). IEPA Resp. at 37 (providing link to webinar); IEPA Post-Hrg. Cmts. at 8; *see* CWLP Questions at 2 (Question 6); PC 8 at 2.

Exhibit 3, USEPA's Total Coliform Positives in Surface Water (2006-2011), shows "significant improvements" in the percentage of positive samples at concentrations of 0.2 to 0.5 mg/L compared to concentrations below 0.2 mg/L. Tr.1 at 39-40. CWLP agrees that "there was some additional reduction in positive samples for levels between 0.2 mg/L and 0.5 mg/L. . . ." CWLP Post-Hrg. Cmts. at 5, citing Exh. 3. CWLP argued that there was a very small percentage increase of total coliform positive samples when free chlorine residual levels changed from 0.5 – 1.0 mg/L to > 1.0 mg/L, although Mr. Meckes' testimony acknowledged that the difference was less than 0.01%. CWLP Test. at 3. Based on Exhibit 3, the Board agrees that increasing the free chlorine residual from the current to the proposed limit decreases percentage of total coliform positive samples. Also, the Board notes Mr. McMillan's testimony that the number of surface water systems relying on free chlorine residuals has dropped since USEPA obtained this date from 2006 to 2011. Tr.1 at 42-43.

As authority for its proposed increase in the combined chlorine residual, IEPA cited AWWA's M-56 Fundamentals and Control of Nitrification in Chloraminated Drinking Water Distribution Systems (M-56). IEPA Resp. at 37; *see* IEPA Hrg. Resp. at 1; Tr.1 at 48-49. AWWA cites a study concluding that nitrification is less likely to occur with total chlorine residual greater than 1.5 mg/L. IEPA Resp. at 37; *see* M-56 at 166.

Mr. McMillan testified that, in Exhibit 3, levels above 0.5 mg/L show additional improvement in the percentage of positive samples. Tr.1 at 40. While CWLP disputes his characterization, he added that it is a "valid observation" that levels greater than 1.0 mg/L achieve an improvement over levels from 0.5 to 1.0 mg/L. *Id*. at 41. Based on Exhibit 3, the Board agrees that, as total chlorine residual increases, the percentage of total coliform positive samples decreases. Mr. Millan stressed that Exhibit 3 reports a percentage of samples and not the number of samples collected or the number of systems. *Id*. at 42.

IDPH supports IEPA's proposed revision of the residual disinfection requirements "to improve and maintain water quality in plumbing systems" (IDPH Test. at 3), and the Board weighs IPDH's position in favor of IEPA's proposal *Id*. IPDH states that "[i]mproving the disinfectant residual across the potable water systems is anticipated to have an effect on associated cases of illness." *Id*.

Mr. Dewitt testified that its investigations of outbreaks increasingly "involve potable or domestic water systems as a contributing or causative factor in the origination and spread of disease." IDPH Test. at 2. Potable or domestic water systems include piping and fixtures addressed in the Illinois Plumbing Code and can include recirculating pipes and pipes terminating at taps and fixtures. Tr.2. at 25-26; *see* Board Questions 2 at 2.

Mr. Dewitt testified that, for investigations of waterborne disease, "a primary water quality indicator is the amount of residual chlorine found in the potable water system." Tr.2 at 28-29; *see* Board Questions 2 at 2. IDPH relies on data and scientific analysis to makes its determinations. Tr.2 at 27. He added that IDPH collects "samples at the point closest to the water service entrance and, if possible, from other proximal water services on the same distribution main." *Id*. Mr. Dewitt added that systems found to have "no residual chlorine at all are almost universally implicated in related outbreaks." Tr.2 at 29; *see* Board Questions 2 at 2; IEPA Post-Hrg. Cmts. at 7.

IPDH testified that there are approximately 300 annual cases of *Legionellosis* in Illinois. IPDH Test. at 3. IPDH cites an outbreak of Legionnaires disease at the Illinois Veterans Home in Quincy. Although the Home was served by a water supply that met current requirements for disinfection residual, more than 50 cases and 12 deaths were associated with the outbreak. *Id*. at 2; *see* IEPA Post-Hrg. Cmts. at 7. IDPH states that, because of the age and condition of the plumbing at the Home, "the minimal residual disinfectant found in the public water supply was found to be drastically ineffective." IDPH Test. at 2-3; Tr.2 at 29-30. IDPH reports that the Home now re-treats the water it receives from the public water supply. IDPH Test at 2. "With total free residual chlorine at or above 1 ppm throughout the domestic water system, the veteran's home has seen remarkable improvement in biological monitoring results across the campus." *Id*. at 3.

Distinction Between Distribution and Plumbing.

ILAW commented that *Legionella* outbreaks typically develop within building's on-premises water systems "outside the control of the water utility." PC 24 at 1. ILAW comments

that the design, operation, and maintenance of on-premises plumbing is more important than the level of disinfectant in distribution systems to protect the public from these outbreaks. *Id*.

ISAWWA raised a similar issue. It commented that residuals concentrations generally do not pose problems "except in large buildings or locations where privately owned water mains were oversized." PC 7 at 2 (Question 11a). ISAWWA questioned how a CWS could maintain chlorine residuals at these kinds of locations. *Id*.

CWLP testified that it attempts to maintain a total chlorine residual of 2.2 – 2.5 mg/L in the water leaving its plants. CWLP Test. at 2. CWLP suggests that lower readings result from inadequate flow within larger buildings at the farthest reaches of its distribution system. *Id*. CWLP states that water providers like itself do not control "the condition of the interior plumbing or the length and size of private plumbing within a complex that contribute to water age." *Id*. at 2. CWLP argues that IEPA should not address facilities lacking adequate flow within their private plumbing systems by increasing chlorine residuals system-wide. *Id*. at 4.

IEPA stressed that these comments hinge on a distinction between distribution systems and plumbing. IEPA argued that this distinction is based on the definition of "water main" (35 Ill. Adm. Code 601.105). Resp. 7-8 at 3. IEPA states that "[p]lumbing is not regulated under this Board regulation." *Id*.; *see* 77 Ill. Adm. Code 890 (Illinois Plumbing Code).

The Board asked CWLP to comment on "whether a CWS is responsible to maintain the proposed residual chlorine level at the point of use in a larger building or only within the distribution system." Board Questions 2 at 3. Mr. Meckes acknowledged that "we cannot be responsible for the condition of the plumbing in interior buildings and structures." Tr.2 at 19. However, he stated that "as water providers we understand that our main purpose and responsibility is to provide safe drinking water to our customers." *Id*. The Board recognizes and commends CWLP for its commitment to this responsibility. However, the Board also recognizes IDPH's view that increasing chlorine residual levels in public water supplies is expected to improve and maintain water quality in plumbing systems. IDPH Test. at 3.

CWLP disputes IDPH's position that IEPA's proposed revision is anticipated to affect associated illnesses. CWLP argues that systems like the Veterans' Home "need to develop Water Quality Management Programs to ensure adequate turn-over of water to reduce water age and maintain adequate chlorine residuals." *Id*. Addressing "Best Practices" above, the Board noted IEPA's emphasis on strategies such as flushing to control water age and attempt to meet the proposed chlorine residual requirement without increasing chemical addition. The Board agrees that these management techniques may help maintain chlorine residuals in plumbing. However, the Board does not consider them an effective replacement for IEPA's proposed chlorine residual levels.

Technical Basis

As the technical basis for its proposed minimum free chlorine residual, IEPA cited information supplied to the states by ORD and OW indicating that "concentrations above 0.5 mg/L significantly reduce the number of samples that are positive for total coliform bacteria."

IEPA Resp. at 35 (providing link to webinar); Tr.1 at 33; IEPA Post-Hrg. Cmts. at 8. IEPA also cited AWWA Manual M56, which recommends that a CWS "maintain a goal of 2 to 3 mg/L combined chlorine in finished water." IEPA Post-Hrg. Cmts. at 7-8, citing Fundamentals and Control of Nitrification in Chloraminated Drinking Water Distribution Systems, AWWA Manual M56, 1st ed. (2006) at 59. IEPA also cites a publication of the Centers for Disease Control and Prevention, which states that most drinking water-associated outbreaks and illness reported in 2013-2014 "were in community systems, which serve larger numbers of persons; outbreaks in these systems can sicken entire communities." IEPA Post-Hrg. Cmts. at 8, citing "Surveillance for Waterborne Disease Outbreaks Associated with Drinking Water – United States, 2013-2014 (Nov. 10, 2017).

IEPA also addressed the technical basis for its proposed total chlorine residual. IEPA stated that the "combined residual relies upon the formation of chloramines which are a combination of free chlorine and free ammonia. This combination results in the formation of three inorganic species: monochloramine, dichloramine and trichloramine." IEPA Resp. at 35. Although monochloramine is regarded as the most effective disinfectant species, USEPA has not approved a readily available monochloramine testing device. *Id*. As a result, it is necessary to test the combined chlorine residual. *Id*. However, natural organic matter can affect testing for residuals. *Id*. The organic matter can cause formation of organic chloramines, which are poor disinfectants; interfere with testing for inorganic chloramines; and persist and cause other water quality issues throughout the distribution system. *Id*.

IEPA added that, when concentrations of combined chloramines are low, nitrification can become an issue. IEPA Resp. at 35. AWWA reports that this issue is "less likely to occur at concentrations greater than 1.5 mg/L." *Id.*; *see* Tr.1 at 46-47. Mr. McMillan testified that IEPA's total coliform data show that "most water systems that are using a combined residual greater than 1 in all areas of their distribution system and that that level appears at the time to be controlling nitrification." Tr.1 at 47.

ISAWWA asked what problems IEPA had observed in "systems that feed chloramines that would require raising the total to 1.0." PC 7 at 2 (Question 11c). IEPA responds that "AWWA [Manual] M56 indicates adequate control of nitrification in water supply distribution systems may require total residuals of 1.5 mg/L or greater." Resp. 7-8 at 3, citing Fundamentals and Control of Nitrification in Chloraminated Drinking Water Distribution Systems, AWWA Manual M56 at 165-66 (1st ed., 2006).

ISAWWA stated that CWSs "that do not have nitrification issues and have lower total chlorine residuals in the far reaches of their systems see no benefits" from increasing the required concentrations. PC 7 at 2 (Question 11b). IEPA responded that "a well operated utility would not have significantly reduced chlorine residuals in the extremities of its system because water age would be managed." Resp. 7-8 at 3. To meet its proposed standards, IEPA recommends "better distribution system management" and does not generally recommend increased chemical addition. *Id*.; *see* IEPA Post-Hrg. Cmts. at 7.

For a combined chlorine community water supply like itself, CWLP asked IEPA what public health improvements would result from its proposed requirements. CWLP Questions at 2

(Question 2). Citing ORD and AWWA, IEPA responded that systems not meeting its proposed requirement "may be vulnerable to nitrification, may develop difficulties maintaining sufficient disinfection, and may be subject to biological growth in the distribution system including waterborne disease if pathogens penetrate the distribution system." IEPA Resp. at 36. IEPA acknowledged that it would be difficult to assess improvement for CWSs that already meet the proposed requirement. *Id*.

Economic Reasonableness

CWLP testified that maintaining a higher chlorine residual would increase its costs, and it stressed that a number of communities submitted comments opposing IEPA's proposed changes. CWLP Test. at 4; Tr.2 at 17; *see* PC 24 at 2; CWLP Post-Hrg. Cmts. at 9-10; PC 8-15, 17-17. 20, 22. CWLP asked what costs IEPA assumed for increased use of chemical needed to meet its proposed requirement. CWLP Questions at 2 (Question 5a); *see* PC 2 at 8.

IEPA expects that its proposal will not require most CWSs to increase chemical addition. "With proper planning and operational measures residuals leaving the treatment works should be maintained in all areas of the distribution system." IEPA Resp. at 37. CWSs can use tank mixers, loop water mains, and flush when necessary. *Id.*; Tr.1 at 52; *see* IEPA Post-Hrg. Cmts. at 7. IEPA believes that most CWSs can comply with proper distribution system management, including configuration, enhanced treatment control, reservoir mixing, and reservoir inlet/outlet configuration. IEPA Resp. at 36; *see* IEPA Post-Hrg. Cmts. at 7. Mr. McMillan testified that these measures result in "a manageable cost." Tr.1 at 57.

IEPA acknowledged that its proposal could result in "a minimal increase in chemical usage." IEPA Resp. at 37; *see* Tr.1 at 55. Mr. McMillan suggested that IEPA would work with a CWS to achieve compliance without increasing chemical addition. His testimony listed issues that may prevent compliance, and he suggested that solving these issues could achieve compliance without increasing chemical addition. "Is it nitrification in the distribution system? Is it their chemical addition is not adequately controlled? It may be that – it may be such a thing as their ammonia is not being fed in the proper proportion." Tr.1 at 57-58; *see* IEPA Post-Hrg. Cmts. at 7. IEPA acknowledged that enhanced treatment such as improved organic removal, biological active filtration, and improved chemical addition controls may result in additional cost. IEPA Resp. at 37.

The record persuades the Board that complying with IEPA's proposed requirements does not automatically require increased chemical addition. IEPA identified strategies that it expects to limit water age in the distribution system, improve treatment, and achieve compliance without increasing chemical addition. IEPA indicates that these involve manageable costs. The record does not contradict this position. Balanced against the public health benefits expected to result, the Board concludes that IEPA's proposed minimum chlorine residual is economically reasonable.

Enforcement

CWLP asked IEPA "how compliance with these new minimums will be determined." CWLP Questions at 2 (Question 1c). CDWM questioned whether it must monitor Total Coliform Rule sites or whether it must demonstrate compliance "for any home sampled at any point?" PC 27 at 2. Citing the language of its proposal, IEPA responded that the proposed minimum concentrations must "be maintained in all active parts of the distribution system at all times." IEPA Resp. at 36; *see* Prop. 604 at 59. Although not responding directly to CDWM, IEPA stated that "[c]ompliance can be determined by samples that are from, or representative of, the distribution system." IEPA Resp. at 36.

CWLP argued that it could try to ensure technical compliance with IEPA's proposal by moving sampling areas to water distribution mains to "avoid problem areas." CWLP Post-Hrg. Cmts. at 12. CWLP estimates that re-locating its 48 sample sites and 41 alternate sites would cost approximately $250,000. *Id*. CWLP adds that it "would not know the quality of the water that people are drinking. . . ." *Id*., citing Tr.2 at 20. This comment does not appear to be consistent with CWLP's testimony that "our main purpose and responsibility is to provide safe drinking water to our customers." Tr.2 at 19. Also, IEPA's proposal does not require or even suggest that a CWS comply by adding or moving sampling locations. The Board does not weigh the possibility of moving sampling location against IEPA's proposal.

CDWM asked whether IEPA will consider a system to be non-compliant if it has more than five percent of sites showing chlorine residual below 0.5 mg/l or if it has a single site below that limit. PC 27 at 2. IEPA's current rule and its proposal require maintaining chlorine residuals "at all times." 35 Ill. Adm. Code 653.604(a); Prop. 604 at 59. While the Board believes that this addresses CDWM's question, IEPA has not responded to CDWM's comment. Addressing comments below at pages 217-18, the Board seeks IEPA's response, and the Board also welcomes comment from any of the other participants.

CWLP asked IEPA how it would enforce its proposed requirements for community water supplies that purchase water. CWLP Questions at 2 (Question 1d). For systems that purchase water, CWLP testified that chlorine/ammonia feed systems "would be very difficult to operate and very expensive to install and maintain." CWLP Test. at 4; CWLP Post-Hrg. Cmts. at 11-12. CWLP suggests that the supplying system cannot maintain the higher chlorine residual without controlling the purchaser's distribution system. CWLP Test. at 4.

IEPA responded that "[t]here is no differentiation between types of water systems in this regulation." IEPA Resp. at 36. IEPA added that CWSs must "monitor chlorine residual to determine the amount and type of residuals existing at different points in the distribution system." *Id*. IEPA's response suggests that supplying systems need not control purchasing systems, as each CWS must monitor and maintain its own residual. The Board does not discount the potential costs of complying with IEPA's proposal. However, in light of the public health benefits considered above, the Board is not persuaded to distinguish supplying and purchasing systems from one another for purposes of these proposed requirements.

Suggested Revisions of Section 604.725

HPCs. CDWM commented that it does not oppose revising requirements for chlorine residual. PC 27 at 1. CDWM states that it "goes above and beyond minimum regulations to ensure Heterotrophic Plate Counts (HPCs)[1] are done alongside chlorine measurements." *Id*. at 2. CDWM argues that HPCs could be employed with or in place of chlorine levels to indicate disinfection. *Id*. CDWM requests that the Board amend IEPA's proposal to allow "an HPC measurement to be used as evidence of proper disinfection in cases where the chlorine residual is less than 0.5 ppm." This would base compliance "on either a chlorine residual level of 0.5 ppm or an acceptable HPC count." *Id*.

CDWM's comment offered an alternative measure of disinfection when minimum chlorine residual does not meet IEPA's proposed limit. IEPA has not provided its position on CDWM's comment, and no other participant has responded to its suggested language. In its order below, the Board submits IEPA's proposed minimum chlorine residuals to first-notice publication. Addressing comments below at pages 217-18, the Board seeks IEPA's comment on this proposal. The Board also welcomes comment on it from any of the other participants, including any elaboration CDWM may wish to offer.

Delayed Effective Date. Capt. Curry acknowledges that IEPA "has observed water quality problems that adversely affected public health, as a result of inadequate disinfectant residual." He also notes IEPA's belief "that increasing the minimum residual values will improve protection of public health." Curry Test. at 20. He suggests revising Section 604.725 by making it take effect 90 days after adoption. *Id*. He argues that it will take time to inform operators of this revision and for PWSs to modify their operation. *Id*. IEPA's response recognizes the time needed to implement operational changes and states that it "will use discretion in enforcing this provision." Curry Resp. at 9. However, IEPA believes that CWSs will have a sufficient amount of time to become aware of this proposal. *Id*.

The Board recognizes that proposed Section 604.725(a) may require CWSs to modify operations, and the Board agrees with Capt. Curry that it may take time to inform CWSs of the proposal. However, IEPA filed its proposal with the Board on August 3, 2017, and the Board has held two public hearings and received a number of comments from CWSs. Before the Board could adopt rules, it must publish its proposal in the *Illinois Register*, receive comments for at least 45 days, and then submit a proposal to JCAR. Based on these factors, the Board believes that rulemaking processes have informed and will continue to inform CWSs of proposed Section 604.725(a). The Board declines to establish a delayed effective date for this single section.

Withdraw and Study. In its second comment, CLCJAWA stated that IEPA's proposed Section 604.725 caused "exceptional concern" among its members. PC 12 at 1. CLCJAWA argues that the issue requires additional time for analysis and discussion. *Id*. CLCJAWA proposes that IEPA withdraw this proposed section and then initiate a one-year process collect more data, conduct research and discuss findings and conclusions before resuming the

[1] HPC refers to "[a] bacterial enumeration procedure used to estimate bacterial density in an environmental sample, generally water." The Water Dictionary (2nd ed. 2010) at 282, AWWA, incorporated by reference in 35 Ill. Adm. Code 601.115(b); *see* 35 Ill. Adm. Code 601.105(c).

rulemaking process. *Id*. ILAW comments that IEPA's proposal "requires further investigation and informational data review before it should be implemented." PC 24 at 2.

In the preceding subsection, the Board noted that entities including CWSs have generally questioned and commented on IEPA's proposal. Although CLCJAWA proposed that IEPA withdraw this section from its proposal, IEPA has not done so. In this section considering proposed Section 604.725(a), the Board reviewed the record on various issues. The Board is not persuaded to strike Section 604.725 from its proposal.

Summary

The Board has reviewed the record on IEPA's proposed Section 604.725(a), including the issues of best practices, public health, compliance, and enforcement. For the reasons above, the Board concludes to submit IEPA's proposal to first-notice publication. On four matters, the Board specifically requests additional comment from the participants.

Section 604.1010(b)(2)(A): Iron and Manganese Control

Under the heading "Removal of iron and manganese by oxidation, detention and filtration," IEPA addressed detention in subsection (b)(2)(A): "[a] minimum detention time of 30 minutes must be provided following aeration to insure that the oxidation reactions are complete prior to filtration. This minimum detention time may be modified only where a pilot plant study indicates completion of oxidation reactions in less time." Prop. 604 at 68; *see* Curry Resp. at 11-12 (modifying original proposal).

Capt. Curry testified that, when raw water iron concentrations approach 8-10 mg/L, "the solids loading to the filters causes very short filter runs and a considerable amount of water (and plant capacity) is taken up by the increasing frequency of filter backwash." Curry Test. at 31, citing Iron and Manganese Removal Handbook, 2nd ed., AWWA (2015). He suggested adding a provision that, "[w]hen raw water iron and manganese concentration is expected to exceed 10 mg/L, consideration should be given to use of a clarification unit or settling basin prior to filtration in order to reduce the solids loading to the filters and minimize potential for excessive water usage for backwashing the filters." *Id*.

IEPA does not agree at this time to add this proposed language. Curry Resp. at 12. IEPA stated that it will consider this factor when permitting treatment facilities. *Id*. IEPA has committed to provide the consideration proposed by Capt. Curry, and the Board is not persuaded to add the proposed language to its order.

Section 604.1225(c): Gauges and Meters

IEPA proposed in subsection (c)(1) that "[e]ach pump must have the following gauges and meters: a standard pressure gauge on its discharge line, a compound gauge on its suction line; and a meter for measuring the flow rate." Prop. 604 at 86 (subsections (A) – (C)); *see* Recommended Standards § 6.6.3; SR at 49.

Subsection (c)(2) proposes that "[t]he station must have the following: a flow rate indicator; and a method of recording the total water pumped." Prop. 604 at 86 (subsections (A) and (B)); *see* Recommended Standards § 6.6.3; SR at 49.

Capt. Curry stated that the required flow rate indicator for the station in subsection (c)(2)(A) is redundant with subsection (c)(1)(C). He added that complying with subsection (c)(2)(A) would be costly and suggested striking subsection (c)(1)(C). Curry Test. at 36.

IEPA responded that "Section 604.145(a) will not require modification to existing water systems provided the provisions of this Section are met." IEPA did not accept Capt. Curry's recommendation. Curry Resp. at 16.

The Board is not persuaded that it is genuinely redundant to require a flow rate meter for each pump and a totalizing meter for the station. Noting the exception cited by IEPA, the Board is also not persuaded that it would necessarily be costly to comply with the separate requirements of subsection (c). The Board's order retains subsections (c)(1)(C) and (c)(2)(A) as proposed by IEPA.

Section 604.1225(e)(3): Electrical Controls

Under the heading "Controls" for pumping facilities, IEPA proposes in subsection (e)(3) that "[e]lectrical controls must be located above grade." Prop. 604 at 87; *see* Recommended Standards § 6.6.5; SR at 49.

Capt. Curry testified that underground pump stations have operated in Illinois for many years. Curry Test. at 37. He first proposed to delete subsection (e)(3). *Id*. If the Board adopted this requirement, he favored delaying the effective date for 24 months. He indicated that systems would require time to modify existing underground pump stations. *Id*.

IEPA responded that "[a] CWS operating before the effective date of this Part will not be required to modify or replace components to meet the requirements of this Part under the conditions outline in proposed Section 604.145(a)." Curry Resp. at 16. IEPA does not believe it is necessary to extend the compliance deadline for this proposed requirement. *Id*.

Based on the exception cited by IEPA, the Board is not persuaded that subsection (e)(3) would necessarily require pumping station modifications. The Board is not persuaded to delay the effective date of this provision and retains subsection (e)(3) as proposed by IEPA.

Section 604.1415(c): Dead Ends

Under the heading "Dead ends," subsection (c)(1) proposes that "[d]ead ends must be minimized." Prop. 604 at 99; *see* Recommended Standards § 8.2.4.a; SR at 55. IEPA stated that "[d]ead ends tend to have poorer water quality." SR at 55. Subsection (c)(2) proposes that "[d]ead end mains must be equipped with a means to provide flushing as provided in Section 604.1425(b)(1)." Prop. 604 at 99; *see* Recommended Standards § 8.2.4.b; SR at 55.

CLCJAWA requested that IEPA define the term "dead end" in terms of distance from flowing main. PC 8 at 3. IEPA cited *The Water Dictionary*, incorporated by reference at 35 Ill. Adm. Code 601.115(b); *see* 35 Ill. Adm. Code 601.105(c). It defines the term as

> [a] section of a water distribution system that is not connected to another section of pipe by means of a connecting loop. Such portions of a distribution system can experience lower flows than surrounding portions, which can lead to water quality problems caused by somewhat stagnant water. Examples of problems include tastes or odors, bacteriological growth, loss of chlorine residual, or any combination of these. The Water Dictionary at 145 (2nd ed. 2010).

IEPA argues that "[t]his requirement is not new to the regulations." Resp. 7-8 at 9. IEPA does not believe that it is necessary to define "dead end" in terms of distance from a flowing main. *Id*.

While the Board recognizes that the water quality problems listed in the definition may be exacerbated by distance from a flowing main, it is not convinced that distance is the sole cause of those problems. The Board is not persuaded that the definition in *The Water Dictionary* is inadequate or that the rules should define "dead end" in the terms of distance as suggested by CLCJAWA. The Board's order includes subsection (c) as proposed by IEPA.

Section 604.1440(a)(1): Horizontal Separation of Finished Water Mains

Under the heading "Horizontal Separation," subsection (a)(1) proposes that "[w]ater mains shall be laid at least ten feet horizontally from any existing or proposed drain, storm sewer, sanitary sewer, combined sewer or sewer service connection. The distance must be measured edge to edge." Prop. 604 at 101; *see* 35 Ill. Adm. Code 653.119(a)(1); Recommended Standards § 8.8.2.a; SR at 56.

Capt. Curry suggested adding to subsection (a)(1) the exception that "[t]he ten ft. horizontal separation is not required between water mains and open-ended culvert pipes intermittently conveying storm water runoff in response to precipitation events, and interconnected with open ditches upstream and downstream." Curry Test. at 37. IEPA responded that this proposal reflects current practice and the "exclusion of sanitary separation for culverts and ditches." Curry Resp. at 16. IEPA "does not believe that this modification is necessary." *Id*.

The Board agrees that IEPA's proposal does not specifically require horizontal sanitary separation for the culverts described in Capt. Curry's comment. The Board also notes IEPA's response that his comment reflects IEPA's current practice. The Board does not believe that the proposed additional language is necessary and declines to include it in its order.

Section 604.1500(a), (b): Cross Connections

IEPA proposed in subsection (a) that "[n]o cross connection shall be allowed between water plant piping and any drain or sewer. Backflow prevention installed within the water

treatment facility must comply with the Illinois Plumbing Code, 77 Ill. Adm. Code 890." Prop. 604 at 105; *see* 35 Ill. Adm. Code 607.104(a); Prop. 607 at 2 (repealing cross connection requirements at Section 607.104); SR at 59.

IAPHCC commented that subsection (a) should be amended to provide that "[n]o cross connection shall be allowed between water plant piping and any non-potable source, drain or sewer." PC 1 at 2.

In subsection (b), IEPA proposed that "[n]o cross connection shall be allowed whereby an unsafe substance may enter a community water supply." Prop. 604 at 105; *see* 35 Ill. Adm. Code 607.104(b); Prop. 607 at 2 (proposing repeal of Section 607.104); SR at 59.

The Backflow Comments proposed to revise subsection (b) to provide that "[n]o cross connection shall be allowed, whereby, any non-potable source may enter a community water supply." PC 2 at 1. They argued that this would protect a potable water supply not only from unsafe substances but also from those that are not life-threatening. *Id*.

IEPA cited its proposed definition of "cross-connection" as "any physical connection or arrangement between two otherwise separate piping systems where flow from one system to the other is possible." IEPA Resp. 1-6 at 1, 5; *see* Prop. 601 at 4. IEPA also proposed a subsection (c) addressing cross connections with any portion of a distribution system. Prop. 604 at 105. IEPA argued that the intent of Section 604.1500 is clear and that these proposed changes are unnecessary. IEPA Resp. 1-6 at 1, 5.

The Board recognizes the proposed definition of "cross connection," and the three subsections of proposed Section 604.1500 prohibit three types. Subsections (a) and (b) are based on existing regulations, and the record does not indicate that they have provided insufficient protection. The Board agrees with IEPA that the intent of the Section is clear and that it protects from risks of cross connection with non-potable water. The Board does not believe that the proposed additions to subsections (a) and (b) are necessary and declines to include them in its order.

Section 604.1510: Cross Connection Control Device Inspectors

IEPA proposed requirements for approval as a Cross Connection Control Device Inspector (CCCDI) and the inspections they conduct.

IAPHCC and the Backflow Comments reported that industry and professional groups consistently use the term "tester" rather than "inspector." PC 1 at 1-2; PC 2 at 2. They recommended replacing references to inspection with the terms "test" and "tester." *Id*.

IEPA responded that the term "Cross Connection Control Device Inspector" has been in the Illinois regulations "for at least two decades and is familiar to both the plumbing and water supply professions." IEPA Resp. 1-6 at 1, 6; *see* 35 Ill. Adm. Code 653.802(d) (Requirements for Cross-Connection Control Device Inspector Approval). Section 653.802 has referred to cross connection control device inspectors since it was last amended in 1985. *See* 9 Ill. Reg. 17367.

This supports IEPA's argument that the term is a familiar one to the relevant professions, and the Board declines to revise IEPA's proposed use of "inspector."

IAPHCC and the Backflow Comments also stated that backflow devices are not merely inspected but are physically tested to ensure that they operate properly. PC 1 at 2; PC 2 at 2. Proposed Section 604.1510(a) states that inspection "must include physical testing in accordance with the manufacturer's instructions." Prop. 604 at 106; *see* IEPA Resp. 1-6 at 1, 6. IEPA's rules include the same statement. 35 Ill. Adm. Code 653.802(c). The Board concludes that both the current rules and IEPA's proposal are consistent with these comments and that it is not necessary to revise the proposal on this point.

Mr. Marvel testified that Subpart O uses the terms "inspection" and "testing" as if they have different meanings. Tr.2 at 36. He stated that Section 601.105 does not define "inspection," and he asks whether IEPA will define it. *Id*.

IEPA stresses that IPDH regulations use the term "inspection" but do not define it. IEPA Post-Hrg. Cmts. at 3; *see* 77 Ill. Adm. Code 890.120 (Definitions). IEPA argues that the Plumbing Code uses both "inspection" and "testing" and distinguishes them from one another. IEPA Post-Hrg. Cmts. at 3, citing 77 Ill. Adm. Code 890.1130 (Protection of Potable Water), 890.1910 (Inspection), 890.1920 (Testing of Plumbing Systems), 890.1930 (Test Methods). IEPA intends to give the term "inspector" the same meaning as the Illinois Plumbing Code. IEPA Post-Hrg. Cmts. at 3.

However, the Backflow Comments suggested that the definition of "plumbing inspector" does not include testers, so IEPA's proposed reference to an "inspector" is not consistent with the Illinois Plumbing Code. PC 2 at 2. The Plumbing Code defines a "plumbing inspector" as "[a]n employee or agent of State or local government. . . ." PC 2 at 2, citing 77 Ill. Adm. Code 890.120. However, neither IEPA's current rule nor its proposed Section 604.1510(b) requires a CCCDI to be or become one of these government officials. *See* 35 Ill. Adm. Code 653.802(d); Prop. 604 at 107. The Board concludes that IEPA did not intend "plumbing inspectors" and CCCDIs to have the same qualifications and duties and did not intend for CCCDIs to fall under the existing definition of "plumbing inspector."

Mr. Marvel testified that IDPH interprets its rules to forbid a licensed plumber from inspecting any plumbing that he or she installed, repaired, or maintained. Tr.2 at 38. Mr. Marvel suggested that, if a CCCDI is considered a "plumbing inspector," then he or she cannot re-test a failed backflow device after repairing it. Mr. Marvel argued that requiring separate inspectors will increase costs for facilities such as universities and hospitals. *Id*. at 39. He requested that IEPA clarify what it considers to be an inspection. *Id*. at 39-40.

IEPA responded that the term "inspector" is not ambiguous and that this clarification is not necessary or appropriate. IEPA Resp. 1-6 at 1, 5-6; IEPA Post-Hrg. Cmts at 3. The Board concluded above that neither IEPA's current rules nor its proposal would themselves cause a CCCDI to become a "plumbing inspector." Mr. Marvel comments suggest that a requirement for separate inspections may result from IDPH's interpretation of its rules. The Board takes no position on another agency's interpretation of its own regulations. Based on these factors, the

Board is not persuaded that additional definitions would clarify the proposed regulations and declines to propose its own definitions.

Section 604.1510(a): Cross Connection Device Inspection.

Section 653.802(c) of IEPA's rules requires that "[c]ross connection control devices shall be inspected at least annually by a person approved by the Agency as a cross-connection control device inspector (CCCDI). The inspection of mechanical devices shall include physical testing in accordance with the manufacturer's instructions." 35 Ill. Adm. Code 653.802(c). IEPA's rules also provide that "[e]ach device shall be tested at least annually or more frequently if recommended by the manufacturer." 35 Ill. Adm. Code 653.802(e)(1).

IEPA proposed that, "[e]xcept as provided in subsection (c) cross-connection control devices shall be inspected at least annually by a person approved by the Agency or its designee as a cross-connection control device inspector (CCCDI). The inspection of mechanical devices shall include physical testing in accordance with the manufacturer's instructions." Prop. 604 at 106; *see* 35 Ill. Adm. Code 653.802(c); SR at 60.

The Backflow Comments proposed alternate language: "[a]t a minimum, backflow preventers shall be tested upon installation, annually and immediately after repair, or when returned to service. The test shall be performed by a trained and Certified Cross-Connection Control Tester. The backflow test shall include physical testing in accordance with manufacturer's instructions and specifications." PC 2 at 2.

IEPA responded that its proposal provides "a general reference to device testing" and is not "intended to lower the requirements of the public health regulations in 77 Ill. Adm. Code 890 [Illinois Plumbing Code]." IEPA Resp. 1-6 at 6. In the Plumbing Code, IDPH as has adopted rules for inspections and tests. 77 Ill. Adm. Code 890.1910 – 890.1950. IEPA argued that the level of specificity in the Backflow Comments would be appropriate for those regulations. IEPA Resp. 1-6 at 6. IEPA's proposal requires testing "at least annually," which may include circumstances named in the Backflow Comments. Like the Backflow Comments, IEPA requires physical testing according to the manufacturer's recommendation. Based on these considerations, the Board is not persuaded to adopt language proposed by the Backflow Comments, and its order reflects Section 604.1510(a) as proposed by IEPA.

Section 604.1510(a)(1): Inspection Records

IEPA proposed that "[r]ecords of the annual inspection must be submitted to the community water supply." Prop. 604 at 106.

The Backflow Comments stated that CWS personnel do not receive timely test results. PC 2 at 2. IAPHCC stated that timely reporting can alert a CWS to potential hazards. The Backflow Comments recommended forwarding results to the CWS within 10 business days (PC 2 at 2), and IAPHCC argued that the reports should be submitted "within 10 business days of the test" (PC 1 at 2).

IEPA responded that proposed Section 604.1505(b)(4) requires each cross connection control program to adopt "[a]n ordinance, tariff, or required condition for service" consistent with the Illinois Plumbing Code. IEPA Resp. 1-6 at 2, 6. IEPA argued that effective programs require local responsibility. *Id*. IEPA "believes that this level of detail is more appropriately addressed by local government" and "that this timeliness issue is best addressed at that level." *Id*.

Mr. Marvel questioned whether IEPA would consider requiring submission of results in "a timely manner" rather than a 10-day deadline. Tr.2 at 40-41. IEPA responded that requiring submission "in a timely manner" would require a definition or interpretation and that "this level of specificity is better addressed at the local level." IEPA Post-Hrg. Cmts. at 5. IEPA added that it "has viewed many local ordinances over the past twenty years and all have general provisions set forth to deal with high risk service connections." IEPA's response cited language similar to what "municipal ordinances often contain." *Id*. That language provides in part

> [t]hat the Superintendent of the Water of the _____ is hereby authorized and directed to discontinue, after reasonable notice to the occupant thereof, the water service to any property wherein any connection in violation of the provisions of this ordinance is known to exist, and to take such other precautionary measures as he may deem necessary to eliminate any danger of contamination of the public water supply distribution mains. Water service to such property shall not be restored until such conditions have been eliminated or corrected in compliance with the provisions of this ordinance. . . . *Id.*

The language also provides for immediate disconnection with verbal notice when the superintendent "is assured that imminent danger of harmful contamination of the public water supply system exists" and immediate disconnection without notice "to prevent actual or anticipated contamination or pollution. . . ." *Id*.

The Board agrees with IAPHCC that a timely report of inspection results can provide notice of potential hazards. However, the Board also agrees that the proposed deadline of submitting test results "in a timely manner" would be difficult to define or interpret consistently for the more than 1,700 public water supplies in Illinois. The Board recognizes that each cross connection program must adopt an ordinance, and the Board notes IEPA's experience that "all" local ordinances have provisions addressing connections violating the ordinance. The Board also agrees with IEPA that the required local ordinance allows each cross connection control program to set its reporting deadline – which may be 10 days or a different length. The Board declines to propose any of the deadlines suggested in the comments and adopts for first notice IEPA's proposed subsection (a)(1).

Section 604.1510(a)(3): Maintenance Log

For cross connection control devices, IEPA proposes that "[a] maintenance log shall be maintained at the site of installation and must include the date of each test; name and approval number of person performing the test; test results; repairs or servicing required; repairs and date completed; and servicing performed and date completed." Prop. 604 at 106-07 (subsections (A)

– (F)). IEPA's rules require that the maintenance log include the same information. *See* 35 Ill. Adm. Code 653.802(e)(4).

Both IAPHCC and the Backflow Comments argued that the required maintenance log should include additional items. PC 1 at 2: PC 2 at 3.

First, IAPHC and the Backflow Comments proposed that the maintenance log include information about the plumbing contractor employing the tester. PC 1 at 2; PC 2 at 3. Both argued that this information protects consumers, as plumbing contractors must have proof of proper insurance and bonding to register with IDPH. *Id*.

Second, IAPHCC and the Backflow Comments proposed that the maintenance log also include the type of test kit used and the date of the most recent calibration. PC 1 at 2; PC 2 at 3. The Backflow Comments reported that annual calibration of test kits is required by the Illinois Plumbing Code and recommended by manufacturers. PC 2 at 3. Without the date of the most recent calibration in the log, CWS personnel will not know whether a test kit complies with these standards. *Id*.

Third, IAHPCC and the Backflow Comments proposed that the log also include a statement whether the device passed or failed in addition to test results. PC 1 at 2; PC 2 at 3.

Fourth, IAHPCC and the Backflow Comments proposed that the log also include the make, model, and serial number of the backflow preventer; the location of the backflow preventer on the premises; the type of water service the device protects; and whether the device is used for isolation or containment purposes. PC 1 at 3; PC 2 at 3.

Although IEPA responded that it "does not object" to adding any of these items to the maintenance log, it stated that "this level of detail may be more appropriately addressed by local government through an ordinance, tariff, or required condition for service." IEPA Resp. 1-6 at 2, 7. While the Board agrees with IEPA that the comments would make detailed additions to the maintenance log, the Board finds that some of these additions would clarify the log and help enforce testing requirements. As one example, the Board agrees that test results should include a brief statement whether those results pass or fail the test. The Board also agrees that listing the test kit used and the date of its most recent calibration will help ensure accurate test results. Finally, both IAHPCC and the Backflow Comments propose to add information on the backflow prevention device and its location on the facility's premises. The Backflow Comments argue that "water utilities have incomplete data to enforce annual testing requirements." PC 2 at 3. The Board is persuaded to add this requirement to its first-notice proposal.

However, the Board is not persuaded to add each item proposed in the comments. Although the Backflow Comments recommended that the log include the name and certified approval number of the person who performed the test (PC 2 at 3), IEPA's proposal includes this requirement as subsection (a)(3)(B) (Prop. 604 at 106). IAPHCC and the Backflow Comments proposed to include information about the plumbing contractor employing the tester. PC 1 at 2; PC 2 at 3. Although the Board recognizes the importance of a contractor's insurance and bonding, it is not persuaded that this additional information identifies the tester more clearly or

helps make testing procedures more accurate. Also, IAHPCC and the Backflow Comments proposed to include in the maintenance log information on the use or purpose of the backflow preventer. The comments do not explain how this information will clarify or improve testing, and the Board declines to add it to its proposed subsection (a)(3).

In addition, the Backflow Comments stated that neither Part 653 nor IEPA's proposal include requirements for backflow test kits. PC 2 at 3. They added that kit manufacturers require annual calibration to ensure proper results. *Id*. The comments recommended adding this requirement to provide more accurate testing and better protection of the water supply. *Id*. IEPA responded that this requirement may be more appropriately addressed in the Illinois Plumbing Code (IEPA Resp. 1-6 at 7), and the Backflow Comments state that the Plumbing Code requires annual calibration of backflow test kits. PC 2 at 3. Based on these comments, the Board declines to propose a requirement for backflow test kits in Part 604.

Section 604.1510(c): Backflow Prevention Device Inspection

IEPA proposed to incorporate into this subsection its existing requirements for annual inspection of backflow prevention devices and the qualifications of the inspector. Prop. 604 at 109; *see* 35 Ill. Adm. Code 653.802(f); SR at 60.

The Backflow Comments noted that subsection (c) refers to inspection of backflow prevention devices. PC 2 at 4-5; *see* Prop. 604 at 109. The comments argued that the subsection refers to a test and not to an inspection. PC 2 at 4-5. They recommended that subsection (c) refer to "testing" instead of "inspection." *Id*.

IEPA responded that it does not believe this proposed revision is necessary. IEPA Resp. 1-6 at 1, 5-6. Proposed Section 604.1510(a) states that inspection "must include physical testing in accordance with the manufacturer's instructions." Prop. 604 at 106; *see* IEPA Resp. 1-6 at 1, 6. The Board concludes IEPA's proposal reflects these comments and that it is not necessary to revise this subsection.

Section 604.1510(c): Backflow Prevention Device Repair

The Backflow Comments stated that "there is no requirement for a failed backflow preventer to be repaired." PC 2 at 2. They proposed that "all failed and deficient backflow preventers must be righted within 30 days." *Id*. IAPHCC proposed that all devices failing their test must be repaired within 30 days of the detected failure "or water service to the customer will be terminated." PC 1 at 3. IAPHCC argued that this proposal ensures "that the potential hazard is mitigated as soon as possible." *Id*.

IEPA responded that "this level of detail is more appropriate to 77 Ill. Adm. Code 890 [Illinois Plumbing Code]." IEPA Resp. 1-6 at 6-7. IEPA added that proposed Section 604.1505(b)(4) requires each cross connection control program to adopt "[a]n ordinance, tariff, or required condition for service" consistent with the Illinois Plumbing Code. IEPA Resp. 1-6 at 2. IEPA argued that IAPHCC's proposed level of detail "is more appropriately addressed by local government" and "that this timeliness issue is best addressed at that level." *Id*.

Mr. Marvel later questioned whether IEPA would consider requiring repairs in "a timely manner" instead of setting a deadline. Tr.2 at 40-41. He requested language allowing a CWS to strengthen its ordinance. *Id*. at 41. IEPA responded that requiring repair "in a timely manner" would require a definition or interpretation. IEPA argued that "this level of specificity is better addressed at the local level." IEPA Post-Hrg. Cmts. at 5. IEPA added that it "has viewed many local ordinances over the past twenty years and all have general provisions set forth to deal with high risk service connections." *Id*. IEPA's response cited sample language of an ordinance allowing discontinuation and disconnection of service. *Id*.

As it did above when addressing the submission of test results, the Board agrees that the proposed deadline to perform repairs "in a timely manner" would be difficult to define or interpret consistently for the range of repairs that may be necessary at more than 1,700 public water supplies in Illinois. The Board recognizes that each cross connection program must adopt an ordinance, and the Board notes IEPA's experience that "all" local ordinances have provisions addressing connections violating the ordinance. The Board agrees with IAPHCC that potential hazards must be mitigated as quickly as possible. The Board also agrees with IEPA that the required local ordinance allows each cross connection control program to address repairs and set a deadline for them. Based on these factors, the Board declines to propose the deadlines proposed in the comments.

SECTION-BY-SECTION SUMMARY OF IEPA PROPOSAL

Many provisions of IEPA's original proposal did not trigger comments or questions. For others, the rulemaking process resolved many questions and disputes about IEPA's original proposal. The section-by-section summary below reviews testimony, comments, questions, and responses that culminated in agreed revisions. The summary also identifies the source of the proposed provision in authorities such as IEPA rules, Board rules, or the Recommended Standards.

Part 601: Introduction

Proposed Part 604 necessitates conforming changes to Part 601. SR at 2, 10, 13.

Section 601.101: General Requirements

Subsection (a). Section 601.101 now consists of a single undesignated provision. 35 Ill. Adm. Code 601.101. IEPA did not propose to amend it but re-designated it subsection (a) to propose subsequent new subsections. *See* Prop. 601 at 1.

IEPA stated that it had "no objection" to clarifying subsection (a), and the Board's order includes the following revision. Board Questions at 2; IEPA Resp. at 1.

> Owners and official custodians of a public water supply in the State of Illinois shall provide, pursuant to the Act, Board Rules, and the Safe Drinking Water Act (42 USC 300f et seq.), continuous operation and maintenance of public water supply facilities to

assure ~~so~~that the water is ~~shall be assuredly~~safe in quality, clean, adequate in quantity, and of satisfactory mineral characteristics for ordinary domestic consumption.

Subsection (b). IEPA proposed to add subsection (b) under the heading "Finished Water Quality." Prop. 601 at 1.

Subsection (b)(1). Section 611.121(b)(1) of the Board's rules provides that

> [t]he finished water delivered to any user at any point in the distribution system must contain no impurity at a concentration that may be hazardous to the health of the consumer or that would be excessively corrosive or otherwise deleterious to the water supply. Drinking water delivered to any user at any point in the distribution system must contain no impurity that could reasonably be expected to cause offense to the sense of sight, taste, or smell. 35 Ill. Adm. Code 611.121(b)(1).

IEPA proposes to move this narrative standard into a new subsection (b)(1). Prop. 601 at 1; SR at 13, 69.

Subsection (b)(2). The Board addressed comments on IEPA's proposed narrative standard above under "Disputed Issues." *See supra* at 7-8.

Subsection (b)(3). Section 654.403 of IEPA's rules provides recommended contaminant concentrations for finished water. 35 Ill. Adm. Code 654.403. IEPA proposed to move these recommended concentrations into a new subsection (b)(3). SR at 13, 69; Prop. 601 at 1-2.

In its questions, the Board noted that subsection (b)(3) proposes that listed concentrations "*should not be exceeded* in the finished water." Board Questions at 2 (emphasis added). The Board asked IEPA whether a CWS that fails to meet the italicized standard would violate the proposed regulation. *Id*. IEPA responded that, if a CWS "fails to meet these standards, that failure could violate regulations." IEPA Resp. at 1.

Section 601.105: Definitions

Capt. Curry commented that IEPA's proposal includes terms that are not defined. Curry Test. at 1. He argued that adding definitions of these terms "would be helpful to the public entities" that will implement the proposed rules. *Id*.

IEPA responded that it proposed definitions in this section and through The Water Dictionary, a publication of the American Water Works Association that is already incorporated by reference in 35 Ill. Adm. Code 601.115(b). Curry Resp. at 1; *see* 35 Ill. Adm. Code 601.105(c). Capt. Curry reported that IEPA's reference to these sources was "satisfactory." Board Questions 2 at 1; Tr.2 at 14.

Air gap. IEPA's rules now define "air gap" to mean "the unobstructed vertical distance through the free atmosphere between the water discharge point and the flood level rim of the

receptacle." 35 Ill. Adm. Code 651.102. IEPA proposes that the Board adopt this definition. SR at 13, 69; Prop. 601 at 3.

Atmospheric vacuum breaker. IEPA's rules now define "atmospheric vacuum breaker" to mean "a device designed to admit atmospheric pressure into a piping system whenever a vacuum is caused on the upstream side of the device." 35 Ill. Adm. Code 651.102. IEPA proposes that the Board adopt this definition. SR at 13, 69; Prop. 601 at 3.

Conventional filtration treatment. Part 611 of the Board's rules now defines "conventional filtration treatment" to mean "a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in substantial particulate removal." 35 Ill. Adm. Code 611.101. IEPA proposes that the Board incorporate this definition into Part 601. SR at 13, 69; Prop. 601 at 4; Cook Test. at 3.

Cross connection. The current definition of "cross connection" in the Board's rules includes a distinction between direct and indirect cross connections. 35 Ill. Adm. Code 601.105. IEPA proposes to amend the definition to provide that the term "means any physical connection or arrangement between two otherwise separate piping systems where flow from one system to the other is possible." SR at 13, 69; Prop. 601 at 4.

CT or CT_{calc}. Part 611 of the Board's rules now defines "CT" or "CT_{calc}" as

> the product of 'residual disinfectant concentration' (RDC or C) in mg/ℓ determined before or at the first customer, and the corresponding 'disinfectant contact time' (T) in minutes. If a supplier applies disinfectants at more than one point prior to the first customer, it must determine the CT of each disinfectant sequence before or at the first customer to determine the total percent inactivation or 'total inactivation ratio.' In determining the total inactivation ratio, the supplier must determine the RDC of each disinfection sequence and corresponding contact time before any subsequent disinfection application points. (See "$CT_{99.9}$") 35 Ill. Adm. Code 611.101.

IEPA proposes that the Board add this definition to Part 601. SR at 13, 69; Prop. 601 at 4.

DPD method. IEPA's rules now define "DPD method" to mean "an analytical method for determining chlorine residual utilizing the reagent DPD (n-diethyl-p-phenylenylenediamine." 35 Ill. Adm. Code 651.102. IEPA proposes that the Board adopt this definition. SR at 13, 69; Prop. 601 at 5.

Effective external linkage. IEPA's rules now define "effective external linkage" to mean "the ability of a water system to communicate and exchange information with water customers, regulators, technical and financial assistance organizations, and other entities that routinely interact with the water system." 35 Ill. Adm. Code 651.102. IEPA proposes that the Board adopt this definition. SR at 13, 69; Prop. 601 at 5.

Interconnection. IEPA's rules now define "interconnection" to mean "a physical connection between two or more community water supply systems." 35 Ill. Adm. Code 651.102. IEPA proposes that the Board adopt this definition. SR at 13, 69; Prop. 601 at 5.

Maximum Average Daily Demand or Maximum Demand. Part 601 now defines "Maximum Average Daily Demand" or "Maximum Demand" to mean "the maximum seven day production period." 35 Ill. Adm. Code 601.105. IEPA proposes to amend the definition to mean the "highest average daily production over seven consecutive days." SR at 13, 69; Prop. 601 at 5.

Satellite supply. IEPA's rules now define "satellite supply" to mean "any community water supply that: purchases all finished water from another community water supply; does not provide any treatment other than chlorination; and distributes finished water to consumers." 35 Ill. Adm. Code 651.102. IEPA proposed that the Board adopt this definition. SR at 13, 69; Prop. 601 at 6.

CLCJAWA comments that this definition does not appear to allow a satellite supply to feed corrosion inhibitors. PC 8 at 3. CLCJAWA questions whether this was IEPA's intent, as it may be more cost effective for a satellite to treat its water when the parent serves many satellites that do not all have the same treatment requirements. *Id*. IEPA "concurs with this observation" and suggests revising the definition to mean "any community water supply that purchases all finished water from another community water supply; does not provide any treatment other than chlorination or corrosion control; and distributes finished water to consumers." Resp. 7-8 at 9. The Board's order includes this revision.

SEP. Part 611 of the Board's rules now defines "SEP" to mean "special exception permit (Section 611.110)." 35 Ill. Adm. Code 601.101. Section 611.110 addresses initiating, issuing, appealing, and violating an SEP. 35 Ill. Adm. Code 611.110. IEPA proposes that the Board define SEP as "special exception permit." SR at 13, 69; Prop. 601 at 7.

Section 601.115: Incorporations by Reference

Subsection (a). This provision lists abbreviated names of entities whose materials the Board incorporated by reference in subsection (b). 35 Ill. Adm. Code 601.115(a). IEPA proposed to add the listing that "'ASME' means the American Society of Mechanical Engineers." Prop. 601 at 8.

Subsection (b). This provision incorporates by reference materials used to implement the Board's public water supplies rules. 35 Ill. Adm. Code 601.115. IEPA proposes to add incorporations of materials used to implement its proposed Part 604. SR at 13, 69, 75-78; Prop. 601 at 8-12.

Addressing inactivation of pathogens, Capt. Curry proposed to revise Section 604.720(d) by including a standard to determine a baffling factor. Curry Test. at 18. IEPA did not object and proposed to incorporate "Improving Clearwell Design for CT Compliance (1999),"

published by the AWWA Research Foundation. IEPA provided a copy of the standard (IEPA Resp. 2 at 1), and the Board proposes to incorporate it by reference in this subsection.

ISAWWA and CLCJAWA suggested additional revisions, which the Board addressed above under "Disputed Issues." *See supra* at 8.

Part 602: Permits

IEPA's proposed addition of Part 604 necessitates conforming changes to Part 602. SR at 2, 10. IEPA also proposes a new testing procedure to verify disinfection in existing Section 602.310 and an operating permit-by-rule for specified construction projects in a new Section 602.325. *Id*. at 9-10; *see* Prop. 602 at 20, 21-22. The Board discusses these revisions below in a section-by-section summary of IEPA's proposed amendments to Part 602.

Subpart A; General Permit Provisions

Section 602.102: Community Water Supply Permits. Subsections (a) – (d) provide that a CWS may seek from IEPA a construction permit, an operating permit, an algicide permit, or an aquatic pesticide permit. 35 Ill. Adm. Code 602.102. IEPA proposes to add a subsection (e) providing that a CWS may also seek an SEP. SR at 61; Prop. 602 at 3.

Section 602.105: Standard for Issuance. The Board noted that subsections (a)(1), (a)(2), and (a)(4) provide that IEPA "shall not issue" a permit, while subsections (a)(3), (a)(5), and (b) provide that IEPA "must not issue" a permit. Board Questions at 2. The Board asked IEPA to comment on whether each of these should be amended for consistency and clarity to provide that IEPA "will not issue." *Id*. IEPA responded that it "does not object to this proposal." IEPA Resp. at 1. The Board's order includes these revisions.

Subsection (a)(2). This subsection provides that IEPA will not issue a construction or operating permit unless the facility conforms to design criteria including the Recommended Standards; various AWWA, ASTM, ANSI, and NSI standards incorporated by reference; and criteria "promulgated by the Agency under Section 39(a) of the Act or Section 602.115." 35 Ill. Adm. Code 602.105(a)(2). Because IEPA proposes to repeal Section 602.115, it proposes to amend the cross reference to cite Part 604. SR at 61; *see* Prop. 602 at 3.

Subsection (a)(3). This subsection provides that, when the regulatory authorities and technical sources listed in subsection (a)(2) do not provide design criteria for a proposed facility, the applicant must submit proof that the facility conforms to other criteria "that the applicant proves will produce consistently satisfactory results." 35 Ill. Adm. Code 602.105(a)(3). IEPA proposes to strike the phrase "the applicant proves." Prop. 602 at 4.

IEPA also proposed that it may require a pilot study, which the Board addressed above under "Disputed Issues." *See supra* at 8-9.

Section 602.106: Restricted Status. Subsection (a) defines "restricted status" for a community water supply, and IEPA did not propose to revise it. *See* Prop. 602 at 5. The Board

asked whether it would be acceptable to IEPA to clarify the first sentence of subsection (a) with the following revision. Board Questions at 2.

> Restricted status is ~~shall be~~ defined as the Agency determination, pursuant to Section 39(a) of the Act and Section 602.105, that a community water supply facility, or portion thereof, may no longer be issued a construction permit without causing a violation of the Act or Board or Agency rules.

IEPA responded that it "has no objection to this proposal," and the Board's order includes the revision. IEPA Resp. at 2.

Subsection (a)(2) provides that, except as specified in Section 602.105(a)(5), IEPA must not issue a permit to construct a water main extension if that water main would extend an existing violation. 35 Ill. Adm. Code 602.106(a)(2). However, Section 601.105(a)(5) provides that IEPA cannot issue a construction permit unless a CWS files a notification of ownership. 35 Ill. Adm. Code 601.105(a)(1). IEPA proposed to correct the cross reference to Section 602.105(a)(6), which lists four circumstances under which a violation will not prevent IEPA from issuing a construction permit. SR at 61; Prop. 602 at 5; *see* 35 Ill. Adm. Code 602.105(a)(6).

Section 602.115: Design, Operation, and Maintenance Criteria. Proposed Part 604 addresses design, operation, and maintenance, and IEPA proposes to repeal this section because adopting Part 604 would make it unnecessary. SR at 61; Prop. 602 at 6. IEPA adds that, if the Board adopts Part 604, it will also repeal the design, operation, and maintenance standards in Part 653 of its own rules. SR at 61; *see* 35 Ill. Adm. Code 653 (Design, Operation and Maintenance Criteria).

Subpart B: Construction Permits

Section 602.200: Construction Permit Requirement.

Subsection (b). Subsections (b)(1) – (b)(3) list activities that require the owner or official custodian of a CWS to obtain a construction permit. 35 Ill. Adm. Code 602.200(b). IEPA proposes to add a subsection (b)(4) requiring a construction permit "prior to rehabilitating a water main using cured-in-place pipe." SR at 62; Prop. 602 at 6.

ISAWWA comments that this proposal does not refer to slip-in liners or spray-on liners. PC 7 at 1. ISAWWA suggests that this subsection could be clarified by exempting only pipe cleaning and requiring a construction permit for all water main rehabilitation. *Id*. Alternatively, ISAWWA seeks "some additional direction" on the scope of this proposed requirement. *Id*.

IEPA responded by revising subsection (b)(4) to require a construction permit "prior to rehabilitating a water main using ~~cured in place pipe~~ a liner." Resp. 7-8 at 1. The Board's order includes this revision.

Subsection (c). Subsections (c)(1) – (c)(6) list examples of "normal work items" that do not require a construction permit. 35 Ill. Adm. Code 602.200(c). IEPA proposes clarifying that a permit is not needed for these items "[e]xcept as required by subsection (b)." Prop. 602 at 6.

IEPA proposed to amend subsection (c)(5) addressing replacement of specified facilities, and the Board addressed that proposal above under "Disputed Issues." *See supra* at 9.

Section 602.210: Construction Permit Applications. Subsections (a) – (j) list information that must be submitted with a construction permit application. 35 Ill. Adm. Code 602.210. Subsection (d) refers to specifications listed in Section 602.635, a section not included in the Board's rules. IEPA proposes to correct the cross reference to "Section 602.235," which addresses specifications. SR at 62; Prop. 602 at 7; *see* 35 Ill. Adm. Code 602.235 (Specifications).

Section 602.220: Alterations.

Subsection (a). This subsection now requires a PWS to submit a written request for a supplemental permit if it makes any deviation from an approved plan or specification. 35 Ill. Adm. Code 602.220(a). IEPA proposed to add language stating that "[t]he written request must document all of the changes made to the previously approved plans and specifications. Only those changes identified will be considered for a supplemental permit." SR at 62; Prop. 602 at 8. IEPA added that "[c]hanges not identified will not be considered when granting requests for alterations." SR at 62.

Subsection (e). IEPA proposed to add a new subsection providing that "[a] supplemental permit will not be granted to add water main after construction has begun, except for additional water main necessary due to a change in the connection point to the existing water distribution system or due to a change in route or alignment." Prop. 602 at 8. IEPA stated that any alteration other than these exceptions will require a new construction permit application. SR at 62. IEPA also proposed that "[a] new application must be submitted for water main to serve additional users." Prop. 602 at 8-9.

Section 602.245: Source Construction Applications. This section now begins with an undesignated paragraph providing that "[c]onstruction permit applications for the construction of a new or the modification of an existing well or surface water intake must include the information specified by this Section." 35 Ill. Adm. Code 602.245. IEPA proposed to strike this language and to codify expanded permit application requirements in subsection (a), which now addresses well construction permit applications. *See* Prop. 604 at 9-10.

Subsection (a)(1). IEPA's proposed new subsection (a)(1) lists information that an applicant must submit with an application for a permit to construct a new or modified well or surface water intake or a water main to transport water purchased from another CWS. First, the CWS must submit existing and proposed finished water quality for 15 parameters. SR at 62-63; Prop. 602 at 9-10 (subsections (A) – (O)). USEPA lists these parameters for evaluation of corrosion control measures. SR at 63.

Subsection (a)(2). IEPA's proposed new subsection (a)(2) requires that the application for a construction permit must also include "a recommendation of the treatment necessary to reduce corrosion in household plumbing." Prop. 602 at 10.

IEPA stated that, before changing a source or treatment, a large CWS must obtain approval of corrosion control treatment for copper and lead in plumbing. SR at 63, citing 35 Ill. Adm. Code 611.351(b)(3)(C); *see* Cook Test. at 2. USEPA now recommends that states also approve corrosion control treatment for small and medium systems. SR at 63. IEPA's proposal follows this recommendation. SR at 63; Prop. 602 at 10.

Subsection (b). Existing subsection (a) requires specified information in an application for a well construction permit. 35 Ill. Adm. Code 602.245(a) (subsections (1) – (20)). IEPA re-designates it as subsection (b) without amendment to reflect the proposed new subsection (a).

Subsection (c). Existing subsection (b) requires specified information "on plans for well construction permit applications." 35 Ill. Adm. Code 602.245(b). IEPA re-designates it as subsection (c) and adds subsections (c)(1)(B)(i) – (c)(1)(B)(iv). These new subsections require that well location information include clean-up sites within 2,500 feet of the proposed well site with a No Further Remediation Letter, a Groundwater Management Zone, an Environmental Land Use Covenant, or an ordinance restricting use of groundwater. SR at 63; Prop. 602 at 11.

Existing subsection (b)(2) requires that plans include a 400-foot radius showing the location of listed sources of pollution. 35 Ill. Adm. Code 602.245(b)(2). IEPA proposed to re-designate it as subsection (c)(2)(C). IEPA also proposed to update the cross reference to the listed sources to Section 604.150(a), Protection of Community Water Supply Structures. SR at 63; Prop. 604 at 11.

Subsection (d). Existing subsection (c) requires that plans for a surface water intake construction permit application must include specific information. 35 Ill. Adm. Code 602.245(c). IEPA re-designated it as subsection (d) and added a subsection (d)(2). It requires that, for sites subject to flooding, the application must include "maximum flood level based upon best available information, which includes, but is not limited to, the flood of record or the 100 year or 500 year flood projections." Prop. 602 at 12; SR at 63.

Section 602.250: Treatment Construction Applications.

Subsection (e). Section 602.250 requires specified information on plans to construct treatment facilities. Subsection (e) requires locations of listed sources of pollution. 35 Ill. Adm. Code 602.250(h). IEPA proposed to update the cross reference to the listed sources from Table A of Section 653.118 to Section 604.150(a), Protection of Community Water Supply Structures. SR at 63; Prop. 604 at 12.

Subsection (h). IEPA proposed to add this subsection requiring information on "stability and corrosion control." Prop. 602 at 12-13; *see* SR at 63; Cook Test. at 2. Under subsection (h)(1), the CWS must submit existing and proposed finished water quality for 15 parameters. SR

at 63; Prop. 602 at 13 (subsections (A) – (O)). USEPA lists these parameters for evaluation of corrosion control measures. SR at 63.

Second, under subsection (h)(2), the CWS also must recommend "the treatment necessary to reduce corrosion in household plumbing." SR at 63; Prop. 602 at 13. IEPA noted that its proposed Section 602.245(a) addressing source construction applications also includes this requirement. SR at 63.

Section 602.255: Storage Construction Applications. Section 602.255 requires specified information on plans to construct storage facilities. For storage tanks that are below ground or partially below ground, subsection (c) requires the locations of listed sources of pollution. 35 Ill. Adm. Code 602.255(c). IEPA proposes to update the cross reference to the listed sources to Section 604.150(a), Protection of Community Water Supply Structures. SR at 63; Prop. 602 at 13-14.

Section 602.260: Water Main Construction Applications.

Subsection (a). An application for a water main construction permit must include specified information. Subsection (a)(14)(A) addresses whether the water main meets sewer and water separation requirements. 35 Ill. Adm. Code 602.260(a)(14)(A). IEPA proposed to update a cross reference to the separation requirements from Section 653.119 to Section 604.1440, Sanitary Separation for Finished Water Mains. Prop. 602 at 15.

Subsection (b). Plans submitted with a water main construction permit application must include specified information. Subsection (b)(7) requires submitting the distance between community water supply structures and listed sources of pollution. 35 Ill. Adm. Code 602.260(b)(7). IEPA proposes to update the cross reference to the listed sources to Section 604.150(a), Protection of Community Water Supply Structures. SR at 64; Prop. 602 at 16.

Subpart C: Operating Permits

Section 602.300: Operating Permit Requirement.

Subsection (a). This subsection now provides that "[n]o person shall cause or allow the use or operation of any new community water supply, or any new addition to an existing community water supply, for which a construction permit is required under this Part, without an operating permit issued by the Agency." IEPA proposes to add the alternative of complying by obtaining an operating permit-by-rule under Section 604.325. SR at 64; Prop. 602 at 16.

Subsection (b). This subsection now provides that a CWS must file an application for an operating permit when construction is complete. IEPA proposed to add language clarifying that a CWS must file an application for an operating permit when its "construction project is not eligible for an operating permit-by-rule under Section 604.325." SR at 64; Prop. 602 at 16.

Subsection (c). This subsection now provides that "[t]he operating permit must be obtained before the project is placed in service." IEPA first proposes to add this language as the final sentence of amended subsection (b). Prop. 602 at 16.

IEPA proposes new language providing that "[c]ommunity water supplies projects identified in Section 602.325 may be placed into operation upon submission of the permit-by-rule certification to the Agency." SR at 64; Prop. 602 at 16. IEPA clarifies that this submission is available either to a water main extension or a project that does not require disinfection. SR at 64; *see* Prop. 604 at 21 (proposed Section 604.325(b)).

Subsection (d). This subsection now provides for partial operating permits, which may be obtained "[if] all phases of a construction project will not be completed at one time." 35 Ill. Adm. Code 602.320. IEPA proposed to add language providing that partial operating permits may also be obtained through a permit-by-rule under Section 602.325. SR at 64; Prop. 602 at 16.

Section 602.305: Operating Permit Applications.

Subsection (a). IEPA first proposed that operating permit applications "must be on forms prescribed by the Agency." Prop. 602 at 17. IEPA submitted to the Board an "Application for Operating Permit" and instructions from its Division of Public Water Supplies. Board Questions at 2; IEPA Resp., Exh. (A)(1).

This subsection requires that an operating permit application must contain five items of information. 35 Ill. Adm. Code 602.305(a). IEPA proposes to strike the first item: "the name, signature, and identification number of the Responsible Operator in Charge (*see* 35 Ill. Adm. Code 603 [Ownership and Responsible Personnel])." Prop. 602 at 17. IEPA's permit application requires the applicant to list the "Certified Operator in Responsible Charge" and the "Owner of the Completed Project" and their contact information. IEPA Resp., Exh. (A)(1) at 1. IEPA re-numbered the following four subsections, which it did not propose to amend. *See id*.

Subsection (b). This subsection requires that an application for a permit to operate a well must include four items of information. 35 Ill. Adm. Code 602.305(b). IEPA proposes to add 11 additional specified items. Prop. 602 at 17-19 (subsections (5) – (15). These items parallel requirements under proposed Section 604.245, Well Testing and Records. SR at 64; *see* Prop. 604 at 25-27 (proposed Section 604.245(d)).

The Board omitted IEPA's proposed subsection (b)(12), the lateral area of influence, which is listed in existing subsection (b)(3). *See* Prop. 602 at 17, 18; *see* 35 Ill. Adm. Code 602.305(b)(3).

Section 602.310: Projects Requiring Disinfection.

Subsection (a). This subsection now requires satisfactory disinfection before issuance of an operating permit for completed construction projects including water mains, filters, finished water storage tanks, and wells. IEPA proposed to replace this language with a requirement that "[w]ells, water storage tanks, water treatment plants, and water mains shall be disinfected in

accordance with AWWA C651, C652, C653 or C654 incorporated by reference in Section 601.115." Prop. 602 at 19; SR at 64. IEPA states that these standards require the absence of total coliforms for new construction. SR at 9-10.

Subsection (c). This subsection now provides that, except as specified, "satisfactory disinfection is demonstrated when two consecutive water sample sets collected from the completed project at least 24 hours apart indicate no bacterial growths as measured by the membrane filter technique or no tubes testing positive as measured by the presumptive test, fermentation tube method, as set forth in 35 Ill. Adm. Code 611." *See* SR at 9; Cook Test. at 8.

IEPA reported that many of the certified laboratories in Illinois no longer perform either of these two methods. SR at 9. Under the Safe Drinking Water Act's Revised Total Coliform Rule, "there are several other approved methods that are based upon the presence or absence of total coliforms." *Id*. IEPA suggested that all other states have followed this standard for new construction. *Id*.; *see* Cook Test. at 8.

IEPA proposed to amend this subsection to provide that, except for projects that do not require disinfection under Section 602.315,

> the permit applicant must verify disinfection before seeking an operating permit-by-rule pursuant to Section 604.325 or the issuance of an operating permit by the Agency for completed construction projects. Disinfection is verified when two consecutive water sample sets collected from the completed project at least 24 hours apart show the absence of coliform bacteria and the presence of a chlorine residual when required by 35 Ill. Adm. Code 604.725. Prop. 602 at 20.; *see* SR at 64; Cook Test. at 2, 8.

IEPA argued that this amendment allows "additional testing methods and consistency with AWWA Standards requirements, while still providing verification of satisfactory bacterial quality for new construction." SR at 10, 64-65; *see* Cook Test. at 8. IEPA added that this revision is consistent with proposed Section 604.135(b)(4). SR at 64.

Both ISAWWA and CLCJAWA comment that this proposed subsection refers to Section 602.315, which IEPA's proposal does not include. PC 7 at 2; PC 8 at 4. The Board adopted Section 602.315, Projects Not Requiring Disinfection, in 2016. Public Water Supplies: Proposed Amendments to 35 Ill. Adm. Code Parts 601, 602, and 603, R15-22, slip op. at 45 (Apr. 7, 2016); *see* 40 Ill. Reg. 6841-42 (Apr. 29, 2016). Because IEPA did not propose to revise or repeal Section 602.315, it was not required to include that section in its proposal to the Board. 35 Ill. Adm. Code 102.202(a) (Proposal Contents for Regulations of General Applicability); *see* 5 ILCS 100/5-40(b)(1) (2016); Resp. 7-8 at 1, 10. For these reasons, the Board does not revise this subsection (c) in response to these comments and does not include Section 602.315 below in its order.

Subsections (d), (e). Subsection (d) establishes a process to demonstrate disinfection at water main construction projects at existing CWSs. Subsection (d)(1) allows a demonstration of satisfactory disinfection based in part on "one water sample set from the completed project." 35

Ill. Adm. Code 602.310(d)(1). If the analysis under subsection (d) indicates the presence of bacterial growth, subsection (e) lists steps a CWS must take to demonstrate satisfactory disinfection. 35 Ill. Adm. Code 602.310(e). IEPA proposes to remove these two subsections. SR at 64-65; Prop. 602 at 20-21.

CLCJAWA seeks confirmation "that single sample sets will no longer be permitted." PC 8 at 4. IEPA agreed "that the proposal no longer considers a single sample set. This approach is consistent with AWWA C651," entitled "Disinfecting Water Mains" and incorporated by reference at 35 Ill. Adm. Code 601.115(b). *See* Resp. 7-8 at 10.

Subsection (f). This provision requires that analyses under Section 602.315 "must be performed by a certified laboratory." After removing subsections (d) and (e), IEPA proposed to re-designate this as subsection (d) without amending it. Prop. 602 at 21.

Section 602.325: Operating Permits-by-Rule. IEPA proposed to add this section allowing specified CWS construction projects to obtain an operating permit-by-rule. SR at 10. IEPA reported that "[t]his change affects approximately 80 percent of the 1200 operating permits issued on average on an annual basis." *Id.*; McMillan Test. at 6.

Subsection (a). IEPA proposed that "[t]he purpose of this Section is to implement the permit-by-rule program provided for in Section 39.12 of the Act for classes of community water supply operating permits. By fulfilling all the requirements of this section, a community water supply is considered to have met the requirements for obtaining an operation permit pursuant to Section 18(a)(3) of the Act, and Section 602.300." Prop. 602 at 21; SR at 10, 65; *see* 415 ILCS 5/18(a)(3), 39.12 (2016).

The Board asked whether it would clarify the second sentence to state that, "[b]y fulfilling all of the requirements of this section, a community water supply is considered to have met the requirements for obtaining an operating permit. . . ." Board Questions at 3. IEPA responded that if "has no objection to this proposal." IEPA Resp. at 2. The Board's order includes this revision.

Subsection (b). IEPA proposed that

> [a] community water supply is eligible to obtain an operating permit-by-rule if the construction project for which the Agency granted a construction permit is for any of the following projects:
>
> 1) Water main extensions; or
>
> 2) Projects not requiring disinfection specified in Section 602.315.
> SR at 10, 65; Prop. 602 at 21; *see* McMillan Test. at 6.

ISAWWA states that this proposed subsection refers to Section 602.315, which is not included in IEPA's proposal. PC 7 at 2. The Board adopted Section 602.315, Projects Not Requiring Disinfection, in 2016. Public Water Supplies: Proposed Amendments to 35 Ill. Adm. Code

Parts 601, 602, and 603, R15-22, slip op. at 45 (Apr. 7, 2016); *see* 40 Ill. Reg. 6841-42 (Apr. 29, 2016). Because IEPA did not propose to revise or repeal Section 602.315, it was not required to include it in its proposal to the Board. 35 Ill. Adm. Code 102.202(a) (Proposal Contents for Regulations of General Applicability); *see* 5 ILCS 100/5-40(b)(1) (2016); Resp. 7-8 at 1, 10. For these reasons, the Board does not revise this subsection (b) in response to ISAWWA's comment and does not include Section 602.315 below in its order.

Subsection (c). IEPA proposed that "[a] community water supply is not eligible to obtain an operating permit-by-rule if the construction project involves a water main that connects two or more community water supplies." SR at 65; Prop. 602 at 21.

Subsection (d). IEPA proposed that "[u]pon issuance of a construction permit the Agency may notify an eligible community water supply that it may not seek a permit-by-rule if the community water supply has previously neglected to submit the information required by Agency or Board rules in the last two years." SR at 65; Prop. 602 at 21.

The Board asked whether it would clarify subsection (d) to state that a community water supply "may not seek a permit-by-rule if the community water supply has failed ~~neglected~~ to submit ~~the~~ information required by Agency or Board rules in the ~~last~~ two years preceding the Agency's notification." Board Questions at 3. IEPA responded that it "has no objection to this proposal." IEPA Resp. at 3; *see* Resp. 7-8 at 10 (correcting typographical error). The Board's order includes this revision.

The Board also asked IEPA to comment on the factors or standards it would use in determining whether to notify a CWS that it may not seek a permit-by-rule. Board Questions at 3. Citing its proposed language, IEPA responded that, "[i]f the CWS has previously neglected to submit the information required by the Agency or Board in the last two years, the Agency may notify the CWS." IEPA Resp. at 2.

The Board also asked whether a CWS that has received this notification but believes that it is otherwise eligible to obtain a permit-by-rule has any recourse other than waiting for the two-year period to end. Board Questions at 3. IEPA responded that a CWS may avail itself of appeal processes, which include appealing a condition of a construction permit or denial of an operating permit. IEPA Resp. at 3.

Subsection (e). IEPA proposed that, "[f]or construction projects that contain both permit-by-rule eligible and non-eligible components, a community water supply may obtain a partial operating permit-by-rule for the eligible portions of the project." SR at 65; Prop. 602 at 22.

Subsection (f). IEPA proposed that "[a] community water supply eligible for a permit-by-rule under subsection (b), who does not elect to obtain an operating permit-by-rule, must obtain an operating permit issued by the Agency before commencing operation." SR at 65; Prop. 602 at 22.

Subsection (g). IEPA addressed permit-by-rule certification by proposing that

> Any community water supply seeking to obtain an operating permit-by-rule must submit a certification on forms prescribed by the Agency specifying the following:
>
> 1) the community water supply's name, address, identification number, and project name;
>
> 2) the construction permit number, type of construction permit, and date the construction permit was issued;
>
> 3) an explanation of the status of the construction project, and if the project is only partially completed, the information set forth in Section 602.320 [Partial Operating Permits];
>
> 4) a statement attesting to compliance with Section 602.310 [Projects Requiring Disinfection], if disinfection is required; and
>
> 5) the submission of the water sample results required by Section 602.310. SR at 65; Prop. 602 at 22.

In response to a Board question, IEPA stated that it is developing a certification form. Board Questions at 3; IEPA Resp. at 3. IEPA committed to submit this form into the record when it becomes available. IEPA Resp. at 1; *see* Tr.1 at 16.

Subsection (h). IEPA proposed that "[t]he community water supply may begin operation of a permit-by-rule eligible construction project immediately after it files the certification required by subsection (g)." SR at 10, 65; Prop. 602 at 22. IEPA argued that this allows quicker connections to new water mains and limits construction disruption. SR at 10; McMillan Test. at 6.

Section 602.600: Special Exception Permit. IEPA uses an SEP when it exercises discretion on a case-by-case basis as allowed under Part 611. SR at 10-11, citing Safe Drinking Water Act Regulations, R88-26, slip op. at 14 (Aug. 9, 1990). IEPA proposes to continue using SEPs to make these case-by-case decisions. SR at 11. IEPA largely based this proposed section on the Recommended Standards, which also allow the exercise of discretion in specified instances. *Id*. at 11-12.

The Board's rules now address SEPs at 35 Ill. Adm. Code 611.110. Having proposed using SEPs to implement the new Part 604, IEPA believes that this section should be moved to the general permitting language at Part 602. SR at 12, 66; *see* McMillan Test. at 5-6. The proposed new section 602.600 includes the same requirements as Part 611.110 but adds a cross reference to Part 604. SR at 66; *see* McMillan Test. at 6.

Subsection (a). IEPA proposed that, "[u]nless contained in a construction or operating permit, each Agency determination in Part 604 and Part 611 is to be made by way of a written

special exception permit ("SEP") pursuant to Section 39(a) of the Act [415 ICLS 5/39(a)]." SR at 66; Prop. 602 at 22; *see* 35 Ill. Adm. Code 611.110(a).

Subsection (b). IEPA proposed that "[n]o person may cause or allow the violation of any condition of a SEP." Prop. 602 at 22; *see* 35 Ill. Adm. Code 611.110(b); SR at 66.

Subsection (c). IEPA proposed that "[t]he community water supply may appeal the denial of or the conditions of a SEP to the Board pursuant to Section 40 of the Act [415 ILCS 5/40]." Prop. 602 at 23; *see* 35 Ill. Adm. Code 611.110(c); SR at 66.

Subsection (d). IEPA proposed that a SEP may be initiated either by a written request from a community water supply or by IEPA when authorized by Board regulations. Prop. 602 at 23 (subsections (1) and (2)); *see* 35 Ill. Adm. Code 611.110; SR at 66.

Board Note. IEPA also proposed a Board Note stating that "[t]he Board does not intend by any provision of this Part to require that the Agency exercise its discretion and initiate a SEP pursuant to subsection (d)(2). Rather, the Board intends to clarify by subsection (d)(2) that the Agency may initiate a SEP without receiving a request from the supplier." Prop. 602 at 23.

Part 604: Design, Operation and Maintenance Criteria

IEPA stated that the "primary focus" of its proposal is Part 604, which would govern the design, operation, and maintenance of community water supplies. SR at 1. IEPA based the proposed new Part 604 on existing IEPA rules at Part 653 and on the 2012 edition of the Recommended Standards. *Id*. at 1-2; *see id*. at 5, 11, 14.

IEPA stated that Part 604 places these requirements largely in a single Part. SR at 5. IEPA argued that this will help ensure proper operation of community water supplies by providing one comprehensive source for these requirements. *Id*. at 8-9. CWLP credits IEPA's update. CWLP Test. at 1. CWLP stated that for many years water suppliers "have had to review numerous documents to determine which rule applied to their activities and these amendments will simplify and help ensure water providers are following the most up to date rules." *Id*. IDPH generally supports IEPA's updates. IDPH Test. at 1. IDPH stated that its own authority gives it a significant interest "in the outcome of IEPA's efforts to increase the safety of Illinois' potable water supplies, reduce regulatory overlap and update its standards and requirements to meet the needs of users connected to public and private water supplies." *Id*. at 2.

The Agency organized the subparts of Part 604 to follow the general course of water treatment from source selection to distribution. SR at 7, 14; *see* Cobb Test. at 3; McMillan Test. at 2-3.

Subpart A: General Provisions

IEPA's proposed Subpart A includes all of "the general requirements that can apply to any phase of treatment or drinking water production." SR at 7; *see* McMillan Test. at 3. IEPA argued that placing these requirements in a single subpart makes it easier to find applicable

regulations. SR at 13. IEPA stated that many requirements in Subpart A of Part 653 have been proposed as Subpart A of new Part 604. SR at 5-6; *see* 35 Ill. Adm. Code 653.101 – 653.120 (Design Requirements); McMillan Test. at 3. Subpart A is also based in part on the Recommended Standards. SR at 13; McMillan Test. at 3; *see* Recommended Standards §§ 2.0 – 2.22 (Part 2: General Design Considerations).

Section 604.100: Purpose. As its statement of purpose, IEPA proposed that "[t]his Part includes the design, operation, and maintenance criteria for owners, operators, and official custodians of community water supplies." Prop. 604 at 5; *see* SR at 14.

The Board asked IEPA to clarify whether the criteria in proposed Part 604 apply to both existing and new CWSs. Board Questions at 3. IEPA responded that its proposed Part 604 "applies to all CWSs." IEPA Resp. at 3. IEPA clarified that "[a] CWS operating before the effective date of this Part will not be required to modify or replace components to meet the requirements of this Part under the conditions outlined in Section 604.145(a) [Exceptions for Community Water Supplies]." IEPA Resp. at 2-3.

Section 604.105: General Requirements. IEPA proposed requirements that "apply at all times for all community water supplies, regardless of the type of treatment or the stage of water production." SR at 14.

Subsection (a). IEPA proposed design capacity requirements, which the Board addressed above under "Disputed Issues." *See supra* at 9-10.

Subsection (b). IEPA proposed that "[t]he basic criteria for design of community water supply facilities must be the standards under this Part or other criteria which the applicant demonstrates will produce a finished water which meets requirements of 35 Ill. Adm. Code 611 under all operating conditions." Prop. 604 at 5; *see* SR at 14. IEPA stated that it proposed a reference to "other criteria" because there may in the future be new treatment and distribution technologies capable of producing safe water. SR at 14.

The Board asked IEPA to explain "basic" criteria. Board Questions at 3-4. IEPA responded by proposing to strike the term "basic." IEPA Resp. at 4. The Board's order reflects this revision.

The Board also asked whether there are optional criteria for design of CWS facilities in proposed Part 604. Board Questions at 4. IEPA explained that "other criteria" include methods such as ultraviolet, membranes, and ozone that are not provided in Part 604. IEPA Resp. at 4. IEPA proposed to clarify this subsection by referring to "other criteria pursuant to 35 Ill. Adm. Code 602." *Id*. The Board's order includes this revision.

The Board asked whether an applicant should be required to demonstrate that "other criteria" also comply with the requirements of 35 Ill. Adm. Code 601.101 in order to be consistent with proposed Section 604.145(b)(1). Board Questions at 4. IEPA responded that Section 604.145(b)(1) provides a limited exception from design criteria specified in Part 604.

IEPA Resp. at 4. "These exceptions may be granted by the Agency only when specifically provided in Part 604." *Id*.

Regarding "other criteria," the Board asked IEPA to clarify whether it plans to implement an application process to demonstrate compliance with Part 611. Board Questions at 4. If so, the Board asked IEPA to comment on whether its determination on the use of "other criteria" would be appealable to the Board. *Id*. IEPA responded that every change to a CWS must be made through a construction permit issued under Part 602. IEPA Resp. at 4. IEPA added that a determination on use of other criteria "would be appealable to the Board through the regular permitting process." *Id*.

Subsection (c). IEPA proposed that "[w]ater must be treated to meet the national primary drinking water standards in 35 Ill. Adm. Code 611." Prop. 604 at 5; *see* SR at 14.

Subsection (d). IEPA proposed that treatment facilities must provide duplicate treatment units in three cases: to comply with any microbial requirement in Part 611; to comply with the maximum contaminant level for nitrite or nitrate in 35 Ill. Adm. Code 611.301; and to comply with Section 17.10 of the Act regarding removal of carcinogenic volatile organic compounds. Prop. 604 at 5 (subsections (1) – (3)); *see* SR at 15.

Capt. Curry's testimony stated that the PWS for East Alton "has a single aerator and intermittently detects troublesome concentrations" of regulated volatile organic chemicals. Curry Test. at 2. He questioned whether IEPA's proposal would require East Alton to install a second aerator. *Id*. IEPA responded that it would consider site-specific factors before determining whether duplicate treatment units are necessary (Curry Resp. at 1), and the Board does not revise IEPA's proposal in response to this comment.

Subsection (e). IEPA proposed that duplicate treatment required under subsection (d) is not necessary if a CWS can provide an adequate supply to meet maximum daily demand and the water complies with Part 611 "with the water treatment facility out of service for any period of time." SR at 15; Prop. 604 at 5. IEPA proposed this exception because a CWS able to purchase wholesale water from another CWS does not need to provide duplicate treatment units. SR at 15.

Subsection (f). IEPA proposed that,

> [u]nless otherwise approved by the Agency pursuant to Section 604.145(b) [Exceptions for Community Water Supplies], products that come in contact with water, including but not limited to, protective barrier materials, joining and sealing materials, mechanical devices, pipes and related products, plumbing devices, process media and non-metallic potable water materials, or components which comprise chemical feed systems in a community water supply must be certified to comply with NSF/ANSI Standard 61 [Drinking Water System Components – Health Effects] and NSF/ANSI Standard 372 [Drinking Water System Components – Lead Content], incorporated by reference in 35 Ill. Adm. Code 601.115. Prop. 604 at 5-6; *see* Prop. 601 at 12 (incorporations).

IEPA stated that these "are the industry standards." SR at 15.

Subsection (g). IEPA proposed that "[w]ater treatment chemicals must be certified to comply with NSF/ANSI Standard 60 [Drinking Water Treatment Chemicals – Health Effects], incorporated by reference in 35 Ill. Adm. Code 601.115." Prop. 604 at 6; *see* Prop. 601 at 12 (incorporations). IEPA stated that these "are the industry standards." SR at 15.

Section 604.110: Location. IEPA argued that this section requires "the best available location" for community water supply facilities. SR at 15.

Subsection (a). IEPA proposed that

> [a]ll community water supplies shall select construction sites after completing an evaluation of risk from earthquakes, land subsidence, floods, fires or other disasters which could result in breakdown of any part of the system. If a site is subject to an identified risk, the community water supply shall submit a complete statement describing reasons for site selection and identify construction measures which will be taken to protect the community water supply. Prop. 604 at 6; *see* 35 Ill. Adm. Code 653.101(a), (c) (Sites); Recommended Standards § 2.4.

The Board asked IEPA to clarify the applicability of this section to existing CWS facilities. Board Questions at 4. IEPA responded that this section applies to all CWSs. IEPA Resp. at 4. The Board also asked how existing CWS facilities would comply with proposed location standards. Board Questions at 4. IEPA responded that "[e]xisting CES facilities already must be located at sites not subject to significant risk from earthquakes, land subsidence, floods, fires or other disasters which could result in a breakdown of any part of the system, except as described in 35 Ill. Adm. Code 653.101(c) [Sites]." IEPA Resp. at 4; *see* 35 Ill. Adm. Code 653.101(a).

CWLP asked IEPA to clarify the effect of this proposal on a facility at which a flood established a new flood of record. Tr.1 at 18. Mr. McMillan responded that IEPA would work with the facility either to provide additional flood protection or relocate the facility above the level of the new flood of record. *Id*. He added that this is IEPA's current practice and that the proposal would not change it. *Id*.

Subsection (b). IEPA proposed that "[a]ll community water supply facilities must be located outside the flood plain of or shall be at least two feet above the 100 year flood or flood of record, whichever is higher." Prop. 604 at 6; *see* 35 Ill. Adm. Code 653.101(b) (Sites); Recommended Standards § 2.20 (Flood Protection).

The Board asked IEPA whether subsection (b) should refer to "2 feet above the 100 year flood elevation or maximum flood of record" to be consistent with proposed subsection (c). Board Questions at 4-5. IEPA responded that "[s]ubsection (b) is intentionally more stringent than subsection (c) as the 100 year flood could be lower than the flood of record and vice versa." IEPA Resp. at 5. IEPA stated that its proposal reflects its intent. *Id*.

The Board recognizes IEPA's intent that the facilities must be located above the higher of the listed flood levels, although the Board's question may suggest that it considered striking the phrase "whichever is higher." *See* Board Questions at 4-5. The Board believes that it would follow IEPA's intent, clarify this subsection, and align it with subsection (c) to require that "[a]ll community water supply facilities must be located outside the flood plain of or shall be at least two feet above the 100 year flood elevation or maximum flood of record, whichever is higher." The Board's order includes this revision.

Subsection (c). IEPA proposed that "[a]ll access roads, except roads to wells, shall be protected to at least the 100 year flood elevation or maximum flood of record." Prop. 604 at 6; *see* 35 Ill. Adm. Code 653.101(b) (Sites); Recommended Standards § 2.20.

Section 604.115: Usage.

Subsection (a). IEPA proposed that "[a]verage daily usage shall be based on finished water pumpage records. When records are not available or when a new supply is proposed, average daily usage shall be based on at least 75 gallons per person per day based on the current or projected population to be served." Prop. 604 at 6; *see* 35 Ill. Adm. Code 653.104 (Usage); SR at 15.

IEPA rules provide that, "when records are not available or when a new supply is proposed, average daily usage shall be based on at least 50 gallons per person per day." 35 Ill. Adm. Code 653.104(a). The Board asked IEPA to explain its proposed increase to 75 gallons per person per day. Board Questions at 4. IEPA responded that USEPA reported per capita residential water needs of 50-75 gallons per day. IEPA Resp. at 5 (citation omitted). The U.S. Geologic Survey reported average water use of 80-100 gallons per capita per day. IEPA Resp. at 5 (citation omitted). Citing increased use of water-saving plumbing fixtures, IEPA argued that 75 gallons per person per day is "appropriate for design." *Id*.

The Board also asked whether IEPA's proposed usage rate reflects both indoor and outdoor water usage. Board Questions at 4. IEPA stated that it "does not differentiate as to where water is used or consumed." IEPA Resp. at 5,

The Board asked whether IEPA's proposed increase in average daily usage would have an economic effect on CWSs by requiring them to increase the size of their facilities. Tr.1 at 17. Mr. Cook stated that new facilities typically base usage on rates higher than 50 gallons per person per day. *Id*. IEPA argues that its proposal reflects current practice, and Mr. Cook did not expect the proposal to have an economic impact. *Id*.

Subsection (b). IEPA proposed that "[t]he daily average usage estimate shall be increased when large uses such as irrigation, filling swimming pools and service to commercial or industrial establishments are known or anticipated." Prop. 604 at 6; *see* 35 Ill. Adm. Code 653.104(b) (Usage); SR at 15

Subsection (c). IEPA proposed that, "[w]hen records are not available, maximum demand shall be calculated as 1.5 times the average daily usage." Prop. 604 at 6; *see* SR at 15.

Subsection (d). IEPA proposed that, "[f]or Sections 604.1345 [Hydropneumatic Storage] and 604.1350 [Combined Pressure Tanks and Ground Storage], peak hourly flow shall be calculated using six times the average daily usage and converted into units of gallons per minute." Prop. 604 at 6; *see* 35 Ill. Adm. Code 653.104 (Usage); 653.105 (Rate of Usage); SR at 15. IEPA states that it re-wrote Sections 653.104 and 653.105 to simplify a three-step calculation to a one-step calculation having the same result. SR at 15.

The Board asked IEPA to explain the proposed multiplication factors of 1.5 and 6 used to calculate maximum demand and peak hourly flow in subsections (c) and (d). Board Questions at 4. The Board also asked IEPA to explain why subsection (d) expresses "peak hourly flow" in "gallons per minute." *Id*.

IEPA responded that Section 653.105 estimates peak hourly flow in the absence of data. "Average use is multiplied by 2 and converted into an average rate [in gallons per minute], since most water is in a 12-hour period instead of 24. The average rate is multiplied by 1.5 for a maximum rate. The maximum rate is multiplied by 2 for peak hourly flow." IEPA Resp. at 5, citing 35 Ill. Adm. Code 653.105. IEPA "decided to eliminate the intermediate step and just require a peaking factor of 6 ($2 \times 1.5 \times 2$), since the intermediate steps are not used for any design criteria." IEPA Resp. at 5.

Section 604.120: Piping Identification.

Subsection (a). IEPA proposed that "[p]iping in a community water system treatment facility shall be identified clearly by legends and color coding. A consistent standard shall be used throughout the system." Prop. 604 at 6; *see* 35 Ill. Adm. Code 653.120(a) (Piping Identification); Recommended Standards § 2.14; SR at 16.

The Board asked IEPA to clarify whether the phrase "consistent standard" in proposed subsection (a) refers to the piping color scheme proposed in subsection (b). Board Questions at 4. If so, the Board asked IEPA to comment on whether the changes below would be acceptable. *Id*. at 5.

a) Piping in a community water supply treatment facility ~~shall~~ must be identified clearly by legends and color coding that are consistent~~. A consistent standard shall be used~~ throughout the system.

IEPA responded that it "has no objections to these proposals." IEPA Resp. at 6.

Capt. Curry testified that "[m]any existing plants do not use color coding, and the individual pipes bear painted labels identifying the contents." Curry Test. at 2. He also stated that he knows water operators who are color-blind, and he questioned whether color-coding would prevent them from correctly identifying pipes and their contents. *Id*. He questioned whether IEPA's proposal requires plants using these labels to re-paint and color code all of their piping. *Id*. If so, he questioned whether IEPA and the Board would allow 12 months to do so. *Id*.

IEPA responded that it "has no objection to the use of painted labels" and revised subsection (a) to provide that "[p]iping in a community water supply treatment facility shall be identified clearly by legends and color coding or the use of color coded labels. A consistent standard shall be used throughout the system." Curry Resp. at 1.

In his supplemental testimony, Capt. Curry stated that, "[i]f the labels identify the contents, then it would not be necessary to color code the individual labels with added expense." Curry Supp. Test. at 2. He proposed the following additional revision of subsection (a): "[p]iping in a community water supply treatment facility shall be identified clearly by legends and color coding or the use of ~~color coded labels~~ nametag labels identifying the contents of individual pipes, spaced at intervals to allow convenient identification of individual pipes. A consistent standard shall be used throughout the system." *Id*. IEPA responded that it "agrees with this change" (Curry Supp. Resp. at 1), and the Board's order reflects this revision.

Subsection (b). IEPA proposed a scheme of 24 colors, each of which identifies a specific water line, chemical line, waste line, or other line in plants and pumping stations. SR at 16; *see* Prop. 604 at 7-8; Recommended Standards § 2.14 (Piping Color Code).

IEPA indicated that the "consistent standard" in proposed subsection (a) refers to the piping color scheme proposed in subsection (b). IEPA Resp. at 6. However, IEPA had "no objections" to the following revision of subsection (b). *Id*.

> b) The following color scheme or a similar consistent scheme must be used to identify~~To facilitate identification of~~ piping in plants and pumping stations ~~it is recommended that the following color scheme be utilized~~:

The Board's order reflects this revision.

CLCJAWA commented that IEPA's proposed color scheme differs from the ANSI/ASME A13.1 pipe identification standard used in the U.S. PC 8 at 1. CLCJAWA suggested adopting the ANSI/ASME standard to be consistent with other states and to reduce confusion for operators. *Id*. IEPA responded that, although it intended its proposal to be consistent with the A13.1 Standard, any consistent scheme would be acceptable. Resp. 7-8 at 4.

Subsection (c). IEPA proposed that "[p]otable water lines shall be clearly and permanently identified where dual water lines or pressure sewer systems exist." Prop. 604 at 8; *see* 35 Ill. Adm. Code 653.120(b) (Piping Identification).

Section 604.125: Automatic Equipment.

Subsection (a). IEPA proposed that "[e]quipment which will automatically shut down a water treatment process is acceptable, provided restart procedures are manual." Prop. 604 at 8; *see* 35 Ill. Adm. Code 653.112(a) (Automatic Equipment); SR at 16.

Subsection (b). IEPA proposed that "[a]utomatic startup shall be allowed for treatment plants which treat only groundwater and have only unit processes not exposed to contamination. Examples include iron removal by protected aeration, enclosed retention and pressure sand filtration or ion exchange softening in a pressure vessel operated in a downflow mode." Prop. 604 at 8; *see* 35 Ill. Adm. Code 653.112(b) (Automatic Equipment); SR at 16. IEPA argued that this protects water safety by prohibiting automatic start up when "the water being treated has a higher susceptibility to contamination." SR at 16.

The Board asked IEPA to explain the terms "protected aeration" and "enclosed retention." Board Questions at 5. IEPA responded that its rules include these terms. IEPA Resp. at 6, citing 35 Ill. Adm. Code 653.112 (Automatic Equipment). IEPA stated that "[p]rotected aeration and enclosed retention guard against contamination through such measures as screens, roofs, or other enclosures." IEPA Resp. at 6.

Section 604.130: Operational Testing Equipment.

Subsection (a). Under the heading "Monitoring Equipment," IEPA proposed to require that a CWS provide testing and monitoring equipment based on the treatment provided. SR at 16. The Board asked IEPA to clarify whether this section addresses only equipment and does not address performing monitoring. Board Questions at 5. If so, the Board asked IEPA to comment on whether subsection (a) should provide that "[c]ommunity water supplies must have ~~provide~~ equipment to monitor the water. . . ." *Id*. IEPA agreed to this proposed change (IEPA Resp. at 6), and the Board's order reflects this revision.

Subsection (a)(1). IEPA proposed that plants treating surface water and groundwater under the direct influence of surface water must have the capability to monitor and record chlorine residual, water temperature, and pH at locations necessary to evaluate adequate CT disinfection; turbidity; and ammonia. Prop. 604 at 8 (subsections (A) – (C)); *see* Recommended Standards § 2.9.a (Monitoring Equipment).

CLCJAWA commented that this proposed subsection "does not clearly state whether the equipment must be on-line." PC 8 at 1. IEPA intends this requirement to be "flexible and allow for benchtop or on-line testing." Resp. 7-8 at 5.

CLCJAWA also commented that subsection (a)(1)(C) appears to require ammonia monitoring. PC 8 at 1. CLCJAWA argued that "[a]mmonia is not detectable in Lake Michigan water" and that requiring monitoring equipment would cause unnecessary expense. *Id*. IEPA concurred that the ammonia requirement should be stricken. "Section 604.140(a) [Nitrification Action Plan] requires ammonia monitoring at appropriate community water systems." Resp. 7-8 at 5. The Board's order reflects this revision.

Subsection (a)(2). IEPA proposed that plants treating groundwater using iron removal or ion exchange softening must have the capacity to monitor chlorine residual. Prop. 604 at 8; *see* Recommended Standards § 2.9.b (Monitoring Equipment).

ISAWWA questioned whether this proposal requires a grab sample or a continuous monitoring device. PC 7 at 2. IEPA responded that it intends this subsection to be flexible "and allow for benchtop or on-line testing." Resp. 7-8 at 2.

Subsection (a)(3). IEPA proposed that "[i]on exchange plants for nitrate removal must continuously monitor and record the finished water nitrate level." SR at 9; *see* Recommended Standards § 2.9.c (Monitoring Equipment).

If this section pertains only to monitoring equipment, the Board asked IEPA to comment on whether subsection (a)(3) should provide that "[i]on exchange plants for nitrate removal must have the capability to continuously monitor and record the finished water nitrate level." Board Questions at 5. IEPA did not agree to this revision. IEPA Resp. at 6. "The water system must continuously monitor for this acute contaminant." *Id*. The Board asked IEPA whether this language effectively embeds a monitoring requirement in the monitoring equipment provision. Tr.1 at 20. Mr. McMillan responded that the Part 611 includes monitoring requirements for the MCL constituents. *Id*. Because this subsection addresses removal of an acute contaminant, IEPA intends for it to include the continuous monitoring requirement. *Id*. at 20-21.

Subsection (b). Under the heading "Sampling taps," subsection (b)(1) proposed that "[s]mooth-nosed sampling taps shall be provided for collecting representative samples of treated and untreated water." Prop. 604 at 9; *see* 35 Ill. Adm. Code 653.501(a); SR at 16; Recommended Standards § 2.10 (Sample Taps).

Subsection (b)(2) proposed that, "[w]hen fluoride is added, the sample tap for the finished water must be located after the fluoride solution is added and has thoroughly mixed with the water being fluoridated." Prop. 604 at 9; *see* 35 Ill. Adm. Code 653.501(c)(1); Recommended Standards § 2.8.1.g (Testing equipment); SR at 16.

Subsection (b)(3) proposed that "[s]mooth-nosed sample taps for untreated water shall be provided at each well or source." Prop. 604 at 8; *see* 35 Ill. Adm. Code 653.501(a); Recommended Standards § 2.10 (Sample Taps); SR at 16.

Subsection (c). IEPA proposed that, "[f]or measuring chlorine residual, DPD test equipment or other means, as approved in "Standard Methods for the Examination of Water and Wastewater," incorporated by reference in 35 Ill. Adm. Code 611.102, shall be used." Prop. 604 at 9; *see* 35 Ill. Adm. Code 653.501(b); Recommended Standards §§ 2.8.1.f (Testing equipment); SR at 16.

Subsection (d). IEPA proposed that, for plants performing treatment including processes listed in subsections (1) – (9), specified testing equipment must be available. Prop. 604 at 9-10; *see* 35 Ill. Adm. Code 653.501(c); Recommended Standards § 2.8.1 (Testing equipment); SR at 16.; *see* also Prop. 611 at 129 (proposing repeal of Section 611.491 laboratory testing equipment requirements).

Subsection (d)(1). IEPA proposed that plants with fluoride adjustment processes must have "test equipment for measuring levels of fluoride ion." Prop. 604 at 9.

Subsection (d)(2). IEPA proposed that plants with iron removal processes must have available "test equipment for measuring iron levels." Prop. 604 at 9.

Capt. Curry testified that conventional iron removal oxidizes soluble ferrous iron (Fe^{+2}) to insoluble ferric iron (Fe^{+3}) that can be removed with filtration. Curry Test. at 3. He argued that monitoring should measure unoxidized ferrous iron. *Id*. Capt. Curry proposed revising this subsection to list "iron removal – test equipment for measuring ferrous and total iron." *Id*. He stated that methods, equipment, and reagents for these tests are commercially available. *Id*.

IEPA responded that it "has no objection to this addition." Curry Resp. at 2. IEPA proposed a revision requiring plants with iron removal to have "test equipment for measuring ferrous and total iron levels." *Id*. The Board's order reflects this revision.

Subsection (d)(3). IEPA proposed that plants with ion exchange softening processes must have "equipment for measuring hardness." Prop. 604 at 9.

Capt. Curry stated that cation exchange softeners use sodium chloride to regenerate the ion exchange resin. The process exchanges sodium with divalent metallic cations to accomplish softening, and chloride remains in solution. Curry Test. at 3. If rinsing portions of the process do not remove 100% of excess chloride from the cation exchange vessel, then the chloride concentration in treated water and the corrosivity of the water increase. *Id*. Capt. Curry proposed revising IEPA's subsection (d)(3) to list "ion exchange softening – equipment for measuring hardness and chloride." *Id*. He stated that methods, equipment, and reagents for these tests are commercially available. *Id*.

IEPA responded that it "has no objection to this addition." Curry Resp. at 2. IEPA proposed a revision requiring plants with cation exchange softening to have "equipment for measuring hardness and chloride concentration. *Id*. The Board's order reflects this revision.

Subsection (d)(4). IEPA proposed that plants with coagulation and filtration must have "jar test equipment for determining chemical dosages and equipment for measuring pH, hardness, alkalinity and nitrate." Prop. 604 at 9.

Capt. Curry stated that effectiveness of the coagulation process depends on factors including the form of alkalinity. Curry Test. at 4. Capt. Curry proposed revising IEPA's subsection (d)(4) by replacing "alkalinity" with "total and phenolphthalein (P) alkalinity forms." *Id*. He stated that methods, equipment, and reagents for these tests are commercially available. *Id*.

Capt. Curry further stated that, if nitrification occurs, Nitrite-N forms first, followed by oxidation to Nitrate-N. Curry Test. at 3. He argued that measuring concentrations of Nitrite-N ensures that treated water meets MCLs. *Id*. He added that the proposed Nitrification Action Plan proposed at Section 604.140 will require the capability to monitor for Nitrite-N and Nitrate-N. *Id*. Capt. Curry proposed revising IEPA's subsection (d)(4) by adding Nitrite-N to the

parameters for which plants with coagulation and filtration must have measuring equipment. *Id*. He stated that methods, equipment, and reagents for these tests are commercially available. *Id*.

IEPA responded that it "has no objection to these changes." Curry Resp. at 2. IEPA proposed a revision requiring plants with coagulation and filtration to have "jar testing equipment for determining chemical dosages and equipment for measuring pH, hardness, total and phenolphthalein ("P") alkalinity ~~and~~ nitrate and nitrite." *Id*. The Board's order reflects this revision.

Subsection (d)(5). IEPA proposed that plants using lime softening must have "equipment for measuring pH, hardness, and alkalinity." Prop. 604 at 9. As in subsection (d)(4), Capt. Curry proposes revising this subsection by replacing "alkalinity" with "total and phenolphthalein (P) alkalinity forms." Curry Test. at 5.

IEPA responded that it "has no objection to this addition." Curry Resp. at 3. IEPA proposed a revision requiring plants with lime softening to have "equipment for measuring pH, hardness, and total and phenolphthalein alkalinity." *Id*. The Board's order reflects this revision.

Subsection (d)(6). IEPA proposed that plants using reverse osmosis must have "equipment for measuring total dissolved solids, chlorides and monitoring sulfates." Prop. 604 at 9.

Subsection (d)(7). IEPA proposed that plants using phosphate addition must have "equipment for measuring both orthophosphates and total phosphates." Prop. 604 at 9.

Subsection (d)(8). IEPA proposed that, for plants using anion exchange, "equipment for continuous monitoring of nitrate concentration must be provided for treated water and finished water after blending." Prop. 604 at 9.

Subsection (d)(9). IEPA proposed that plants using stabilization must have "equipment for determining the effectiveness of stabilization treatment for parameters which may include but are not limited to pH, alkalinity, total dissolved solids, calcium, and hardness." Prop. 604 at 10.

Capt. Curry stated that calcium hardness as $CaCO_3$ is a factor in determining Calcium Carbonate Precipitation Potential (CCPP), which estimates the tendency of water to form scale. Curry Test. at 6. While excessive scale can clog plumbing, an acceptable amount of scale can help prevent "red water" resulting from corrosion of iron piping. *Id*. Capt. Curry proposed revising IEPA's subsection (d)(9) by replacing "hardness" with "calcium hardness and total hardness, expressed as calcium carbonate." *Id*. He stated that methods, equipment, and reagents for these tests are commercially available. *Id*.

Capt. Curry further stated that temperature is another factor in calculating CCPP. Curry Test. at 6. He proposed revising subsection (d)(9) by adding temperature as a parameter for which plants using stabilization must have measuring equipment. *Id*.

Capt. Curry added that the chloride:sulfate mass ratio is an important factor in determining corrosivity and potential to release lead into water. Curry Test. at 6, citing Atts. 1, 2, 3. He proposed revising subsection (d)(9) by adding chloride and sulfate to the parameters for which plants using stabilization must have measuring equipment. Curry Test. at 6.

IEPA responded that is "has no objection to these additions." Curry Resp. at 3. IEPA proposed a revision requiring that plants using stabilization have "equipment for determining the effectiveness of stabilization treatment for parameters which may include but are not limited to temperature, pH, alkalinity, total dissolved solids, chloride, sulfate, calcium ~~and~~ hardness and total hardness, expressed as calcium carbonate. *Id*. The Board's order reflects this revision.

Subsection (d)(10). Capt. Curry testified that systems using chloramination must be able to speciate the form and concentration of the chloramine residuals and analyze products of chloramine decay such as dichloramine, ammonia, and ammonium in their distribution systems. Curry Test. at 2. As examples, he stated that the Ammonia-N concentration in raw water is necessary to determine the correct dose of ammonia or ammonium to form monochloramine. *Id*. Also, measuring the concentration of total and free Ammonia-N is necessary to monitor treatment and reduce potential for nitrification. *Id*.

Capt. Curry proposed adding a requirement that, "[f]or systems that use chloramines for disinfection and as a secondary disinfectant, "test equipment to measure free chlorine residual, total chlorine residual, monochloramine residual, dichloramine, free Ammonia-N, total Ammonia-N (including reagents to dechlorinate samples containing chloramines)" shall be available. Curry Test. at 2 (proposing addition to subsection (c)).

IEPA responded that it "has no objection to this addition." Curry Resp. at 2. However, IEPA stated that, for most CWSs, monitoring four parameters is sufficient "to determine where a treated water is located on the chloramination curve." *Id*. IEPA added that it could require monitoring of dichloramine and total Ammonia-N as necessary through a Special Exception Permit. *Id*. IEPA proposed adding a subsection (d)(10) requiring plants with chloramination to have "equipment to measure free chlorine residual, total chlorine residual, monochloramine residual, and free Ammonia-N." Curry Resp. at 2. The Board's order reflects IEPA's revision.

Subsection (d)(11). Capt. Curry stated that, if plants use coagulants containing aluminum and coagulation occurs outside the pH zone for the least solubility of aluminum, then soluble aluminum may pass through filters and precipitate in solid form. Curry Test. at 4. The water then may exceed the MCL for turbidity. *Id*. Capt. Curry stated that AWWA recommends that the concentration of total aluminum in drinking water should not exceed 0.05 mg/L. *Id*. He proposed revising IEPA's subsection (d)(4) by adding "total and insoluble aluminum" to the parameters for which plants with coagulation and filtration must have measuring equipment. *Id*. He stated that methods, equipment, and reagents for these tests are commercially available. *Id*.

IEPA responded that it "has no objection to this addition." Curry Resp. at 2. IEPA proposes adding a subsection (d)(11) requiring plants with coagulation using coagulants that contain aluminum to have, "in addition to the equipment described in 604.130(d)(4), equipment to measure total and insoluble aluminum." *Id*. The Board's order reflects this revision.

Subsection (d)(12). Capt. Curry stated that many PWSs treat water to remove manganese. Curry Test. at 7. He added that AWWA recommends that the concentration of total manganese in drinking water not exceed 0.05 mg/L. *Id*. He argued that successful manganese removal depends on measuring total and soluble manganese. *Id*. He proposed to add a subsection (d)(10) listing "manganese removal" and requiring test equipment for measuring the concentration of total and soluble manganese. *Id*. He stated that methods, equipment, and reagents for these tests are commercially available. *Id*.

IEPA responded that it "has no objection to this proposal." Curry Resp. at 3. IEPA proposed to add a subsection (d)(12) requiring plants with manganese removal to have "equipment for measuring the concentration of total manganese and soluble manganese." *Id*. The Board's order reflects this revision.

Subsection (d)(13). Capt. Curry noted an MCL of 1.0 mg/L for chlorite ion and stated that other guidance limits chlorine dioxide residual to 0.8 mg/L. Curry Test. at 8. He argued that "monitoring is necessary." *Id*. He proposed to add a subsection listing "treatment with chlorine dioxide" and requiring test equipment for measuring chlorine dioxide residual and chlorite ion concentration. *Id*. However, he questioned whether this proposed requirement should be included in proposed Section 604.130(c), which addresses measuring chlorine residual. *Id*.; *see* Prop. 604 at 9.

IEPA responded that it "has no objection to this addition." Curry Resp. at 3. IEPA proposed to add a subsection (d)(13) requiring plants using chlorine dioxide treatment to have "equipment for measuring chlorine dioxide residual and chlorite ion concentration." *Id*. The Board's order reflects this revision.

Section 604.135: Repair Work and Emergency Operation.

Subsection (a). IEPA proposed that "[t]he community water supply must be protected from contamination when any part of the system is out of service for repair, construction, alteration, or replacement." Prop. 604 at 10; *see* 35 Ill. Adm. Code 653.301 (Protection During Repair Work); SR at 16; *see* also Prop. 611 at 45 (proposing repeal of Section 611.271 requiring protection during repair work).

Subsection (b). IEPA proposed requirements under the heading "Disinfection Following Repair."

Subsection (b)(1). IEPA proposed that "[a]ny part of a community water system which has direct contact with finished water and has been out of service for repair, alteration, or replacement shall be disinfected and sampled as required by 35 Ill. Adm. Code 602.310 [Projects Requiring Disinfection] before being returned to service." Prop. 604 at 10; *see* 35 Ill. Adm. Code 653.302 (Disinfection Following Repair or Replacement); SR at 16-17.

Subsection (b)(2). IEPA proposed that "[e]quipment which does not come into contact with finished water such as raw surface water pumps, raw surface water transmission lines,

chemical mixing tanks and clarifiers need only be flushed before being returned to service." Prop. 604 at 10; *see* 35 Ill. Adm. Code 653.302 (Disinfection Following Repair or Replacement); SR at 16-17.

Subsection (b)(3). IEPA required disinfecting filters, which the Board addressed this above under "Disputed Issues." *See supra* at 10-11.

Subsection (b)(4). IEPA proposed that "[w]ells, water storage tanks, water treatment plants, and water mains shall be disinfected in accordance with AWWA C651, C652, C653, or C654 incorporated by reference in 35 Ill. Adm. Code 601.115." Prop. 604 at 10; *see* 35 Ill. Adm. Code 653.302 (Disinfection Following Repair or Replacement); SR at 16-17.

Subsection (c). IEPA placed this proposed subsection under the heading "Emergency Operation."

Subsection (c)(1). Under the heading "Boil Order," subsection (c)(1)(A) requires that, "[w]henever microbiological contamination is determined to persist in a public water supply, as demonstrated by microbiological analysis results, the owners or official custodians of the supply shall notify all consumers to boil for five minutes all water used for consumption or culinary purposes." Prop. 604 at 10; *see* 35 Ill. Adm. Code 653.303 (Emergency Operations); SR at 17; *see* also Prop. 607 at 1 (proposing repeal of Section 607.103 emergency operation requirements).

The Board asked IEPA to clarify whether the term "public water supply" in proposed subsection (c)(1)(A) should be changed to "community water supply." Board Questions at 5. IEPA "agrees with this proposed change." IEPA Resp. at 6. The Board's order reflects this revision.

ISAWWA commented that notification to boil for five minutes is not consistent with CDC's recommendation of a rolling boil for one minute. PC 7 at 2. ISAWWA asked IEPA to explain why it proposed boiling for five minutes. *Id*. IEPA responded that its proposal avoids confusion about whether "rolling boil" refers to "when the first bubble forms, when a stream of bubbles begins or when the water becomes highly agitated." Resp. 7-8 at 2. IEPA added that the proposal is based on an existing Board rule. *Id*.; *see* 35 Ill. Adm. Code 607.103(a); Prop. 607 at 1.

The Board asked IEPA whether this boil order notification is subject to notification requirements in proposed subsection (c)(2). Board Questions at 5. If so, then the Board asked whether subsection(c)(1) should include a cross-reference to subsection (c)(2). *Id*. IEPA responded that the notification is subject to the requirements at subsection (c)(2). IEPA Resp. at 7. While IEPA believes that its proposal addresses notification, it "has no objection to adding a cross reference." *Id*. The Board's order includes this cross-reference.

Subsection (c)(1)(B) requires that "[t]his boil order shall remain in effect until appropriate corrective action approved by the Agency is taken and microbiological samples demonstrate that the water is safe for domestic use." Prop. 604 at 10; *see* 35 Ill. Adm. Code

653.303 (Emergency Operation); SR at 17; *see* also Prop. 607 at 1 (proposing repeal of Section 607.103 emergency operation requirements).

The Board asked whether it would be acceptable to IEPA to clarify proposed subsection (c)(1)(B) by providing that "[t]his boil order will ~~shall~~ remain in effect . . ." Board Questions at 5. IEPA "has no objection to this proposal." IEPA Resp. at 7. The Board's order reflects this revision.

Subsection (c)(1)(C) requires that, "[i]f the owner or official custodian of the supply fails to take such action, the Agency may issue a boil order directly to the consumers affected." Prop. 604 at 10; SR at 17; *see* also Prop. 607 at 1 (proposing repeal of Section 607.103 emergency operation requirements).

The Board asked IEPA to comment on the factors and standards IEPA will consider when determining whether to issue a boil order if the owner or official custodian of a community water supply fails to take appropriate corrective action. Board Questions at 5. IEPA responded that "'may' was used instead of 'shall' to allow Agency discretion in instances where, for example, mitigation efforts occur faster than notification." IEPA Resp. at 7, citing 35 Ill. Adm. Code 607.103(c). During the first hearing, Mr. McMillan elaborated that this subsection addresses the situation of a CWS that did not issue a boil order but took corrective action to address an issue such as loss of pressure. Tr.1 at 22-23. He indicated that, if a CWS takes corrective action and monitoring data show that no contaminant persists, then IEPA would not need to issue a boil order. *Id.*

Subsection (c)(1)(D) provides that "[i]ssuance of a boil order does not relieve the water supply from making public notification in accordance with 35 Ill. Adm. Code 611.Subpart V [Public Notification of Drinking Water Violations]." Prop. 604 at 11; *see* 35 Ill. Adm. Code 653.303 (Emergency Operations); SR at 17.

Subsection (c)(2). Under the heading "Required Notification," subsection (c)(2)(A) requires that

> [o]wners and operators of community water supplies shall immediately notify the Agency at the appropriate Regional Office in accordance with 35 Ill. Adm. Code 602.104(f) when there is knowledge or suspicion that a water supply has become contaminated or the community water supply's finished water quality is negatively impacted due to treatment equipment malfunction. Prop. 604 at 11; *see* 35 Ill. Adm. Code 653.303(b) (Emergency Operation); SR at 17.

Subsection (c)(2)(B) requires that, "[w]henever the safety of a supply is endangered for any reason, including but not limited to spillage of hazardous substances, the community water supply owner, official custodian or Responsible Operator in Charge shall take appropriate action to protect the community water supply, and immediately notify the Agency." Prop. 604 at 11; SR at 17; *see* also Prop. 607 at 2 (proposing repeal of Section 607.103(c) notification requirements).

Subsection (c)(2)(C) provides that "[t]he Agency shall require the community water supply to notify all consumers of appropriate actions to protect themselves if the water supply has become contaminated or the consumers' safety may be endangered. If the community water supply fails to make such notifications, the Agency shall notify directly the consumers affected." Prop. 604 at 11; *see* SR at 17; *see* also Prop. 607 at 2 (proposing repeal of Section 607.103(c) notification requirements).

The Board asked whether it would be acceptable to IEPA to clarify subsection (c)(2)(C) by providing that "[t]he Agency will ~~shall~~ require the community water supply to notify all consumers . . ." Board Questions at 5-6. IEPA "has no objection to this proposal" (IEPA Resp. at 7), and the Board's order includes this revision.

Subsection (c)(2)(D) requires that, "[o]n weekends, holidays and after office hours, the Agency must be notified through the Illinois Emergency Management Agency at 1-800-782-7860." Prop. 604 at 11; *see* 35 Ill. Adm. Code 653.303(b) (Emergency Operation); SR at 17.

Subsection (c)(3). IEPA proposed that, "[w]hen the water pressure falls below twenty pounds per square inch on any portion of the distribution system for any amount of time, the owner or official custodian of the community water supply shall issue a boil order to those consumers affected unless the Agency has issued a SEP" and the CWS meets three conditions. Prop. 604 at 11; SR at 17; *see* 35 Ill. Adm. Code 607.103(b). The Board addressed this provision above under "Disputed Issues." *See supra* at 11.

In subsection (c)(3)(A), the first of these conditions is that "[t]here is a historical record of adequate chlorine residual and approved turbidity levels in the general area affected covering at least twelve monthly readings." Prop. 604 at 11; *see* 35 Ill. Adm. Code 607.103(b)(1).

The Board asked IEPA to clarify what would be an "adequate" level of chlorine residual. If public water supplies regulations specify minimum levels of residual chlorine for finished water, the Board asked IEPA to comment on whether subsection (c)(3)(A) should include a cross-reference to those regulations. Board Questions at 6. IEPA responded that "[a] minimum free chlorine residual of 0.5 mg/L or a minimum combined residual of 1.0 mg/L shall be maintained in all active parts of the distribution system at all times under proposed Section 604.725(a)." IEPA Resp. at 8. IEPA added that "[a] cross reference could be added." *Id.* The Board's order includes this cross reference.

In subsection (c)(3)(B), the second condition is that "[s]amples for bacteriological examination are taken in the affected area immediately and approximately twelve hours later." Prop. 604 at 11; *see* 35 Ill. Adm. Code 607.103(b)(2).

In subsection (c)(3)(C), the third condition is that "[t]ests for chlorine and turbidity taken at not more than hourly intervals in the affected area for several hours do not vary significantly from the historical record. If significant decrease in chlorine residual or increase in turbidity occurs, a boil order shall be issued." Prop. 604 at 11-12. The Board asked IEPA to comment on whether the issuance of a boil order is subject to notification requirements in proposed subsection (c)(2). Board Questions at 6. If so, the Board asked whether subsection (c)(3) should

include a cross-reference. *Id*. IEPA responded that the notification is subject to the requirements at subsection (c)(2). IEPA Resp. at 7. While IEPA believes that its proposal addressed notification, it "has no objection to adding a cross reference." *Id*. The Board's order includes this cross reference.

The Board also addressed testing in subsection (C) above under "Disputed Issues." *See supra* at 11-12.

Subsection (d). Under the heading "Emergency Operations Plan," IEPA proposed in subsection (d)(1) that

> [e]ach community water supply must develop an emergency operations plan for the provision of water under emergency circumstances including earthquakes, floods, tornados, and other disasters. The emergency operations plan shall include a review of the methods and means by which alternative supplies of drinking water could be provided in the event of destruction, impairment or contamination of community water supply. Prop. 604 at 12; SR at 17, citing 42 U.S.C. § 300g-2(a)(5).

IEPA stated that "[m]ost, if not all, community water supplies in Illinois have already written emergency operations plans." SR at 17.

Capt. Curry acknowledged that these plans benefit the public, but he stated that many small water supplies lack the resources to develop their own plans. Curry Test. at 8. He questioned whether IEPA or another source has sample plans available. *Id*. CLCJAWA commented that IEPA or another agency should provide templates and other guidance to prepare these plans. PC 8 at 2. IEPA responded that it has been requiring emergency plans through its inspection process "for at least the past 20 years." Curry Resp. at 4; Resp. 7-8 at 6. IEPA stated that, among the many sample plans available, "the Illinois Rural Water Association (IRWA) has a very serviceable template." *Id*. IEPA added that IRWA apparently "will also help in the preparation of plans for small CWSs." *Id*.

Subsection (d)(2) requires that "[t]he community water supply must review its emergency operations plan at least every three years and revise the plan as necessary. The community water supply shall maintain the emergency operations plan on site and make it available to the Agency, upon request." Prop. 604 at 12.

Above under "Disputed Issues," the Board addressed a comment that these plans should be exempt from disclosure under FOIA. *See supra* at 12-13.

Section 604.140: Nitrification Action Plan. Factors including temperature, water age, or free ammonia may cause a community water supply to experience loss of chlorine residual in the distribution system. SR at 17. Loss of chlorine residual may result in water quality issues including nitrification or detecting bacteria. *Id*. at 17-18; *see* McMillan Test. at 4. IEPA proposed that "[a]ny community water supply distributing water without a free chlorine residual

must create a Nitrification Action Plan (NAP)." Prop. 604 at 12; *see* SR at 17; McMillan Test. at 4.

Capt. Curry questioned whether a PWS that purchases treated water from another source will be required to comply with the requirements of this proposed section. Curry Test. at 9. IEPA responded that "CWSs that purchase water without a free chlorine residual and distribute this water must prepare a NAP." IEPA Resp. at 4.

Subsection (a). IEPA proposed that the NAP must "contain a plan for monitoring free ammonia, monochloramine, total chlorine, nitrite and nitrate levels." Prop. 604 at 12.

Capt. Curry stated that performing a nitrogen balance can be useful to evaluate the occurrence of nitrification. Curry Test. at 9; Curry Supp. Test. at 7. As chloramine residual decays, Ammonia-N is released into the water. As nitrification progresses, Ammonia-N oxidizes, and its concentration decreases. Curry Test. at 9. Capt. Curry argued that it is considered "essential" to monitor total ammonia-N and free ammonia-N to identify nitrification. *Id*.; *see* Curry Supp. Test. at 3. Capt. Curry added that IEPA's proposed NAP requires monitoring for total chlorine residual and monochloramine residual, with the difference between them consisting of dichloramine. He argues that dichloramine reacts with precursors to form N-nitrosodimethylamine (NDMA), a carcinogen for which USEPA is considering regulation. Curry Test. at 10, citing Att. 4. Based on these factors, Capt. Curry recommended revising subsection (a) to provide that an NAP must "contain a plan for monitoring total Ammonia-N, free Ammonia-N, Nitrite-N, Nitrate-N, monochloramine residual, dichloramine residual, and total chlorine residual." *Id*. at 9; *see* Curry Supp. Test. at 3, 7.

IEPA responded that its proposal provides monitoring "sufficient to determine if nitrification is occurring" for most CWSs. Curry Resp. at 4. IEPA added that it could require monitoring for Ammonia-N and dichloramine residual through a Special Exception Permit. *Id*.

In his supplemental testimony, Capt. Curry emphasized that measuring total ammonia-N is an important tool for determining whether "nitrification bacteria are present in the distribution system." Curry Supp. Test. at 3. He argued that variations in Nitrate-N concentrations in raw water and the sensitivity of tests measuring concentrations "may minimize the reliability of Nitrate-N as a significant indicator that nitrification is occurring in the distribution system." *Id*. at 7. However, he concluded that Nitrate-N should be included in the NAP because "it is needed to perform a 'Nitrogen Balance' and it is a logical parameter" to include. *Id*.

IEPA responded that based on Capt. Curry's additional testimony, "it is appropriate to include total Ammonia-N in the NAP." Curry Supp. Resp. at 1. IEPA proposes to revise subsection (a) to provide that the NAP must "contain a plan for monitoring total Ammonia-N, free Ammonia-N, ~~monochloramine, total chlorine,~~ Nitrite-N, ~~and~~ Nitrate-N ~~levels~~, monochloramine residual, dichloramine residual, and total chlorine residual. *Id*. The Board's order reflects this revision.

Subsection (b). IEPA proposed that the NAP must "contain system specific levels of the chemicals in subsection (a) where action must be taken." Prop. 604 at 12.

Subsection (c). IEPA proposed that the NAP must "contain specific corrective actions to be taken if the levels in subsection (b) are exceeded." Prop. 604 at 12.

Subsection (d). IEPA proposed that the NAP must "be maintained on site and made available to the Agency, upon request." Prop. 604 at 12.

Section 604.145: Exceptions for Community Water Supplies. IEPA rules do not require replacing certain components that do not meet design requirements if the CWS complies with specified standards and the components were either permitted at the time of construction or did not require a permit. 35 Ill. Adm. Code 653.203(a). To provide flexibility to CWSs, IEPA proposes a similar requirement in Part 604. SR at 18.

Subsection (a). IEPA proposed that "[a] community water supply operating before the effective date of this Part shall not be required to modify or replace components to meet the requirements of this Part" if it meets four conditions. Prop. 604 at 12. First, the CWS must meet the primary drinking water standards at Part 611. *Id*.; *see* 35 Ill. Adm. Code 653.203(a)(1). Second, it must also meet the requirements of Section 604.205 [Surface Water Quantity], 604.230 [Groundwater Quantity] and 604.1210 [Pumps]. Prop. 604 at 12. Third, it must also meet the water pressure standards of Section 604.1415(a)(1) [System Design]. *Id*.; *see* 35 Ill. Adm. Code 653.203(a)(2). Fourth, the components must have been permitted or not required a permit at the time of their construction. Prop. 604 at 13; *see* 35 Ill. Adm. Code 653.203(a)(3), 653.203(a)(4).

IEPA stated that "[t]he exception in Section 604.145(a) allows community water supplies flexibility until future renovations or construction projects are necessary." At that time, the CWS must meet all of the standards in Part 604. SR at 18; *see* 35 Ill. Adm. Code 653.203(b). The Board asked IEPA to comment on whether the regulations should explicitly state this intent. Board Questions at 6. IEPA responded that its proposal adequately addresses this issue. IEPA Resp. at 8.

Subsection (b). IEPA stated that drafting Part 604 presented numerous points at which it was not possible to consider all plausible options for design, operation, and maintenance requirements. SR at 18. IEPA proposed subsection (b) to allow a CWS to present alternatives. *Id*. In Part 604, 21 provisions refer to Section 604.145(b) to indicate where IEPA can consider alternatives. SR at 12 n.1, 18.

Subsection (b)(1). Under the heading "Alternate Design, Maintenance and Operation Requirements," subsection (b)(1) provides that, "[a]s specified in this Part, the Agency may approve design, maintenance, or operation requirements different from those contained in this Part so long as the alternative produces water meeting 35 Ill. Adm. Code 601.101 and 35 Ill. Adm. Code 611." Prop. 604 at 13; SR at 18.

Subsection (b)(2). IEPA proposed that, "[w]hen approving alternate design, maintenance or operation requirements, the Agency shall issue a construction permit, operating permit, or a special exception permit." Prop. 604 at 13; SR at 11-12, 18.

Subsection (b)(3). IEPA proposed that "[t]he Agency shall approve alternate design, maintenance or operation requirements, when the community water supply demonstrates that compliance with this Part is economically unreasonable or technically impossible." Prop. 604 at 13; SR at 18.

The Board asked IEPA to clarify whether the determination under subsection (b)(3) is appealable to the Board. Board Questions at 6. IEPA responded that this determination "is appealable to the Board through the permit appeals process." IEPA Resp. at 8.

Section 604.150: Protection of Community Water Supply Structures.

Subsection (a). IEPA regulations include a table establishing minimum distances separating facilities such as wells and reservoirs from sources of pollution for clay or loam soils. 35 Ill. Adm. Code 653.118(c)(3) (Table A). These distances increase for facilities located in more pervious soils such as sand and gravels. *Id*.

IEPA updated the table by adding a column establishing minimum separations for "soils with higher permeability than clay or loam." Prop. 604 at 13-14; *see* SR at 18. Although it doubled the separation for many sources, IEPA clarified that it did not increase separation for sewer lines because they do not "pose as large of a risk for potential contamination as cesspools, leaching sewage disposal pits, privies, [or] septic tanks." SR at 19; *see* Prop. 604 at 13-14. IEPA also did not increase separation for washwater sumps of reinforced concrete, floodwaters, or above ground fuel storage tanks "because the type of soil does not impact the necessary separation distances." SR at 19; *see* Prop. 604 at 14.

Subsection (b). IEPA proposed that "[w]ells shall meet the setback requirements of the Act." Prop. 604 at 14; SR at 19.

Subsection (c). IEPA proposed that "[f]uel storage tanks located at a community water supply facility must be above ground and must have secondary containment." Prop. 604 at 14; *see* 35 Ill. Adm. Code 653.118(d); SR at 19.

Section 604.155: Electrical Controls and Standby Power.

Subsection (a). IEPA proposed that "[e]lectrical controls shall be located above grade, in areas not subject to flooding." Prop. 604 at 14; *see* Recommended Standards § 2.5; SR at 19.

Subsection (b). The Board addressed subsection (b) and standby power above under "Disputed Issues." *See supra* at 13.

Section 604.160: Safety.

Subsection (a). IEPA proposed that "[a]ll community water supplies whose treatment involves chemical application must have and maintain a chemical safety plan." Prop. 604 at 15; SR at 19, citing 35 Ill. Adm. Code 653.601, 653.701.

The Board asked IEPA to explain the types of information and procedures that a CWS must include in the plan. Board Questions at 6. The Board also asked whether the regulations specify minimum requirements for chemical safety plans. *Id*. CLCJAWA stated that this proposal does not include any standards for these plans. PC 8 at 2.

IEPA acknowledges "the need for workplace safety with a general provision." Mr. Millan stated that IEPA intends to notify CWSs that these plans are required, but IEPA "would not be reviewing the plans." Tr.1 at 25. He added that the "Department of Labor or OSHA would be the regulatory authority for this situation." Tr.1 at 24. IEPA added that the proposal reflects its lack of expertise on worker safety. IEPA Resp. at 8; *see* Tr.1 at 24.

Capt. Curry questioned whether there are model plans or guidance available. Curry Test. at 11. CLCJAWA argued that IEPA should provide a template. PC 8 at 2. IEPA responded by deferring "to the appropriate state and federal agencies who have the proper expertise for the development of templates and proper plans." Curry Resp. at 4. IEPA stated that it "is not attempting to establish a standard. The purpose of this subsection is to raise awareness of the issue/concern." Resp. 7-8 at 6.

Subsection (b). The Board addresses safety training of CWS personnel above under "Disputed Issues." *See supra* at 13-14.

Section 604.165: Monthly Operating Report. Requirements for operating reports and recordkeeping are found in various sections of both IEPA's and the Board's rules. SR at 20, citing 35 Ill. Adm. Code 611.831, 653.605(a) (chlorination), 653.704(a) (fluoride). IEPA proposed to combine these requirements into this section. SR at 20.

Subsection (a). IEPA proposed that "[t]he community water supply shall prepare an operating report on a form approved by the Agency as specified in a construction, operating or special exception permit." Prop. 604 at 15; SR at 20.

The Board asked whether IEPA had approved a form for this report. If so, the Board asked IEPA to submit a copy of it. Board Questions at 6. IEPA submitted a Monthly Operation and Chemical Feeding Report, Monthly Coagulation and Lime Softening Report, Distribution System Operating Report, Monthly Iron Removal and Ion Exchange Softening Report, and Overall Plant Operation Report. IEPA Resp., Exh. (A)(2). IEPA stressed that "these reports are typically modified on a case by case basis." IEPA Resp. at 9 (listing hyperlinks to sample reports).

Subsection (b). IEPA proposed that "[a]n individual set of operating reports shall be maintained for each installation when more than one source of water with separate chemical addition equipment is used." Prop. 604 at 15; SR at 20; *see* 35 Ill. Adm. Code 653.605(b) (Chlorination Operating Records), 653.704(b) (Fluoride Operating Records).

Subsection (c). IEPA proposed that "[t]he operating report must be signed by the Responsible Operator in Charge, and submitted to the Agency within 30 days following the last

day of the month." Prop. 604 at 15; SR at 20; *see* 35 Ill. Adm. Code 611.831 (Monthly Operating Report).

Based on IEPA's proposed submission schedule, the Board asked whether it would be acceptable to IEPA to change the section heading to "Monthly Operating Report." Board Questions at 7. IEPA "has no objection to this proposal." IEPA Resp. at 9. The Board's order reflects this revision.

Subsection (d). The Board addressed maintaining copies of operating reports above under "Disputed Issues." *See supra* at 14.

Section 604.170: Security.

Subsection (a). IEPA proposed that "[e]ach community water supply shall be protected to prevent vandalism and entrance by animals or unauthorized persons." Prop. 604 at 15; SR at 20, citing Recommended Standards §§ 4.7.5.5.k (Aeration), 5.4.1.d.8 (Specific Chemicals), 6.1.1.d (Pumping Facilities Location), 6.2.7 (Pumping Stations Lighting), 7.0.4 (Finished Water Storage), 7.0.7 (Finished Water Storage Overflow), 7.0.9 (Finished Water Storage Vents), 8.9.1 (Surface Water Crossings); *see* Recommended Standards at xxv-xxvi (Policy Statement on Infrastructure Security for Public Water Supplies).

Capt. Curry recommended a revision requiring protection of specified facilities: community water supply wells, well houses, raw water intake structures, pumping stations, treatment plant buildings, and treated water storage reservoirs. Curry Test. at 12. IEPA responded that it "has no objection to this change." Curry Resp. at 5. IEPA revised the subsection to provide that "[e]ach community water supply well, well house, raw water intake structure, pumping stations, treatment plant buildings, and treated water storage reservoirs shall be protected to prevent vandalism and entrance by animals or unauthorized persons." *Id*. The Board's order reflects this revision.

Subsection (b). IEPA proposed that "[f]encing, locks on access manholes, or other necessary precautions must be provided to prevent trespassing, vandalism, and sabotage." Prop. 604 at 15; SR at 20, citing Recommended Standards §§ 4.7.5.5.k (Aeration), 5.4.1.d.8 (Specific Chemicals), 6.1.1.d (Pumping Facilities Location), 6.2.7 (Pumping Stations Lighting), 7.0.4 (Finished Water Storage), 7.0.9 (Finished Water Storage Vents), 8.9.1 (Surface Water Crossings); *see* Recommended Standards at xxv-xxvi (Policy Statement on Infrastructure Security for Public Water Supplies).

The Board addressed the issue of fencing above under "Disputed Issues." *See supra* at 14-15.

ISAWWA asked IEPA to clarify whether providing locks on access manholes requires "that all valve vaults must be locked." PC 7 at 2. IEPA responded by revising subsection (b) to require that "[f]encing, locks on tank access ~~manholes~~ hatches, or other necessary precautions must be provided to prevent trespassing, vandalism and sabotage." Resp. 7-8 at 2. The Board's order reflects this revision.

Subpart B: Source Development

"Before a community water supply can treat the water, it must first identify and select an adequate source of water – which can be surface water, groundwater, or groundwater under the direct influence of surface water." SR at 7. IEPA's proposed Subpart B updates Part 654 of IEPA's regulations. SR at 20; Cook Test. at 2; *see* 35 Ill. Adm. Code 654 (Raw and Unfinished Water Quality and Quantity). It also includes additional requirements from Part 3 of the Recommended Standards. Recommended Standards §§ 3.0 – 3.2 (Source Development). IEPA also proposes that this subpart "include requirements for well construction, well pumps, discharging piping, and well testing and records." SR at 21.

Section 604.200: General Requirements.

Subsection (a). IEPA proposed that "[e]ach water supply must take its raw water from the best available source, which is economically reasonable and technically possible." Prop. 604 at 15; *see* Cobb Test. at 2. Under existing Section 611.231(c), IEPA considers source water quality in determining whether to require filtration. SR at 21; *see* 35 Ill. Adm. Code 611.231(c). IEPA proposed to apply this requirement "universally, and not just when determining whether to require filtration." SR at 21; *see* Prop. 611 at 36 (proposing repeal of Section 611.231(c)).

Subsection (b). IEPA proposed that a CWS must provide specific proof when it selects a source of water. Prop. 604 at 15-16; *see* SR at 21; Recommended Standards § 3.0. Subsection (b)(1) requires proof that "an adequate quantity of water will be available." Prop. 604 at 15; *see* Recommended Standards § 3.0. Subsection (b)(2) requires proof that "the water which is to be delivered to the consumers will meet the current requirements of the Board and Act with respect to microbiological, physical, chemical and radiological qualities." Prop. 604 at 16; *see* Recommended Standards § 3.0.

Capt. Curry commented that other sections of proposed Part 604 provide these requirements more specifically, and he questioned whether this subsection is redundant. Curry Test. at 12. IEPA responded that, while other sections provide detail, "this general provision is necessary to highlight that source water selected must be treatable." IEPA Resp. at 5.

Subsection (c). IEPA proposed that "[a] surface water source includes tributary streams and drainage basins, natural lakes and artificial reservoirs or impoundments above the point of water supply intake." Prop. 604 at 16; *see* Recommended Standards § 3.1; SR at 21.

The Board asked IEPA to clarify the meaning and significance of the phrase "above the point of water supply intake." Board Questions at 7. IEPA responded that it means "upstream of the expected withdrawal point." IEPA Resp. at 9.

Subsection (d). IEPA proposed that "[a] groundwater source includes all water obtained from wells." Prop. 604 at 16; *see* Recommended Standards § 3.2; SR at 21.

Subsection (e). IEPA proposed that "[s]urface water, groundwater under the direct influence of surface water, or groundwater shall be approved as a community water supply source only if treatment produces water which meets the primary drinking water standards of 35 Ill. Adm. Code 611 is provided." Prop. 604 at 16; *see* 35 Ill. Adm. Code 654.101; SR at 21. The Board asked IEPA whether the revision below would be an acceptable clarification. Board Questions at 7.

> e) The Agency will approve ~~S~~surface water, groundwater under the direct influence of surface water, or groundwater ~~must be approved~~ as a community water supply source only if treatment produces water which meets the primary drinking water standards of 35 Ill. Adm. Code 611 and the following conditions are met ~~is provided~~:

IEPA had "no objection to this proposal" (IEPA Resp. at 9), and the Board's order reflects this revision.

Subsection (e)(1). IEPA proposed that "[t]he design of the water treatment plant must consider the worst conditions that may exist during the life of the system." Prop. 604 at 16; *see* Recommended Standards § 3.1.3.a; SR at 21.

Subsection (e)(2). IEPA proposed that "[s]ampling shall be performed to determine treatment requirements. Representative samples shall be submitted to the Agency to determine raw water quality. The Agency may require samples be taken for at least once a month over a 12-consecutive month period." Prop. 604 at 16; *see* 35 Ill. Adm. Code 654.101(a); SR at 21; Cook Test. at 3.

The Board asked IEPA to clarify whether proposed subsection (e)(2) requiring submission of "representative samples" to IEPA requires a CWS to provide actual water samples to IEPA for analysis. Board Questions at 7. IEPA responded that it intends to receive sample results. IEPA Resp. at 10. IEPA proposed the following revision of subsection (e)(2), which is reflected in the Board's order.

> 2) Sampling shall be performed to determine treatment requirements. ~~Representative samples shall be submitted to the Agency to determine raw water quality.~~ The Agency may require samples be taken for at least once a month over a 12 consecutive month period. Representative samples shall be submitted to the Agency to determine raw water quality. *Id*.

Subsection (e)(3). IEPA proposed that "[m]ore frequent sampling shall be required to obtain a true representation of raw water quality. Raw water characteristics shall be determined after heavy rainfall and runoff, low stream flow and at other times when unusual factors pertaining to physical and chemical quality, treatability, tastes and odors exist." Prop. 604 at 16; *see* 35 Ill. Adm. Code 654.101(b); SR at 21; Cook Test. at 3.

The Board asked IEPA to comment on whether subsection (e)(3) requiring "more frequent sampling" to determine raw water quality requires submitting additional samples to

IEPA. Board Questions at 7. IEPA responded that subsection (e)(3) "may require submission of additional samples to the Agency." IEPA Resp. at 10.

Subsection (e)(4). IEPA proposed that "[a]uxiliary treatment shall be provided for water where the geometric mean of fecal coliform exceeds 2000 per 100 ml. Examples of auxiliary treatment are presedimentation, prechlorination and storage of raw water for 30 days or more." Prop. 604 at 16; *see* 35 Ill. Adm. Code 654.101(e); SR at 21; Cook Test. at 3, citing 35 Ill. Adm. Code 302.306 (Fecal Coliform).

Section 604.205: Surface Water Quantity. An adequate amount of drinking water is required to be available at all times, including drought conditions. SR at 21; Cobb Test. at 5. Section 654.201 of IEPA's rules addresses surface water quantity, and IEPA proposes to replace it with this section. SR at 21; *see* 35 Ill. Adm. Code 654.201.

Subsection (a). IEPA proposed that the quantity of surface water at the source must "be adequate to meet the maximum projected water demand of the service area as shown by calculations based on a one in fifty-year drought or the extreme drought of record, and should include consideration of multiple year droughts." Prop. 604 at 16; *see* SR at 21; Cobb Test at 5; Recommended Standard § 3.1.1.a.

The Board asked IEPA to define the terms "drought," "one in fifty-year drought," and "extreme drought of record." Board Questions at 7.

IEPA acknowledged that The Water Dictionary, an AWWA publication previously incorporated by reference in 35 Ill. Adm. Code 601.115(b), defines "drought" as

> [a] normal, recurrent feature of climate that occurs in virtually all climatic zones (although its characteristics vary significantly from one region to another). Drought occurs primarily because of a deficiency of precipitation over an extended period of time, usually a season or more, resulting in a water shortage. There are many definitions of drought, with four main types: meteorological, hydrological, agricultural, and socioeconomic drought. The Water Dictionary at 181-82 (2nd ed. 2010); *see* 35 Ill. Adm. Code 601.105(c).

However, IEPA cited the view of the ISWS that "[d]rought is a complex physical and social phenomenon of widespread significance" that is difficult to define. IEPA Resp. at 10 (citation omitted). "ISWS indicates that the most straightforward way to identify a drought is by looking at the impacts such as crop losses, low water levels in lakes and streams, and water shortages, rather than specific definitions of shortfalls in precipitation." *Id*.

The Board asked whether it would be acceptable to IEPA to tie this requirement to precipitation. Tr.1 at 27. Mr. Cobb responded that this was not appropriate because the ISWS and State Climatologist had not identified it in those terms. *Id*.

The Board also asked IEPA to clarify whether the Illinois State Water Survey determines one in fifty year droughts on a regional basis for Illinois. Board Questions at 7. IEPA responded

that ISWS "maps the departure in precipitation as a percent from normal on a statewide basis but also relates them to return periods or recurrence intervals of a) 25 years, b) 50 years, c) 100 years, and d) 200 years." IEPA Resp. at 10. For the 50-year return period, the worst case is for a 60-month duration. *Id*. If a CWS wishes to determine whether it falls within the boundaries of a one-in-fifty-year drought, Mr. Cobb stated that it could use the ISWS Web page to determine the worst-case fifty-year return period for a sixty-month duration. Tr.1 at 27-28, IEPA Resp. at 11, citing http://www.isws.illinois.edu/atmos/statecli/Drought/60month.htm.

Subsection (b). IEPA proposed that the quantity of surface water at the source must "provide a 20% surplus unless otherwise approved by the Agency pursuant to Section 604.145(b)." Prop. 604 at 16; *see* Recommended Standard § 3.1.1.b. IEPA argued that this provides "a reasonable surplus for anticipated growth." SR at 21; *see* Cobb Test. at 5. IEPA proposed a 20 percent surplus because Section 602.107 requires that "community water supplies will be placed on critical review if records indicate the supply exceeds 80% of the quantity requirements." SR at 22; *see* 35 Ill. Adm. Code 602.107 (Critical Review).

The Board asked IEPA to clarify whether the 20% surplus requires a surplus over the amount of the maximum projected water demand of the service area. Board Questions at 7. IEPA responded that subsection (b) "requires a 20% surplus above the anticipated water usage to avoid the critical review list." IEPA Resp. at 10.

Subsection (c). IEPA proposed that the quantity of surface water at the source must "be adequate to compensate for all losses, including but not limited to silting, evaporation, seepage and required water releases." Prop. 604 at 17; *see* SR at 21-22; Cobb Test. at 5; Recommended Standard § 3.1.1.c.

Section 604.210: Surface Water Quality. Section 654.101 of IEPA's rules addresses surface water quality, and IEPA proposes to replace it with this section. 35 Ill. Adm. Code 654.101(d); *see* SR at 22.

Subsection (a). IEPA proposed that, "[f]or all surface water, community water supplies must provide conventional filtration treatment or other filtration technologies approved by the Agency pursuant to 35 Ill. Adm. Code 611.250(d) and disinfection." Prop. 604 at 17; *see* 35 Ill. Adm. Code 654.101(d); SR at 22. IEPA proposed to define "conventional filtration treatment" in Section 601.101(a). Prop. 601 at 3; *see* Cook Test. at 3.

The Board asked IEPA whether the following revision would be acceptable: "[f]or all surface water, community water supplies must provide conventional filtration treatment or ~~other~~ filtration treatment using technologies approved by the Agency under ~~pursuant to~~ 35 Ill. Adm. Code 611.250(d) and disinfection." Board Questions at 7. IEPA "has no objection to this proposal" (IEPA Resp. at 11), and the Board's order reflects this revision.

Subsection (b). IEPA proposed that, "[f]or all groundwater under the direct influence of surface water, community water supplies must provide filtration technologies approved by the Agency pursuant to 35 Ill. Adm. Code 611.250 and disinfection." Prop. 604 at 17; *see* SR at 22.

IEPA proposed a lower level of treatment because groundwater does not typically require turbidity removal. SR at 22.

The Board asked IEPA whether the following revision would be acceptable: "[f]or all groundwater under the direct influence of surface water, community water supplies must provide filtration treatment using technologies approved by the Agency under ~~pursuant to~~ 35 Ill. Adm. Code 611.250 and disinfection." Board Questions at 7. IEPA "has no objection to this proposal" (IEPA Resp. at 11), and the Board's order reflects this revision.

Subsection (c). IEPA proposed to require that "[a] source water assessment under Section 604.315 must be completed considering factors, both natural and manmade, which may affect water quality in the water supply stream, river, lake, or reservoir." Prop. 604 at 17; *see* Cobb Test. at 6.

The Board asked IEPA to clarify whether a CWS must perform a source water assessment for both surface water and groundwater under the influence of surface water. Board Questions at 8. IEPA responded that a CWS must assess both sources. IEPA proposed the following revision: "[a] source water assessment pursuant to Section 604.315 must be completed considering factors, both natural and manmade, which may affect water quality in the water supply stream, river, lake, reservoir or groundwater under direct influence of surface water. IEPA Resp. at 11. The Board's order reflects this revision.

Section 604.215: Surface Water Structures.

Subsection (a). IEPA proposed requirements for the design of surface water intake structures. Prop. 604 at 17-18; *see* SR at 22; Recommended Standards § 3.1.4.1.

Subsection (a)(1). IEPA proposed that the design must provide for "withdrawal of water from more than one level if quality varies with depth." Prop. 604 at 17; *see* Recommended Standards § 3.1.4.1.a.

Subsection (a)(2). IEPA proposed that the design must provide for "separate facilities for release of less desirable water held in storage." Prop. 604 at 17; *see* Recommended Standards § 3.1.4.1.b

Subsection (a)(3). IEPA proposed that, where frazil ice[2] may be a problem, the design must provide for "holding the velocity of flow into the intake structure to a minimum, generally not to exceed 0.5 feet per second." Prop. 604 at 17; *see* Recommended Standards § 3.1.4.1.c.

Subsection (a)(4). IEPA proposed that the design must provide for "inspection manholes every 1000 feet for pipe sizes large enough to permit visual inspection." Prop. 604 at 17; *see* Recommended Standards § 3.1.4.1.d.

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[2] "Frazil ice" means "[s]mall ice crystals that can block water intakes." The Water Dictionary (2nd ed. 2010) at 245, incorporated by reference in 35 Ill. Adm. Code 601.115(b); *see* 35 Ill. Adm. Code 601.105(c).

Subsection (a)(5). IEPA proposed that the design must provide "occasional cleaning of the inlet line." Prop. 604 at 17; *see* Recommended Standards §3.1.4.1.e. The Board asked IEPA to clarify the frequency of "occasional" cleaning. Board Questions at 8. IEPA responded by striking the word "occasional" (IEPA Resp. at 11), and the Board's order reflects this revision.

Subsection (a)(6). IEPA proposed that the design must provide "adequate protection against rupture by dragging anchors, ice and other factors." Prop. 604 at 17; *see* Recommended Standards § 3.1.4.1.f. The Board asked IEPA to clarify "adequate" protection. Board Questions at 8. IEPA responded by striking the word "adequate" (IEPA Resp. at 11), and the Board's order reflects this revision.

Subsection (a)(7). IEPA proposed that the design must provide for "ports located above the bottom of the stream, lake or impoundment, but at sufficient depth to be kept submerged at low water levels." Prop. 604 at 17; *see* Recommended Standards § 3.1.4.1.g.

Subsection (a)(8). IEPA proposed that, where shore wells are not provided, the design must provide for "a diversion device capable of keeping large quantities of fish or debris from entering an intake structure." Prop. 604 at 17; *see* Recommended Standards § 3.1.4.1.h.

Subsection (a)(9). IEPA proposed that, when buried surface water collectors are used, the design must provide sufficient intake opening area to minimize inlet head loss. "Particular attention should be given to the selection of backfill material in relation to the collector pipe slot size and gradation of the native material over the collector system." Prop. 604 at 17-18; *see* Recommended Standards § 3.1.4.1.i.

Subsection (b). IEPA proposed requirements for the design of raw water pumping stations. Prop. 604 at 18; *see* SR at 22; Recommended Standards § 3.1.4.2.

Subsection (b)(1). IEPA proposed that the station must "be protected from flooding and, when feasible, located above grade." Prop. 604 at 18; *see* Recommended Standards § 3.1.4.2.a.

Subsection (b)(2). IEPA proposed that the station must "be accessible." Prop. 604 at 18; *see* Recommended Standards § 3.1.4.2.b.

Subsection (b)(3). IEPA proposed that the station must "be designed against flotation." Prop. 604 at 18; *see* Recommended Standards § 3.1.4.2.c.

Subsection (b)(4). IEPA proposed that the station must "be equipped with a screen before the pump suction well." Prop. 604 at 18; *see* Recommended Standards § 3.1.4.2.d.

Subsection (b)(5). IEPA proposed that the station must "provide for introduction of chlorine or other chemicals in the raw water transmission line if necessary for quality control." Prop. 604 at 18; *see* Recommended Standards § 3.1.4.2.e.

Subsection (b)(6). IEPA proposed that the station must "have intake valves and provisions for backflushing or cleaning by a mechanical device and testing for leaks, where practical." Prop. 604 at 18; *see* Recommended Standards § 3.1.4.2.f.

Subsection (b)(7). IEPA proposed that the station must "have provisions for withstanding surges where necessary." Prop. 604 at 18; *see* Recommended Standards § 3.1.4.2.g.

Subsection (b)(8). IEPA proposed that the station must "be constructed to prevent intrusion of contaminants." Prop. 604 at 18; *see* Recommended Standards § 3.1.4.2.h.

Subsection (c). IEPA proposed requirements for side channel raw water storage reservoirs. Prop. 604 at 18-19; *see* SR at 22; Recommended Standards § 3.1.4.3.

Subsection (c)(1). IEPA proposed that "[a] side channel water storage reservoir is a facility into which water is pumped during periods of good quality and high stream flow for future release to treatment facilities." Prop. 604 at 18; *see* Recommended Standards § 3.1.4.3.

Subsection (c)(2). IEPA proposed requirements for the design of side channel raw water storage reservoirs. Prop. 604 at 18-19; *see* SR at 22; Recommended Standards § 3.1.4.3. Subsection (A) requires that the reservoir must be constructed to assure that "water quality is protected by controlling runoff into the reservoir." Prop. 604 at 18; *see* Recommended Standards § 3.1.4.3.a. Subsection (B) requires that the reservoir must be constructed to assure that "dikes are structurally sound and protected against wave action and erosion." Prop. 604 at 18; *see* Recommended Standards § 3.1.4.3.b. Subsection (C) requires that the reservoir must be constructed to assure that "intake structures and devices meet requirements of subsection (a) of this Section." Prop. 604 at 18; *see* Recommended Standards § 3.1.4.3.c.

Subsection (D) requires that the reservoir must be constructed to assure that the "point of influent flow is separated from the point of withdrawal." Prop. 604 at 18; *see* Recommended Standards § 3.1.4.3.d. Subsection (E) requires that the reservoir must be constructed to assure that "separate pipes are provided for influent to and effluent from the reservoir." Prop. 604 at 18; *see* Recommended Standards § 3.1.4.3.e. Subsection (F) requires that the reservoir must be constructed to assure that "a bypass line is provided around the reservoir to allow direct pumping to the treatment facilities." Prop. 604 at 19; *see* Recommended Standards § 3.1.4.3.f.

Section 604.220: Zebra Mussel Control. CLCJAWA commented that this section should be entitled "Invasive Mussel Control" because quagga mussels have largely displaced zebra mussels from Lake Michigan. PC 8 at 2. IEPA "concurs with this recommendation" (Resp. 7-8 at 6), which is reflected in the Board's order.

Subsection (a). IEPA proposed new requirements applicable to chemical treatment permitted to control invasive mussels. Prop. 604 at 19; *see* SR at 22; Cobb Test. at 6; Recommended Standards § 3.1.5.

Subsection (a)(1). IEPA proposed that "[c]hemical treatment shall be in accordance with Subpart K [Chemical Application]." Prop. 604 at 19; *see* Recommended Standards § 3.1.5.a.

Subsection (a)(2). IEPA proposed that "[p]lant safety items, including but not limited to ventilation, operator protective equipment, eyewashes/showers, cross connection control, etc., shall be provided." Prop. 604 at 19; *see* Recommended Standards § 3.1.5.b.

Subsection (a)(3). IEPA proposed that [s]olution piping and diffusers shall be installed within the intake pipe or in a suitable carrier pipe. Provisions shall be made to prevent dispersal of chemical into the water environment outside the intake. Diffusers shall be located and designed to protect all intake structure components." Prop. 604 at 19; *see* Recommended Standards § 3.1.5.c.

Subsection (a)(4). IEPA proposed that "[t]he chemical feeder shall be interlocked with plant system controls to shut down automatically when the raw water flow stops." Prop. 604 at 19; *see* Recommended Standards § 3.1.5.e.

Subsection (b). IEPA proposed that, "[w]hen alternative control methods are proposed for the control of zebra mussels, appropriate piloting or demonstration studies must be provided to the Agency for approval." Prop. 604 at 19; *see* Recommended Standards § 3.1.5.f. To be consistent with the revised title of this section, the Board's order refers to control of invasive mussels.

Section 604.225: Reservoirs. IEPA proposed that, where applicable, reservoirs must provide for removal of brush and trees to high water elevation, protection from floods during construction, and abandonment of wells that will be inundated. Prop. 604 at 19 (subsections (a) – (c)); *see* SR at 604; Recommended Standards § 3.1.6; Cobb Test. at 6.

Section 604.230: Groundwater Quantity.

Subsection (a). IEPA proposed that "[g]roundwater source adequacy shall be determined by the amount of water produced by each well pumping within its calculated safe yield." Prop. 604 at 19; *see* 35 Ill. Adm. Code 654.202(a); SR at 23; Recommended Standards § 3.2.1.

The Board asked IEPA whether the following revision would be acceptable: "[a] community water supply must determine groundwater~~Groundwater~~ source adequacy ~~shall be determined~~ by the amount of water produced by each well pumping within its calculated safe yield." Board Questions at 8. IEPA "has no objection to this proposal," (IEPA Resp. at 12), which is reflected in the Board's order.

Subsection (b). IEPA proposed that "[w]here multiple wells are used the combined delivery shall equal or exceed the maximum day demand with the largest producing well out of service." Prop. 604 at 19; *see* 35 Ill. Adm. Code 654.202(b); Recommended Standards § 3.2.1. IEPA intends that this change will increase "protection for the community water supply by requiring a higher water production rate." SR at 23.

The Board asked IEPA to comment on why single well systems are not required to meet the same delivery requirement that multiple-well systems must meet. Board Questions at 8. IEPA responded that the general production requirement at proposed Section 604.105(a) applies to both single-well and multiple-well systems. IEPA Resp. at 12; *see* Prop. 604 at 5 (requiring CWS to produce surplus of at least 20%). IEPA added that "[a] cross reference could be added for clarity." *Id*. The Board's order includes this cross reference.

The Board also asked IEPA whether a groundwater source should be required to meet the maximum projected water demand, including a 20% surplus, and compensate for losses as surface water sources must do under Section 604.205 [Surface Water Quantity]. Board Questions at 8. IEPA responded that groundwater sources "are not subject to evaporation like surface water source systems." IEPA Resp. at 12.

Subsection (c). IEPA sought to prohibit single well systems for new community water supplies, which are allowed under 35 Ill. Adm. Code 654.202(c). Prop. 604 at 20; SR at 23. IEPA intended to protect against "potential health concerns" resulting from having a single well out of service. Prop. 604 at 20; SR at 23; Cook Test. at 3. IEPA proposed that

> [n]o community water supply, the construction or modification of which commences after the effective date of this section shall rely only on a single well for its water source. A community water supply the construction of which commenced before and not modified after effective date of this section may rely on a single well for its water source, but shall be placed on the critical review list under 35 Ill. Adm. Code 602.107. For the purposes of this subsection "modified" means where the fixed capital costs of the new components constructed within a 2-year period exceed 50% of the fixed capital cost of a comparable entirely new facility. Prop. 604 at 20.

The Board asked IEPA whether it would be acceptable to IEPA to refer in this subsection to the effective date of Part 604. Board Questions at 8. IEPA responded that "section" is the correct reference "because other sections of this Part could be amended in the future," which may cause unintended changes to the effective date of this provision. IEPA Resp. at 12.

The Board also asked IEPA to explain the consequences of placing a single well CWS on the critical review list. Board Questions at 8; *see* 35 Ill. Adm. Code 602.107. IEPA responded that placing a single well system on the list "will make them more conscious that expansion without redundancy can leave customers vulnerable to water outages." IEPA Resp. at 12.

The Board also asked whether, after a CWS is placed on that list, there are any circumstances in which it may be removed from the list. Board Questions at 8. IEPA responded that, "[o]nce the water system installs a back-up well, it can be removed from critical review." IEPA Resp. at 12.

Subsection (d). IEPA proposed that "[t]he well location shall be selected to minimize the impact on other wells and other water resources." Prop. 604 at 20; *see* SR at 23; Recommended Standard § 3.2.3.

Section 604.235: Groundwater Quality.

Subsection (a). IEPA proposed to require each CWS using groundwater to perform monthly sampling and analysis for total coliform bacteria. "The analysis must be performed by a certified laboratory." Prop. 604 at 20. IEPA proposed this requirement in response to U.S. EPA's groundwater rule. SR at 23-24, citing 71 Fed. Reg. 65574 (Nov. 8, 2006).

Subsection (a)(1). IEPA proposed that, "[i]f a routine sample is total coliform positive, the community water supply must collect and analyze another sample within 24 hours of being notified of the positive result. The samples must be submitted to a certified laboratory for analysis." Prop. 604 at 20; *see* SR at 23.

Subsection (a)(2). IEPA proposed that "[r]esults which show the presence of coliform and have been confirmed by a sample taken pursuant to subsection (a)(1) of this Section shall be reported to the Agency within 24 hours of being notified of the positive result of the samples taken under subsection (a)(1) of this subsection." Prop. 604 at 20; *see* SR at 23.

Subsection (b). IEPA proposed that "[t]he Agency shall require multiple barrier treatment to achieve at least 99.99 percent (4-log) removal or inactivation of viruses for all groundwater sources subject to bacteriological contamination." Prop. 604 at 20; *see* 35 Ill. Adm. Code 611.822(c)(3); SR at 24.

Subsection (c). IEPA proposed that, "[w]hen maintenance or equipment replacement on a well occurs that does not require a construction or operating permit under 35 Ill. Adm. Code 602, one sample from the well must be submitted to a certified laboratory for microbiological analysis." Prop. 604 at 20; *see* SR at 24.

The Board asked IEPA to clarify whether microbiological analysis involves testing for total coliform bacteria. Board Questions at 8. IEPA responded that subsection (c) could be revised to refer to "total coliform bacteria" as subsection (a) does. IEPA Resp. at 13. The Board's order reflects this revision,

Subsection (c)(1). IEPA proposed that, "[i]f the sample result is satisfactory, the well may be placed into service." Prop. 604 at 20; *see* SR at 24.

The Board asked IEPA whether a sample result is "satisfactory" based on the presence or absence of coliform bacteria. Board Questions at 8. IEPA responded that "[a] sample result would be satisfactory if it did not show the presence of *e.coli* or total coliform bacteria." IEPA Resp. at 13.

Subsection (c)(2). IEPA proposed that, "[i]f the sample is unsatisfactory, the well may not be placed into service until samples collected from the well on two consecutive days and tested by a certified laboratory have satisfactory results." Prop. 604 at 20; *see* SR at 24.

Subsection (d). IEPA proposed that "[a] source water assessment pursuant to Section 604.315 must be made of the factors, both natural and manmade, which may affect water quality in the groundwater." Prop. 604 at 21; *see* SR at 24.

The Board asked whether the following revision would be acceptable to IEPA and make it consistent with proposed Section 604.210(c). Board Questions at 9. "A source water assessment under ~~pursuant to~~ Section 604.315 must be completed considering ~~made of the~~ factors, both natural and manmade, which may affect water quality in the groundwater." *Id*. IEPA "has no objection to this proposal," (IEPA Resp. at 13), which is reflected in the Board's order.

Section 604.240: General Well Construction. Current well construction requirements are based on the 1982 Recommended Standards for Water Works and the AWWA A100 Standard for deep wells. Cobb Test. at 3; *see* 35 Ill. Adm. Code 653. IEPA proposed updated general well construction requirements based on Section 3.2.4 of the Recommend Standards. SR at 24.

Subsection (a). IEPA proposed that "drilling fluids and additives shall not impart any toxic substance to the water or promote bacterial contamination." Prop. 604 at 21; *see* Recommended Standards § 3.2.4.1.a.

Subsection (b). IEPA proposed that "[m]inimum protected depths of drilled wells shall provide watertight construction to exclude contamination and seal off formations that are, or may be, contaminated or yield undesirable water." Prop. 604 at 21; *see* Recommended Standards § 3.2.4.2.

Subsection (c). IEPA proposed that "[s]urface or temporary steel casing used for construction must be capable of withstanding the structural load imposed during its installation and removal. Surface or temporary casing must be removed during or prior to grouting or it must be grouted in place when set according to subsection (j)[3]." Prop. 604 at 21; Recommended Standards § 3.2.4.3.

Subsection (d). IEPA proposed that "[t]he well casing material must be steel." Prop. 604 at 21, 110-11 (Table 1: Steel Pipe); *see* 35 Ill. Adm. Code 653.103(c); Recommended Standards § 3.2.4.4; Cobb Test. at 4-5. IEPA argues that steel is "more reliable and a longer lasting material than PVC" and helps to "reduce contamination to the well." SR at 24.

Subsection (d)(1). IEPA proposed that permanent pipe must "be new single steel casing pipe meeting AWWA A100, incorporated by reference in 35 Ill. Adm. Code 601.115, for water well construction." Prop. 604 at 21; *see* Recommended Standards § 3.2.4.4.a.

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[3] IEPA's proposal omitted subsection (d). Prop. 604 at 21. To maintain alphabetical order, the Board's order re-designates subsections (e) – (n) as subsections (d) - (m).

Subsection (d)(2). IEPA proposed that pipe must "have a minimum weight and thickness indicated in Table 1 of this Part." Prop. 604 at 21, 110-11 (Table 1: Steel Pipe); *see* Recommended Standards § 3.2.4.4.b.

Subsection (d)(3). IEPA proposed that pipe must "be equipped with a drive shoe when driven." Prop. 604 at 21; *see* Recommended Standards § 3.2.4.4.e.

Subsection (d)(4). IEPA proposed that pipe must "have full circumferential welds or threaded coupling joints." Prop. 604 at 21; *see* Recommended Standards § 3.2.4.4.f.

Subsection (e). IEPA proposed that "[a]ll wells during construction shall be protected against the entrance of water, contaminants and tampering. Methods for capping a well include, but are not limited to, a welded metal plate or a threaded cap." Prop. 604 at 21; *see* SR at 21; Recommended Standards § 3.2.4.13.

Subsection (f). IEPA proposed that "[p]ackers shall be of a material that will not impart taste, odor, toxic substances or bacterial contamination to well water. Lead packers shall not be used." Prop. 604 at 21; *see* SR at 24; Recommended Standards § 3.2.4.7.

Subsection (g). IEPA proposed requirements for screens installed in wells. Prop. 604 at 21-22; *see* SR at 24; Recommended Standards § 3.2.4.8.

Subsection (g)(1). IEPA proposed that screens must "be constructed of materials resistant to damage by chemical action of groundwater or cleaning operations." Prop. 604 at 21; *see* Recommended Standards § 3.2.4.8.a.

Subsection (g)(2). IEPA proposed that screens must "have size of openings based on sieve analysis of formation and/or gravel pack materials." Prop. 604 at 21; *see* Recommended Standards § 3.2.4.8.b.

Subsection (g)(3). IEPA proposed that screens must "have sufficient length and diameter to provide adequate specific capacity and low aperture entrance velocity." Prop. 604 at 21; *see* Recommended Standards § 3.2.4.8.c.

Subsection (g)(4). IEPA proposed that screens must "be installed so that pumping water level remains above the screen under all operating conditions." Prop. 604 at 22; *see* Recommended Standards § 3.2.4.8.d.

Subsection (g)(5). IEPA proposed that screens must "be provided with a bottom plate or washdown bottom fitting of the same material as the screen." Prop. 604 at 22; *see* Recommended Standards § 3.2.4.8.f.

Subsection (h). Under the heading "Grouting Requirements," IEPA proposed that "[t]he annulus of all permanent well casings shall be grouted from the original ground surface or pitless unit to a minimum depth of 10 feet utilizing a minimum thickness of 1½ inches of grout." Prop. 604 at 22-23; *see* 35 Ill. Adm. Code 653.103(c); SR at 24-25; Recommended Standards §

3.2.4.9; Cobb Test. at 5. IEPA did not propose to allow bentonite and clay seal grouting "because these materials will dry out and fail." SR at 24-25; *see* Cobb Test. at 5; *but see* Recommended Standards §§ 3.2.4.9.c (Bentonite), 3.2.4.9.d (Clay seal).

Subsection (h)(1). Under the heading "Neat Cement grout," IEPA proposed that "[c]ement conforming to AWWA A100, and water, with not more than six gallons of water per 94 pounds of cement, must be used for 1½ inch openings." Prop. 604 at 22; *see* Recommended Standard § 3.2.4.9.a.1.

Subsection (h)(2). Under the heading "Concrete Grout," IEPA proposed that "[e]qual parts of cement conforming to AWWA A100, and sand, with not more than six gallons of water per 94 pounds of cement may be used for annular openings larger than 1½ inches. For annular opening greater than four inches, gravel added to the concrete shall not exceed one-half inch." Prop. 604 at 22; *see* Recommended Standard § 3.2.4.9.b.

Subsection (h)(3). Under the heading "Application," IEPA proposed in subsection (h)(3)(A) that "[a] minimum thickness of 1½ inches of grout around permanent casings, including couplings shall be provided." Prop. 604 at 22; *see* Recommended Standards § 3.2.4.9.e.1.

Subsection (h)(3)(B) requires that, "[p]rior to grouting through creviced or fractured formations, bentonite or similar materials may be added to the annular opening, in the manner indicated for grouting." Prop. 604 at 22; *see* Recommended Standards § 3.2.4.9.e.2.

Subsection (h)(3)(C) requires that, "[w]hen the annular opening is less than four inches, grout shall be installed under pressure by means of a grout pump from the bottom of the annular opening upward in one continuous operation until the annular opening is filled." Prop. 604 at 22; *see* Recommended Standards § 3.2.4.9.e.3.

Subsection (h)(3)(D) requires that, "[w]hen the annular opening is four inches or greater and extends less than 100 feet, and concrete grout is used, it may be placed by gravity through a grout pipe installed to the bottom of the annular opening in one continuous operation until the annular opening is filled." Prop. 604 at 22; *see* Recommended Standards § 3.2.4.9.e.4.

Subsection (h)(3)(E) requires that "[g]rout shall be allowed to overflow from the annular opening until the proper density or percent solids have been achieved." Prop. 604 at 22. IEPA stated that overflow allows taking samples that can be "analyzed to verify that the proper density or percent solids have been achieved." SR at 24-25.

Subsection (h)(3)(F) requires that "standby grouting equipment for grouting annular openings, including a backup grout pump and tremie pipe[4], shall be on-site during the grouting

[4] "Tremie pipe" means "[a] small pipe inserted into the annular space between a borehole and well casing to place filter pack materials, cements, and grouts." The Water Dictionary (2nd ed. 2010) at 624, incorporated by reference in 35 Ill. Adm. Code 601.115(b); *see* 35 Ill. Adm. Code 601.105(c).

of all wells." Prop. 604 at 23. IEPA stated that, in the event of a pump failure, this requirement ensures that "grout is placed continuously to establish a proper seal." SR at 25.

Subsection (h)(3)(G) requires that "[t]he conductor pipe shall be completely withdrawn from the well prior to flushing excess grout from the conductor pipe when grouting down the annular space or shall be disconnected from the grout shoe or street elbow prior to flushing excess grout when grouting within the casing." Prop. 64 at 23. IEPA argued that this requirement ensures "that flushed grout which can be diluted with the water used in the flushing process does not end up in the annular space of the well." SR at 25.

Subsection (h)(3)(H) requires that, "[a]fter cement grouting is applied, work on the well shall be discontinued until the cement or concrete grout has properly set." Prop. 604 at 23; *see* Recommended Standards § 3.2.4.9.e.6.

Subsection (h)(3)(I) requires that "[g]rout placement must be sufficient to achieve proper density or percent solids throughout the annular space." Prop. 604 at 23; *see* Recommended Standards § 3.2.4.9.e.7.

Subsection (h)(4). Under the heading "Guides," IEPA proposed that "[t]he casing shall be provided with sufficient guides welded to the casing to center the casing in the drill hole, prevent displacement of the casing and still permit unobstructed flow and uniform thickness of grout." Prop. 604 at 23; *see* Recommended Standards § 3.2.4.9.f.

Subsection (i). IEPA proposed upper terminal well construction requirements. Prop. 604 at 23; *see* SR at 24; Recommended Standards § 3.2.4.10.

Subsection (i)(1). IEPA proposed that "[p]ermanent casing for all groundwater sources shall project at least 12 inches above the pumphouse, well platform floor or concrete apron surface and at least 18 inches above final ground surface." Prop. 604 at 23; *see* Recommended Standards § 3.2.4.10.a.

Subsection (i)(2). IEPA proposed that, "[w]here a well house is constructed, the floor surface shall be at least six inches above the final ground elevation." Prop. 604 at 23; *see* Recommended Standards § 3.2.4.10.b.

Subsection (i)(3). IEPA proposed that "[p]rotection from physical damage shall be provided." Prop. 604 at 23; *see* Recommended Standards § 3.2.4.10.e.

Subsection (i)(4). IEPA proposed that "[t]he upper terminal shall be constructed to prevent contamination from entering the well." Prop. 604 at 23; *see* Recommended Standards § 3.2.4.10.f.

Subsection (i)(5). IEPA proposed that, "[w]here well appurtenances protrude through the upper terminal, the connection to the upper terminus shall be mechanical or welded connections that are water tight." Prop. 604 at 23; *see* Recommended Standards § 3.2.4.10.g.

Subsection (j). IEPA placed this subsection under the heading "Upper terminal well construction in the flood plain of a 100 year flood or flood of record."

Subsection (j)(1). IEPA proposed that "[s]ites subject to flooding shall be provided with an earth mound to raise the well house floor to an elevation of at least two feet above the highest known flood elevation, or other suitable protection as determined by the Agency. A 15 foot horizontal distance shall be maintained." Prop. 604 at 23; *see* Recommended Standards § 3.2.4.10.c.

The Board asked IEPA to clarify whether "flood of record" should be "maximum flood of record". Board Questions at 9. IEPA responded that its proposal accurately conveys its intent. IEPA Resp. at 14.

The Board also asked IEPA whether the 15-foot horizontal distance should be measured from the top of the well casing or from the edge of the well house. Board Questions at 9. IEPA responded that the distance should be measured from the well casing and not from the edge of the well house. IEPA Resp. at 13.

Subsection (j)(2). IEPA proposed that "[t]he top of the well casing at sites subject to flooding shall terminate at least three feet above the 100 year flood level or the highest known flood elevation, whichever is higher, or as otherwise approved by the Agency pursuant to Section 604.145(b)." Prop. 604 at 24; *see* SR at 11-12; Recommended Standards § 3.2.4.10.d.

Subsection (j)(3). IEPA proposed that "[w]ells shall have six-inch concrete envelope completely surrounding the regular casing and extending at least 10 feet below original ground surface." Prop. 604 at 24; *see* SR at 25, citing 35 Ill. Adm. Code 653.118 (Table A: Minimum Distances from Sources of Pollution for Clay or Loam Soils).

Subsection (k). IEPA placed these proposed requirements under the heading "Development."

Subsection (k)(1). IEPA proposed that "[e]very well shall be developed to remove the native silts and clays, drilling mud or finer fraction of the gravel pack." Prop. 604 at 24; *see* SR at 24; Recommended Standards § 3.2.4.11.a.

Subsection (k)(2). IEPA proposed that "[d]evelopment must continue until the maximum specific capacity is obtained from the completed well." Prop. 604 at 24; *see* SR at 24; Recommended Standards § 3.2.4.11.b.

Subsection (k)(3). IEPA proposed that, "[w]here chemical conditioning is required, specifications submitted to the Agency pursuant to 35 Ill. Adm. Code 602 shall include provisions for the method, equipment, chemicals, testing for residual chemicals, and disposal of waste." Prop. 604 at 24; *see* SR at 24; Recommended Standards § 3.2.4.11.c.

Subsection (k)(4). IEPA proposed that, "[w]here blasting procedures are used, specifications submitted to the Agency pursuant to 35 Ill. Adm. Code 602 shall include the

provisions for blasting and cleaning. The grouting and casing must not be damaged by the blasting." Prop. 604 at 24; *see* SR at 24; Recommended Standards § 3.2.4.11.d.

Subsection (l). IEPA proposed that, "[w]hen an operating permit is not required pursuant to 35 Ill. Adm. Code 602, disinfection of modified or reconditioned wells shall be provided, and a record of microbiological samples shall be maintained for five years." Prop. 604 at 24; *see* SR at 24; Recommended Standards § 3.2.4.12.

Subsection (m). IEPA proposed that "[t]est wells and groundwater sources which are not in use shall be sealed in accordance with 77 Ill. Adm. Code 920.120. The sealing form specified in 77 Ill. Adm. Code 920.120(e)(2) shall be submitted to the Agency not more than 30 days after the well is sealed. Prop. 604 at 24, *see* 77 Ill. Adm. Code 920.120 (Abandoned Wells); SR at 24; Recommended Standards § 3.2.4.14.

Section 604.245: Well Testing and Records.

Subsection (a). IEPA proposed that "'[t]he specific capacity of the production well must be determined before the well is placed in service. Specific capacity must be determined by a drawdown test in the production well." Prop. 604 at 24; *see* SR at 25; Recommended Standards § 3.2.5.1.a.

The Board asked IEPA whether it would be acceptable to amend the subsection to provide that "[t]he specific capacity of the production well must be determined by a drawdown test before the well is placed in service." Board Questions at 9. IEPA responded that it "has no objection to this proposal" (IEPA Resp. at 13), which is reflected in the Board's order.

Subsection (b). IEPA proposed to require that aquifer property data must be determined in one of three ways: "published values of transmissivity and hydraulic conductivity, estimated by using specific capacity, or a pump test with an observation well." Prop. 604 at 24-25 (subsections (1) – (3)); *see* SR at 25-26; Recommended Standards § 3.2.5. Mr. Cobb testified that this data is used both to delineate wellhead protection area and in a source water protection plan. Cobb Test. at 4. He added that the data also play a role in establishing maximum setback zones and regulated recharge areas. Cobb Test. at 4; *see* 415 ICLS 5/14.3, 17.4 (2016).

Subsection (c). IEPA placed these requirements under the heading "Pump Test."

Subsection (c)(1). IEPA proposed that "[a] pump test must be performed on every production well after construction and prior to placement of the permanent pump." Prop. 604 at 25; *see* SR at 25; Recommended Standards § 3.2.5.1.b.

Subsection (c)(2). IEPA proposed that "[a] pump test must have a capacity of at least 1.5 times the flow anticipated at the maximum anticipated drawdown." Prop. 604 at 25; *see* Recommended Standards § 3.2.5.1.d.

Subsection (c)(3). IEPA proposed that "[t]he test shall provide, as a minimum, for continuous pumping for at least 24 hours at the design pumping rate or until stabilized drawdown

has continued for at least six hours when test pumped at 1.5 times the design pumping rate." Prop. 604 at 25; *see* Recommended Standards § 3.2.5.1.e.

Subsection (d). IEPA proposed to require submission of specific information before it will issue an operating permit. Prop. 604 at 25-27; *see* SR at 25; Recommended Standards § 3.2.5.1.f. Mr. Cobb testified that IEPA proposed to require this well specific empirical data to supplement the general requirements. Cobb Test. at 3. The data can be used to determine the characteristics of the well and aquifer and can also indicate the quantity of water the well can produce before endangering pump equipment or the aquifer. SR at 25-26; *see* Cobb Test. at 4.

Subsection (d)(1). Under the heading "pump test data," IEPA proposed to require submitting the latitude and longitude of the observation well, test pump capacity head characteristics, static water level, depth of test pump settings, and time of starting and ending each test cycle. Prop. 604 at 25 (subsections (A) – (E)); *see* Recommended Standards§ 3.2.5.1.f.

Subsection (d)(2). IEPA proposed to require submitting the "static water level in the production well and observation well(s)." Prop. 604 at 25.

Subsection (d)(3). IEPA proposed to require submitting the "pumping water level in the production well." Prop.604 at 25.

Subsection (d)(4). IEPA proposed to require submitting the "transmissivity in gallons per day per foot of drawdown (GPD/ft)." Prop. 604 at 25. Mr. Cobb testified that the Board has adopted a definition of "transmissivity." Cobb Test. at 3; *see* 35 Ill. Adm. Code 601.105.

Subsection (d)(5). IEPA proposed to require submitting the "hydraulic conductivity in gallons per day per square feet (GPD/ft^2) or feet per day (ft/day)." Prop. 604 at 25. Mr. Cobb testified that the Board has adopted a definition of "hydraulic conductivity." Cobb Test. at 3; *see* 35 Ill. Adm. Code 601.105.

Subsection (d)(6). IEPA proposed to require submitting the "saturated thickness of the aquifer." Prop. 604 at 25; *see* SR at 25-26.

Subsection (d)(7). IEPA proposed to require submitting the "storage coefficient or specific yield (dimensionless)." Prop. 604 at 25; *see* SR at 25-26. Mr. Cobb testified that the Board has adopted a definition of "storage coefficient." Cobb Test. at 3; *see* 35 Ill. Adm. Code 601.105, 602.101.

Subsection (d)(8). IEPA proposed to require submitting the "lateral area of influence calculated pursuant to 35 Ill. Adm. Code 671." Prop. 604 at 25; *see* SR at 26. IEPA stated that the lateral area of influence "is used to establish maximum setback zones pursuant to Section 14.3 of the Act." SR at 26; *see* 415 ICLS 5/14.3 (2016).

Subsection (d)(9). IEPA proposed to require submitting the following data recorded and graphically evaluated at intervals of one hour or less: pumping rate, pumping water level, drawdown, water recovery rate and levels, and specific capacity measured in gallons per minute

per foot (GPM/ft) of draw down." Prop. 604 at 26 (subsections (A) – (E)); *see* Recommended Standards § 3.2.5.1.g.

Subsection (d)(10). IEPA proposed requirements to determine regional groundwater gradient and flow. Subsection (A) states that, "íf the groundwater gradient and flow direction was estimated, provide the data, and the source of such data." Prop. 604 at 26. Subsection (B) states that, "if the groundwater gradient and flow direction was not estimated, provide the longitude and latitude of the wells used, well logs and the water elevations observed in the wells during the pump test." *Id*. Subsection (C) requires providing "the compass direction clockwise from north in degrees." *Id*. Subsection (D) requires providing "the gradient." *Id*.

Subsection (d)(11). Under the heading "Geological Data," IEPA proposed to require submitting "a driller's log determined from samples collected at 5 foot intervals and at each pronounced change in formation; accurate geographical location such as latitude and longitude or GIS coordinates; records of drill hole diameters and depths; order of size and length of casing, screens and liners; grouting depths; formations penetrated; water levels; and location of any blast charges." Prop. 604 at 26-27 (subsections (A) – (H)); *see* SR at 26-27; Recommended Standards § 3.2.5.3.

Subsection (e). IEPA proposed that "[e]very well be tested in accordance with AWWA A100, incorporated by reference in 35 Ill. Adm. Code 601.115, for plumbness and alignment. The test method and allowable tolerance must be clearly stated in the specifications submitted to the Agency." Prop. 604 at 27; *see* SR at 25; Recommended Standards § 3.2.5.2.

Subsection (f). IEPA proposed that "[t]he owner of each well must retain all records pertaining to each well's construction, maintenance and operation." Prop. 604 at 27; *see* Recommended Standards § 3.2.5.4.

Section 604.250: Aquifer Types and Construction Methods,

Subsection (a). Under the heading "Sand or Gravel Wells," IEPA proposed in subsection (a)(1) that, "[u]nless otherwise approved by the Agency pursuant to Section 604.145(b), the permanent casing and grout shall extend at least 25 feet below the original ground elevations." Prop. 604 at 27; *see* SR at 11-12, 26; Recommended Standards § 3.2.6.1. In subsection (b)(2), IEPA proposed that, "[i]f a temporary or surface casing is used, it shall be completely withdrawn." Prop. 604 at 27; *see* SR at 11-12, 26; Recommended Standards § 3.2.6.1.c.

Subsection (b). Under the heading "Gravel Pack Material," IEPA proposed requirements for the composition and placement of these materials. SR at 27-28.

Subsection (b)(1). IEPA proposed in subsection (A) that these materials must "be sized based on sieve analysis of the formation." Prop. 604 at 27; *see* Recommended Standards § 3.2.6.2.a. Subsection (B) requires that the materials must "be well-rounded particles, 95 percent siliceous material, that are smooth and uniform, free of foreign material, properly sized, washed and then disinfected immediately prior to or during placement." Prop. 604 at 27; *see* Recommended Standards § 3.2.6.2.b.

Subsection (b)(2). Under the heading "Gravel pack," IEPA proposed in subsection (A) that "[g]ravel pack shall be placed in one continuous operation." Prop. 604 at 27; *see* SR at 26; Recommended Standards § 3.2.6.2.b.1. Subsection (B) requires that "[g]ravel pack shall be placed in a manner that prevents segregation and gradation during placement." Prop. 604 at 27; *see* SR at 26; Recommended Standards § 3.2.6.2.b.2. Subsection (C) requires that "[t]he annular space between the well screen and the hole shall allow for proper placement of gravel pack." Prop. 604 at 27; *see* SR at 26; Recommended Standards § 3.2.6.2.b.3.

Subsection (D) requires that "[g]ravel pack shall extend above the highest well screen with an allowance for settling." Prop. 604 at 27; *see* SR at 26; Recommended Standards § 3.2.6.2.b.6. Subsection (E) requires that "[p]rotection from leakage of grout into the gravel pack or screen shall be provided." Prop. 604 at 28; *see* SR at 26; Recommended Standards § 3.2.6.2.b.7. Subsection (F) requires that "[p]ermanent inner casing and outer casings shall meet requirements of Section 604.240(e)[5] of this Part." Prop. 604 at 28; *see* SR at 26; Recommended Standards § 3.2.6.2.b.8.

Subsection (c). Under the heading "Radial Water Collector," IEPA proposed requirements for these facilities. SR at 28.

Subsection (c)(1). IEPA proposed that "[l]ocations of all caisson construction joints and porthole assemblies shall be indicated on plans submitted to the Agency." Prop. 604 at 28; *see* SR at 26; Recommended Standards § 3.2.6.3.a.

Subsection (c)(2). IEPA proposed that "[p]rovisions shall be made to assure that radial collectors are essentially horizontal." Prop. 604 at 28; *see* SR at 26; Recommended Standards § 3.2.6.3.d.

Subsection (c)(3). IEPA placed these requirements under the heading "Caisson Construction." Subsection (A) requires that "[t]he caisson wall shall be reinforced to withstand the forces to which it will be subjected." Prop. 604 at 28; *see* SR at 26; Recommended Standards § 3.2.6.3.b. Subsection (B) requires that "[t]he top of the caisson shall be extended at least above the flood plan of a 100 year flood or flood of record and covered with a watertight floor." Prop. 604 at 28; *see* SR at 26; Recommended Standards § 3.2.6.3.e.

Subsection (C) requires that "[a]ll openings in the floor must be curbed and protected from entrance of foreign material." Prop. 604 at 28; *see* SR at 26; Recommended Standards § 3.2.6.3.f. Subsection (D) requires that "[t]he pump discharge piping shall not be placed through the caisson walls." Prop. 604 at 28; *see* SR at 26; Recommended Standards § 3.2.6.3.g.

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[5] IEPA's proposal omitted subsection (d). Prop. 604 at 21. To maintain alphabetical order, the Board's order re-designates subsection (e), which addresses well casing materials, as subsection (d).

Subsection (d). IEPA placed these requirements under the heading "Fractured or Highly Permeable Bedrock Aquifer Wells."

Subsection (d)(1). IEPA proposed that, "[w]here the depth of unconsolidated formations is more than 50 feet over fractured or highly permeable bedrock, the permanent casing shall be firmly seated in rock." Prop 604 at 28; *see* SR at 26; Recommended Standards § 3.2.6.5.a.

Subsection (d)(2). IEPA proposed that, "[w]here the depth of unconsolidated formations is less than 50 feet, the depth of casing and grout shall be at least 50 feet." Prop 604 at 28; *see* SR at 26; Recommended Standards § 3.2.6.5.b.

Section 604.255: Well Pumps, Discharge Piping and Appurtenances.

Subsection (a). Where line shaft pumps are used, IEPA proposed in subsection (a)(1) that "the casing must be firmly connected to the pump structure or have the casing inserted into a recess extending at least one-half inch into the pump base." Prop. 604 at 28-29; *see* Recommended Standards § 3.2.7.1.a. Subsection (a)(2) requires that "the pump foundation and base must be at least six inches above the finished floor elevation." Prop. 604 at 28-29. Subsection (a)(3) requires that "lubricants must comply with Section 604.105(f)." Prop. 604 at 28-29; *see* Recommended Standards § 3.2.7.1.c.

Subsection (b). Where submersible pumps are used, IEPA proposed in subsection (b)(1) that "the top of the casing shall be effectively sealed to prohibit the entrance of water under all conditions of vibration or movement of conductors or cables." Prop. 604 at 29; *see* Recommended Standards § 3.2.7.2.a. Subsection (b)(2) requires that "the pump foundation and base shall be at least six inches above the finished floor elevation." Prop. 604 at 29. Subsection (b)(3) requires that "mercury seals shall not be used when existing submersible pump is replaced or a new submersible pump is installed." *Id*.

Subsection (c). Under the heading "Discharge piping," IEPA proposed standards for these facilities. SR at 29-30.

Subsection (c)(1). Subsection (A) requires that discharge piping for each well must "be designed to minimize friction loss." Prop. 604 at 29; *see* Recommended Standards § 3.2.7.3.a.1. Subsection (B) requires that it must "be equipped with a check valve in or at the well, a shutoff valve, a pressure gauge, and a means of measuring flow." Prop. 604 at 29; *see* Recommended Standards § 3.2.7.3.a.4. Subsection (C) requires that it must "be protected from the entrance of contamination." Prop. 604 at 29; *see* Recommended Standards § 3.2.7.3.a.3. Subsection (D) requires that it "have control valves and appurtenances located above the pumphouse floor when an above-ground discharge is provided." Prop. 604 at 29; *see* Recommended Standards § 3.2.7.3.a.2.

Subsection (E) requires that discharge piping must "be equipped with a smooth nosed sampling tap at least 18 inches above the floor to facilitate sample collection, located at a point where positive pressure is maintained, but before any treatment chemicals are applied." Prop. 604 at 29; *see* Recommended Standards § 3.2.7.3.a.5. Subsection (F) requires that, "when

necessary to remove entrapped air from the well," discharge piping must "be equipped with an air release-vacuum relief valve located upstream from the check valve, with exhaust/relief piping terminating in a down-turned position at least 18 inches above the floor and covered with a 24 mesh corrosion resistant screen." Prop. 604 at 29; *see* Recommended Standards § 3.2.7.3.a.6.

Subsection (G) requires that discharge piping must "be valved to permit test pumping and control of each well." Prop. 604 at 30; *see* Recommended Standards § 3.2.7.3.a.7. Subsection (H) requires that it "have all exposed piping, valves and appurtenances protected against physical damage and freezing." Prop. 604 at 30; *see* Recommended Standards § 3.2.7.3.a.8. Subsection (I) requires that it "be anchored to prevent movement, and be supported to prevent excessive bending forces." Prop. 604 at 30; *see* Recommended Standards § 3.2.7.3.a.9. Subsection (J)[6] requires that it "be protected against surge or water hammer[7]." Prop. 604 at 30; *see* Recommended Standards § 3.2.7.3.a.10. Subsection (K) requires that it "be constructed so that it can be disconnected from the well or well pump to allow the well pump to be pulled." Prop. 604 at 30; *see* Recommended Standards § 3.2.7.3.a.12.

Subsection (c)(2). IEPA proposed that "[w]ells must have a means of pumping to waste that is not directly connected to a sewer." Prop. 604 at 30; *see* Recommended Standards § 3.2.7.3.b.

Subsection (c)(3). IEPA proposed requirements for "[t]he discharge, drop or column piping inside the well for submersible jet and submersible line shaft pumps." Prop. 604 at 30. Subsection (A) requires that the piping must "be capable of supporting the weight of the submersible pump, piping, water and appurtenances and of withstanding the thrust, torque, torque fatigue and other reaction loads created during pumping." *Id*.; *see* Recommended Standards§ 3.2.7.3.c.2. Subsection (B) requires that the piping must "use lubricants, fitting, brackets, tape or other appurtenances that comply with Section 604.105(f)." Prop. 604 at 30; *see* Recommended Standards§ 3.2.7.3.c.1.

Subsection (d). Under the heading "Pitless well units," IEPA proposed standards for these facilities. Prop. 604 at 30-31.

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[6] IEPA's proposal omitted subsection (J). Prop. 604 at 30. In its order, the Board re-designates subsections (K) and (L) as subsections(J) and (K) to maintain alphabetical order.

[7] "Water hammer" means "[t]he phenomenon of pressure oscillation that occurs in pipes when a valve is opened or closed very rapidly, creating a sound similar to someone hammering on a pipe. When a valve position is changed quickly, the water pressure in a pipe increases and decreases in a very quick sequence, potentially causing serious damage to the system." The Water Dictionary (2nd ed. 2010) at 662, AWWA, incorporated by reference in 35 Ill. Adm. Code 601.115(b); *see* 35 Ill. Adm. Code 601.105(c). The Water Dictionary's definition includes an equation for "the speed of the pressure wave created by an instantaneous shutoff of a system." *Id*.

Subsection (d)(1). Subsection (A) requires that these units must "be shop-fabricated from the point of connection with the well casing to the unit cap or cover." Prop. 604 at 30; *see* Recommended Standards § 3.2.7.4.b.1. Subsection (B) requires that they "be threaded or welded to the well casing." Prop. 604 at 30; *see* Recommended Standards § 3.2.7.4.b.2. Subsection (C) requires that they "be of watertight construction throughout." Prop. 604 at 30; *see* Recommended Standards § 3.2.7.4.b.3.

Subsection (D) requires that they "be of materials and weight at least equivalent and compatible to the casing." Prop. 604 at 30; *see* Recommended Standards § 3.2.7.4.b.4. Subsection (E) requires that they "have field connection to the lateral discharge from the pitless unit of threaded, flanged or mechanical joint connection." Prop. 604 at 30; *see* Recommended Standards § 3.2.7.4.b.5. Subsection (F) requires that they "terminate at least 18 inches above final ground elevation or three feet above the 100-year flood level or highest known flood elevation, whichever is highest." Prop. 604 at 31; *see* Recommended Standards § 3.2.7.4.b.6.

Subsection (d)(2). IEPA proposed design requirements for pitless units. Subsection (A) requires that it must provide "access to disinfect the well." Prop. 604 at 31; *see* Recommended Standards § 3.2.7.4.c.1. Subsection (B) requires "a properly constructed casing vent meeting the requirements of subsection (e) [Casing vent]." Prop. 604 at 31; *see* Recommended Standards § 3.2.7.4.c.2. Subsection (C) requires that the unit must provide for "facilities to measure water levels in the well, under subsection (f) [Water level measurement]." Prop. 604 at 31; *see* Recommended Standards § 3.2.7.4.c.3.

Subsection (D) requires "a cover at the upper terminal of the well that will prevent the entrance of contamination." Prop. 604 at 31; *see* Recommended Standards § 3.2.7.4.c.4. Subsection (E) requires "a contamination-proof entrance connection for electrical cable." Prop. 604 at 31; *see* Recommended Standards § 3.2.7.4.c.5. Subsection (F) requires "an inside diameter as great as that of the well casing to facilitate work and repair on the well, pump, or well screen." Prop. 604 at 31; *see* Recommended Standards § 3.2.7.4.c.6. Subsection (G) requires that the unit must provide "at least one check valve within the well casing." Prop. 604 at 31; *see* Recommended Standards § 3.2.7.4.c.7.

Subsection (d)(3). IEPA proposed that, "[i]f the connection to the casing is by field weld, the shop-assembled unit must be designed specifically for field welding to the casing. The only field welding permitted will be that needed to connect a pitless unit to the casing." Prop. 604 at 31; *see* Recommended Standards § 3.2.7.4.d.

Subsection (e). IEPA placed these requirements under the heading "Casing vent."

Subsection (e)(1). IEPA proposed that "[w]ell casing shall be vented to the atmosphere." Prop. 604 at 31; *see* Recommended Standards § 3.2.7.6.

Subsection (e)(2). IEPA proposed that "[t]he vent shall terminate in a downward position, at or above the top of the casing or pitless unit, no less than 12 inches above grade or floor, in a minimum 1½ inch diameter opening covered with a 24 mesh, corrosion resistant screen." *Id*.

Subsection (e)(3). requires that "[t]he pipe connecting the casing to the vent shall be of adequate size to provide rapid venting of the casing." *Id*.

Subsection (e)(4). requires that, "[w]here vertical turbine pumps are used, vents may be placed into the side of the casing." *Id*.

Subsection (f). IEPA placed these requirements under the heading "Water level measurement."

Subsection (f)(1). IEPA proposed that "[e]ach well shall be equipped with a means for taking water level measurements." Prop. 604 at 31-32; *see* Recommended Standards § 3.2.7.7.a.

Subsection (f)(2). IEPA proposed that, "[w]here pneumatic water level measuring equipment is used it shall be made using corrosion resistant materials attached firmly to the drop pipe or pump column to prevent entrance of foreign materials." Prop. 604 at 31-32; *see* Recommended Standards § 3.2.7.7.b.

Subsection (g). IEPA proposed that "[o]bservation wells shall meet the requirements in 77 Ill. Adm. Code 920.170 [Monitoring Wells]." Prop. 604 at 32; *see* Recommended Standards § 3.2.7.8.a.

Subpart C: Source Water Protection Plan

IEPA proposed a new requirement that each community water supply develop a source water protection plan. SR at 7, 26. Mr. Cobb's testimony identified benefits that may result from implementing these plans: protecting public health, preventing contamination that existing treatment may not remove, avoiding costs of contamination, and increasing the likelihood of complying with present and future drinking water requirements. Cobb Test. at 7. He added that proposed Subpart C emphasizes preventing pollution over treating or remediating contaminated water. *Id*. at 7-8.

IEPA stated that it based Subpart C on AWWA Standard G300-07, Source Water Protection. SR at 7; Cobb Test. at 6; *see* also Recommended Standards § 3 (Source Development). As required by the Safe Drinking Water Act, IEPA is conducting a source water assessment program to identify contaminants that may be present. SR at 26. IEPA stated that it has completed an assessment for each CWS in the state. These assessments can be used to help meet the requirements of Subpart C. *Id*. at 26-27.

Section 604.300: Purpose. IEPA proposed that "[t]he purpose of the following requirements is to facilitate protection of source water quality and quantity." Prop. 604 at 32; *see* SR at 27; Cobb Test. at 6.

Section 604.305: Source Water Protection Plan Requirements and Contents. IEPA proposed that "[e]ach community water supply that treats surface or groundwater as a primary or emergency supply of water must develop a source water protection plan." Plans must contain

four minimum elements: a vision statement, a source water assessment, objectives, and an action plan. Prop. 604 at 32 (subsections (a) – (d)); *see* SR at 27; Cobb Test. at 6.

Section 604.310: Vision Statement. IEPA proposed that the vision statement required by Section 604.305(a) must include "the community water supply's policy and commitment to protecting source water, an explanation of the community water supply's resources to protect source water, an explanation of the barriers to protecting source water, and the names of the individuals who developed the vision statement." Prop. 604 at 32 (subsections (a) – (d); *see* SR at 7, 27; Cobb Test. at 6.

Section 604.315: Source Water Assessment.

Subsection (a). IEPA proposed that the source water assessment required by Section 604.305(b) must provide specified information. Prop. 604 at 32; SR at 27.

Subsection (a)(1). IEPA proposed that it must contain a "statement of the importance of the source of water." Prop. 604 at 32-33; SR at 27.

Subsection (a)(2). IEPA proposed that it must contain "a list of water supplies that obtain water from this community water supply." *Id*.

Subsection (a)(3). IEPA proposed that the assessment delineate "all sources of water used by the community water supply." Prop. 604 at 32-33; SR at 27. For surface water, subsection (A) requires that it include a "description of the watershed, map of the watershed, and intake locations." Prop. 603 at 32-33; SR at 27. For groundwater, subsection (B) requires that it include "the well identification number, well description, well status, well depth, a description of setback zones, and a description of the aquifer for each well." *Id*.

Subsection (a)(4). IEPA proposed that the assessment include "a report on the quality of the source water for all sources of water delineated in subsection (a)(3)." Prop. 604 at 32-33; SR at 27. Subsection (A) requires that the report "indicate when and where samples used to determine the quality of the source water was taken. These samples must be tested by a certified laboratory." Prop. 604 at 32-22; SR at 27. Subsection (B) requires that "[t]he report must include the certified laboratory's results."

Capt. Curry recommended that IEPA list the parameters that should be tested to provide this report. Curry Test. at 13. IEPA responded that, before receiving a permit to operate a CWS well, the system must monitor for contaminants listed on IEPA's Web site. Curry Resp. at 6 (providing Web address of list). IEPA expects to use a similar list if a CWS uses a "new" surface water source. *Id*. The Board asked IEPA to comment whether the rule should include a Board Note directing a CWS to IEPA's website for a list of contaminants. Board Questions 2 at 1. IEPA responded that it "does not believe this is necessary." IEPA Resp. 2 at 1.

Subsection (a)(5). IEPA proposed that the assessment must include "a report on the quality of the finished water." Prop. 604 at 32-33; SR at 27.

Subsection (a)(6). IEPA proposed to require that the assessment identify "potential sources of contamination to the source water." *Id*.

Subsection (a)(7). IEPA proposed to require that that the assessment analyze "the source water's susceptibility to contamination." *Id*.

Subsection (a)(8). IEPA proposed to require that the assessment explain "the community water supply's efforts to protect its source water." *Id*.

Subsection (b). IEPA proposed that, "[u]pon request, the Agency shall provide technical assistance to a community water supply in conducting the source water assessment." Prop. 604 at 33; *see* SR at 27; Cobb Test. at 7.

The Board asked IEPA whether it would be acceptable to provide that "the Agency will ~~shall~~ provide technical assistance to a community water supply in conducting the source water assessment." Board Questions at 9. IEPA "has no objection to this proposal" (IEPA Resp. at 13) and the Board's order reflects this revision.

Subsection (c). IEPA proposed that "[a] community water supply may use a Source Water Assessment Program Fact Sheet prepared by the Agency to fulfill the requirements of this Section." Prop. 604 at 33; SR at 27.

Section 604.320: Source Water Protection Plan Objectives. IEPA proposed that

> [t]he source water protection plan must contain a list of the community water supply's objectives to protecting source water. These objectives can include meeting the requirements of any of the Sections in this Subpart, including developing a vision statement or performing a source water assessment. Objectives may also address the specific problems or issues identified in the source water assessment, and should consider current and potential future issues. Prop. 604 at 33; *see* SR at 7, 28.

Section 604.325: Action Plan. IEPA proposed that a community water supply's action plan "must identify the actions needed to achieve the community water supply's objectives pursuant to Section 604.320." Prop. 604 at 34; *see* SR at 7, 28. Subsection (a) requires that the plan must describe "all projects, programs, and activities developed by the community water supply to meet objectives listed in Section 604.320." Prop. 604 at 34; *see* SR at 28. Subsection (b) requires that it include the "community water supply's schedule for implementing the projects, programs and activities." *Id*. Subsection (c) requires that it identify "necessary resources to implement the plan." *Id*. Subsection (d) requires it to identify "potential problems/obstacles for implementing the plan. *Id*.

Section 604.330: Submission.

Subsection (a). IEPA proposed that "[a] community water supply that first commenced construction after the effective date of this section must develop and submit a source water protection plan simultaneously with the construction permit application." Prop. 604 at 34; *see* SR at 28.

Subsection (b). IEPA proposed that, depending on their size, community water supplies in existence on the effective date of this section have from three to five years to submit a source water protection plan to IEPA. Prop. 604 at 34 (subsections (1) – (3)); *see* SR at 7, 28.

Subsection (c). IEPA proposed that "[a]n existing community water supply which anticipates using a new source of water for its supply must develop and submit a revised source water protection plan simultaneously with the construction permit application." Prop. 604 at 34; *see* SR at 28.

Section 604.335: Agency Approval. IEPA proposed that "[t]he Agency, not later than 45 days following the receipt of the source water protection plan, shall either approve or disapprove the plan. If the Agency takes no action within 45 days of receipt of the source water protection plan, the community water supply may deem the plan approved. A community water supply may waive the requirement that the Agency take an action within 45 days from the receipt of the plan by advising the Agency in writing." Prop. 604 at 34-35; *see* SR at 7, 28.

The Board asked IEPA whether it would be acceptable to revise the first sentence by providing that "[t]he Agency, not later than 45 days following the receipt of the source water protection plan, will ~~shall~~ either approve or disapprove the plan." Board Questions at 9. IEPA "has no objection to this proposal" (IEPA Resp. at 14), and the Board's order reflects this revision.

The Board also asked IEPA to clarify whether, if IEPA disapproves a source water protection plan, the disapproval is appealable to the Board. Board Questions at 9. IEPA responded that "[t]he Board has authority to conduct proceedings on petitions for review of final determinations of the Agency which are made pursuant to the Act or Board rules and which involve a subject on which the Board is authorized to regulate." IEPA Resp. at 14, citing 415 ILCS 5/5(d) (2016); 35 Ill. Adm. Code 101.106; 35 Ill. Adm. Code 105.

Section 604.340: Evaluation and Revision. IEPA proposed that "[t]he community water supply shall review and revise as necessary its source water protection plan no less than every five years. If the community water supply revises its source water protection plan, it must submit the plan to the Agency for approval pursuant to Section 604.335 of this Subpart." Prop. 604 at 35; *see* SR at 7, 28.

Subpart D: Aeration

Aeration equipment can be used to remove dissolved gases and volatile organic compounds and to oxidize iron and manganese so they can be removed by filtration. Johnson Test. at 2; SR at 29; *see* Recommended Standards § 4.7 (Aeration). IEPA proposed Subpart D to provide design requirements for aeration equipment. SR at 7, 29; Johnson Test. at 2.

Section 604.400: General Requirements for Aeration.

Subsection (a). IEPA proposed that "[a]ll aerators except those discharging to lime softening or clarification plants must be protected from contamination by birds, insects, wind borne debris, rainfall, and water draining off the exterior of the aerator." Prop. 604 at 35; *see* Johnson Test. at 2; Recommended Standards § 4.7.7 (Protection of aerators). IEPA also proposed that "[a]ll screens must be 24 mesh" to prevent contaminants from entering. Prop. 604 at 35; *see* Johnson Test. at 2; SR at 29.

Subsection (b). IEPA proposed that "[a] bypass shall be provided when a single aeration unit is installed." Prop. 604 at 35; *see* SR at 29; Recommended Standards § 4.7.9 (Bypass).

Subsection (c). IEPA proposed that "[t]he stability of the water after aeration must be evaluated to determine the need for additional treatment pursuant to Subpart I [Stabilization]." Prop. 604 at 35; *see* SR at 29; Recommended Standards § 4.7.10 (Corrosion control).

The Board asked IEPA to explain "stability of the water after aeration" and how stability is evaluated. Board Questions at 9. IEPA responded that, following aeration, water must meet the stabilization requirements of Subpart I because aeration affects the pH of the treated water. IEPA Resp. at 14. Considering the requirements of Subpart I, a PWS evaluates stability to ensure that the chemistry of treated water minimizes corrosion. *Id*.

Section 604.405: Forced or Induced Draft Aeration. IEPA proposed requirements for the design of forced or induced draft aeration devices. Prop. 604 at 35-36; *see* SR at 29; Recommended Standards § 4.7.2.

Subsection (a). IEPA proposed that the design must "include a blower with a weatherproof motor in a tight housing and screened enclosure." Prop. 604 at 35; *see* Recommended Standards § 4.7.2.a.

Subsection (b). IEPA proposed to require that the design "ensure adequate counter current of air through the enclosed aerator column." Prop. 604 at 35; *see* Recommended Standards § 4.7.2.b.

Subsection (c). IEPA proposed to require that the design "exhaust air directly to the outside atmosphere." Prop. 604 at 35; *see* Recommended Standards § 4.7.2.c.

Subsection (d). IEPA proposed to require that the design "include a down turned and 24 mesh screened air outlet and inlet." Prop. 604 at 35; *see* Recommended Standards § 4.7.2.d.

Subsection (e). IEPA proposed to require that the design "be such that air introduced in the column must be as free from obnoxious fumes, dust, and dirt as possible." Prop. 604 at 35; *see* Recommended Standards § 4.7.2.e.

Subsection (f). IEPA proposed to require that the design "be such that sections of the aerator can be reached or removed for maintenance of the interior or installed in a separate aerator room." Prop. 604 at 35; *see* Recommended Standards § 4.7.2.f.

Subsection (g). IEPA proposed to require that the design must "provide loading at a rate of 1 to 5 gallons per minute for each square foot of total tray area (2.5 – 12.5 m/hr)." Prop. 604 at 35; *see* Recommended Standards § 4.7.2.g.

Subsection (h). IEPA proposed to require that the device be designed to "insure that the water outlet is sealed." Prop. 604 at 35; *see* Recommended Standards § 4.7.2.h.

Subsection (i). IEPA proposed to require that the device be designed to "discharge through a series of five or more trays with separation of trays not less than six inches." Prop. 604 at 36; *see* Recommended Standards § 4.7.2.i.

Subsection (j). IEPA proposed to require that the device be designed to "provide distribution of water uniformly over the top tray." Prop. 604 at 36; *see* Recommended Standards § 4.7.2.j.

Subsection (k). IEPA proposed to require that the design "be of durable material resistant to the aggressiveness of the water and dissolved gases." Prop. 604 at 36; *see* Recommended Standards § 4.7.2.k.

The Recommended Standards require that the design "provide for continuous disinfection feed after aeration." Recommended Standards § 4.7.2.l. IEPA did not include this requirement in this subpart because it addresses disinfection in Subpart G. SR at 29.

Section 604.410: Spray Aeration.

Subsection (a). IEPA proposed that design of spray aeration must provide "a hydraulic head of between 5 – 25 feet." Prop. 604 at 36; *see* Recommended Standards § 4.7.3.a.

Subsection (b). IEPA proposed to require that the design must provide "nozzles, with the size, number, and spacing of the nozzles being dependent on the flow rate, space, and the amount of head available." Prop. 604 at 36; *see* Recommended Standards § 4.7.3.b.

Subsection (c). IEPA proposed to require that the design provide "nozzle diameters in the range of 1 to 1.5 inches to minimize clogging." Prop. 604 at 36; *see* Recommended Standards § 4.7.3.c.

Subsection (d). IEPA proposed to require that the design include "an enclosed basin to contain the spray, with any openings protected by a 24-mesh screen." Prop. 604 at 36; *see* Recommended Standards § 4.7.3.d.

IEPA noted that the Recommended Standards also require that the design provide for "continuous disinfection feed after aeration." Recommended Standards § 4.7.3.e. IEPA did not include this requirement in this subpart because it addresses disinfection in Subpart G. SR at 29.

Section 604.415: Pressure Aeration.

Subsection (a). IEPA proposed that "[p]ressure aeration may be used for oxidation purposes only. This process is not acceptable for the removal of dissolved gases." Prop. 604 at 36; *see* SR at 30; Recommended Standards § 4.7.4.

Subsection (b). IEPA proposed that "[f]ilters following pressure aeration must allow for the release of air." Prop. 604 at 36; *see* SR at 30; Recommended Standards § 4.7.4.

Subsection (c). IEPA proposed that the design of pressure aeration must "give thorough mixing of compressed air with water being treated; and provide air free of obnoxious fumes, dust, dirt and other contaminants." Prop. 604 at 36 (subsections (1) and (2)); *see* SR at 30; Recommended Standards § 4.7.4.a-b.

Section 604.420: Packed Tower Aeration. Packed tower aeration, also known as air stripping, passes water down through a column of packing material while a counter current of air passes up through the packing. Recommended Standards § 4.7.5. The process removes volatile organic chemicals, trihalomethanes, carbon dioxide, and radon. *Id*.; SR at 30.

Subsection (a). IEPA proposed that "[p]acked tower aeration (PTA) may be used for compounds with a Henry's Constant greater than 100 atm mol/mol at 120C. Compounds with a Henry's Constant less than 10 may not be removed by PTA." Prop. 604 at 36; *see* SR at 30; Recommended Standards § 4.7.5. For compounds with a Henry's Constant between 10 and 100, "PTA may be used upon completion of a pilot study and approval by the Agency." Prop. 604 at 36; *see* SR at 30; Recommended Standards § 4.7.5.

The Board asked IEPA to comment on whether it would clarify subsection (a) to provide that packed tower aeration "may be used for removing compounds." Board Questions at 10. IPE "has no objection to this proposal" (IEPA Resp. at 14), and the Board's order reflects this revision.

Subsection (b). IEPA placed these requirements under the heading "Process Design."

Subsection (b)(1). IEPA addressed construction permit applications and pilot studies.

The Board asked IEPA to explain why packed tower aeration requires a construction permit and pilot study but other types of aeration (forced, spray and pressure) do not. Board Questions at 10. IEPA responded that "[p]acked tower aeration may require a pilot study because it is normally used for removal of organic contaminants that are regulated under Part 611. Other types of aerators are normally used to improve aesthetic properties of the source water." IEPA Resp. at 14. IEPA stressed that "[a]ll CWS changes require a construction permit." *Id*.

Subsection (A) proposed that, "[b]efore installing PTA, the community water supply must submit a construction permit application which includes Henry's Constant for the contaminant, the mass transfer coefficient, air pressure drop and stripping factor, height and diameter of unit, air to water ratio, packing depth, and surface loading rate." Prop. 604 at 37; *see* Recommended Standards § 4.7.5.1.a.

Subsection (B) proposed that "[p]ilot testing is required for PTA used for compounds with Henry's Constant greater than 100 unless there is considerable past performance data on the contaminant to be treated, there is a concentration level similar to previous projects, the Agency has approved the process design based on use of appropriate calculations without pilot testing." Prop. 604 at 37; *see* Recommended Standards § 4.7.5.1.a (Process design); Johnson Test. at 2. IEPA also proposed that a CWS must discuss PTA proposals with IEPA before submitting any construction permit applications. Prop. 604 at 37; *see* Recommended Standards § 4.7.5.1.a.

Subsection (C) proposed that any required pilot test must "evaluate a variety of loading rates and air to water ratios at the peak contaminant concentration; and give special consideration to removal efficiencies when multiple contaminations occur." Prop. 604 at 37 (subsections (i) and (ii)); *see* Recommended Standards § 4.7.5.1.a.

Subsection (b)(2). IEPA proposed that "[t]he tower must be designed to reduce contaminants to below the maximum contaminant level (MCL) and to the lowest practical level." Prop. 604 at 37; Recommended Standards § 4.7.5.1.b.

Subsection (b)(3). IEPA proposed that "[t]he water loading rates are typically in the range from 15 gpm/ft^2 to 30 gpm/ft^2." Prop. 604 at 37; Recommended Standards § 4.7.5.1.a.

Subsection (b)(4). IEPA proposed that "[t]he ratio of the column diameter to packing diameter must be at least 10:1 for the full-scale tower. The pilot test can have a ratio of 7:1. The type and size of the packing used in the full-scale unit must be the same as that used in the pilot unit." Prop. 604 at 37; Recommended Standards § 4.7.5.1.c.

Subsection (b)(5). IEPA proposed that "[t]he minimum volumetric air to water ratio at peak water flow must be in the range of 25:1 and to 80:1, unless otherwise demonstrated by a pilot study and approved by the Agency pursuant to Section 604.145(b)." Prop. 604 at 37; Recommended Standards § 4.7.5.1.d.

Subsection (b)(6). IEPA proposed that "[t]he design shall consider providing pretreatment if potential fouling problems are likely to occur. Fouling problems can occur from calcium carbonate and iron precipitation and from bacterial growth." Prop. 604 at 38; Recommended Standards § 4.7.5.1.e.

Subsection (b)(7). IEPA proposed that "[d]isinfection capability must be provided prior to and after PTA." Prop. 604 at 37; Recommended Standards § 4.7.5.1.e.

Subsection (b)(8). IEPA proposed that "[t]he effects of temperature must be considered since a drop in water temperature can result in a drop in contaminant removal efficiency." Prop. 604 at 37; Recommended Standards § 4.7.5.1.f.

Subsection (c). IEPA placed these requirements under the heading "Materials of construction."

Subsection (c)(1). IEPA proposed to require that "[t]he tower must not be constructed of uncoated steel." Prop. 604 at 38; *see* Recommended Standards § 4.7.5.2.a.

The Board asked IEPA to comment on whether it would clarify subsection (c)(1) and more closely follow Section 4.7.5.2.a of the Recommended Standards to identify stainless steel, concrete, aluminum, fiberglass, or plastic as materials appropriate for construction of the tower. Board Questions at 10. IEPA responded that it "has no objection" to listing these materials (IEPA Resp. at 15), and the Board's order reflects this revision.

Subsection (c)(2). IEPA proposed to require that "[t]owers must be protected against damage from wind." Prop. 604 at 38; *see* Recommended Standards § 4.7.5.2.a.

Subsection (c)(3). IEPA proposed to require that "[t]owers must have adequate structural support." Prop. 604 at 38; *see* Recommended Standards § 4.7.5.2.a.

Subsection (d). IEPA proposed these requirements under the heading "Water flow system."

Subsection (d)(1). IEPA proposed that "[w]ater must be distributed uniformly at the top of the tower when using spray nozzles or orifice type distributor trays that prevent short circuiting."[8] Prop. 604 at 38; *see* Recommended Standards § 4.7.5.3.a.

Subsection (d)(2). IEPA proposed that "[a] mist eliminator must be provided above the water distributor system." Prop. 604 at 38; *see* Recommended Standards § 4.7.5.3.b.

Subsection (d)(3). IEPA proposed that "[a] side wiper redistribution ring must be provided at least every 10 feet to prevent water channeling along the tower wall and short-circuiting." Prop. 604 at 38; *see* Recommended Standards § 4.7.5.3.c.

Subsection (d)(4). IEPA proposed that "[s]ample taps must be provided in the influent and effluent piping." Prop. 604 at 38; *see* Recommended Standards § 4.7.5.3.d.

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[8] "Short-circuiting" refers to "[a] hydraulic condition in a basin in which the actual flow time of water through the basin is less than the design flow time (*i.e.*, less than the tank volume divided by the flow)." *The Water Dictionary* (2nd ed. 2010) at 547, incorporated by reference in 35 Ill. Adm. Code 601.115(b); *see* 35 Ill. Adm. Code 601.105(c).

Subsection (d)(5). IEPA proposed that, "[i]f an effluent sump is provided, it must be accessible to allow for cleaning and must be equipped with a drain valve in compliance with Section 604.1500." Prop. 604 at 38; *see* Recommended Standards § 4.7.5.3.e.

Subsection (d)(6). IEPA proposed that "[t]he effluent piping must have a means to discharge to waste." Prop. 604 at 38; *see* Recommended Standards § 4.7.5.3.f.

Subsection (d)(7). IEPA proposed that "[t]he design must prevent freezing of the influent riser and effluent piping when the unit is not operating." Prop. 604 at 38; *see* Recommended Standards § 4.7.5.3.g.

Subsection (d)(8). IEPA proposed that, "[i]f piping is buried, is must be maintained under positive pressure." Prop. 604 at 38; *see* Recommended Standards § 4.7.5.3.g.

Subsection (d)(9). IEPA proposed that "[a]n overflow line must be provided which discharges 12 to 24 inches above the ground surface." Prop. 604 at 38; *see* Recommended Standards § 4.7.5.3.i.

Subsection (e). IEPA proposed these requirements under the heading "Air flow system."

Subsection (e)(1). IEPA proposed that "[t]he air inlet to the blower and the tower discharge vent must be down turned and protected with a noncorrodible 24 mesh screen to prevent contamination from extraneous matter." Prop. 604 at 38; Recommended Standards § 4.7.5.4.a.

Subsection (e)(2). IEPA proposed that "[a] positive airflow sensing device and a pressure gauge must be installed on the air influent line. The positive airflow-sensing device must be a part of an automatic control system, which will turn off the influent water if positive airflow is not detected. The pressure gauge will serve as an indicator of fouling buildup." Prop. 604 at 38-39; *see* Recommended Standards § 4.7.5.3.d.

Subsection (f). IEPA proposed these requirements under the heading "Other required features."

Subsection (f)(1). IEPA proposed that "[a]ccess ports with a minimum diameter of 24 inches to facilitate inspection, media replacement, media cleaning and maintenance of the interior must be provided." Prop. 604 at 39; *see* Recommended Standards § 4.7.5.5.a.

Subsection (f)(2). IEPA proposed that "[d]isinfection application points ahead of the tower must be provided." Prop. 604 at 39; *see* Recommended Standards § 4.7.5.5.f.

Subsection (f)(3). IEPA proposed that "[a]dequate packing support to allow free flow of water and to prevent deformation of the media with deep packing heights must be provided." Prop. 604 at 39; *see* Recommended Standards § 4.7.5.5.h.

Subsection (f)(4). IEPA proposed that "[a]n access ladder must be provided." Prop. 604 at 39; *see* Recommended Standards § 4.7.5.5.l.

Subsection (f)(5). IEPA proposed that "[t]he blower, disinfectant feeder and well pump must have an electrical interconnection." Prop. 604 at 39; *see* Recommended Standards § 4.7.5.5.m.

Section 604.425: Other Methods of Aeration. IEPA recognizes that "there may be other methods of aeration to meet treatment needs." SR at 30; *see* Prop. 604 at 39; Recommended Standards § 4.7.6. IEPA proposed that "[t]he treatment processes must be designed to meet the particular needs of the water to be treated and must be approved by the Agency." Prop. 604 at 39; *see* SR at 30; Recommended Standards § 4.7.6. IEPA listed other aeration methods including but not limited to "spraying, diffused air, cascades, mechanical aeration, or natural draft aeration." Prop. 604 at 39 (subsections (a) – (e)); *see* Recommended Standards § 4.7.6.

Subpart E: Clarification

Clarification is a treatment process that removes suspended matter from water before filtration. SR at 30; *see* Recommended Standards § 4.2. This reduction is required because suspended matter can include pathogens. SR at 30. Clarification includes coagulation, flocculation, and sedimentation. *Id*. In conventional clarification, these three steps occur in individual basins. *Id*. A solids contact unit combines the process into a single unit. *Id*. In Subpart E, IEPA proposed design, operation, and maintenance standards for both types of processes. SR at 8, 30-31; *see* Cook Test. at 4; Recommended Standards § 4.2 (Clarification).

Section 604.500: General Clarification Requirements.

Subsection (a). IEPA proposed that "[a]ll community water supplies designed to treat surface water shall have a minimum of two clarification units. The clarifiers must be capable of meeting the plant design capacity with one clarifier removed from service." Prop. 604 at 39; *see* SR at 31; Recommended Standards § 4.2. IEPA stated that this requirement allows the plant to continue operating when maintaining or repairing a clarification unit. SR at 31.

Subsection (b). IEPA proposed that, "[f]or community water supplies treating groundwater under the direct influence of surface water, the community water supply must have a minimum of two clarification units if clarification is provided." Prop. 604 at 39; *see* SR at 31; Recommended Standards § 4.2.

Subsection (c). IEPA proposed that "[c]ommunity water supplies designed to treat groundwater should have a minimum of two units." Prop. 604 at 40; SR at 31. IEPA argued that "[c]larification is not generally required for community water supplies that treat groundwater only." SR at 31; *see* Recommended Standards § 4.2. IEPA added that "[g]round water plants that use lime softening treatment are required to have clarification." SR at 31.

The Board asked IEPA to clarify whether the requirement that a CWS that treats groundwater must have two clarification units applies only if the CWS provides clarification. Board Questions at 10. If so, the Board asked IEPA whether it would be acceptable to revise subsection (c) to provide that '[c]ommunity water supplies designed to treat groundwater will be required to ~~should~~ have a minimum of two clarification units if clarification is provided." *Id*. IEPA "has no objection to this proposal" (IEPA Resp. at 15), and the Board's order reflects this revision.

Subsection (d). IEPA proposed to address the design of a clarification process.

Subsection (d)(1). IEPA proposed that the process must "be constructed to allow units to be taken out of service without disrupting operation." Prop. 604 at 40; *see* Recommended Standards § 4.2.b.

Subsection (d)(2). IEPA proposed that that the process must "be started manually following shutdown." Prop. 604 at 40; *see* SR at 31; Recommended Standards § 4.2.d. This ensures that the entire treatment process is operating properly before resuming operation. SR at 31. "If the system is not properly operated after start up, partially treated water could be pumped to the distribution system." *Id*.

Subsection (d)(3). IEPA proposed that the process must "minimize hydraulic head losses between units to allow future changes in processes without the need for repumping." Prop. 604 at 40; *see* Recommended Standards § 4.2.e.

Subsection (d)(4). IEPA proposed that, "if flow is split, a means of measuring and modifying the flow to each train or unit shall be provided unless flow paths are equivalent and hydraulic controls are provided." Prop. 604 at 40; *see* SR at 31; Recommended Standards §§ 4.2.2.d (Coagulation), 4.2.3.g (Flocculation), 4.2.4.e (Sedimentation), 4.2.5.2.b, c (Solids contact unit: Operating equipment).

Section 604.505: Coagulation.

Subsection (a). IEPA proposed that '[c]oagulation refers to a process using coagulant chemicals and mixing by which colloidal and suspended material are destabilized and agglomerated into settleable or filterable flocs, or both." Prop. 604 at 40; *see* Recommended Standards § 4.2.2. IEPA clarified that the process causes solids in the water to bind together, resulting in larger particles more easily removed by settling or filtration. SR at 31. IEPA added that a community water supply "must select the coagulant that is best suited for the treatment of its particular type of water." SR at 31-32.

Subsection (b). IEPA proposed that, "[f]or community water supplies using direct or conventional filtration, the use of use a primary coagulant is required at all times." Prop. 604 at 40; *see* SR at 32; Recommended Standards § 4.2.2. IEPA identifies alum or iron-based coagulants as primary coagulants. SR at 32.

The Board asked IEPA to clarify whether coagulation requirements apply to all CWSs, including those that treat groundwater. Board Questions at 10. IEPA responded that "[c]oagulation requirements do not necessarily apply to CWSs that treat groundwater." IEPA Resp. at 15.

Subsection (c). IEPA proposed that "[t]he community water supply shall submit with the construction permit application the design basis for the velocity gradient (G value) selected, considering the chemicals to be added and water temperature, color and other related water quality parameters." Prop. 604 at 40; *see* Recommended Standards § 4.2.2.

Subsection (d). Under the heading "Mixing," IEPA proposed that "[m]ixing must be adequate to disperse chemicals in the basin. The detention period should be instantaneous, but not longer than thirty seconds with mixing equipment capable of imparting a minimum velocity gradient (G) of at least 750 fps/ft." Prop. 604 at 40; *see* SR at 32; Recommended Standards § 4.2.2.a.

Subsection (e). Under the heading "Equipment," IEPA proposed that "[b]asins must be designed or equipped to produce adequate mixing for all treatment flow rates. Static mixing may be considered where the flow is relatively constant and will be high enough to maintain the necessary turbulence for complete chemical reactions." Prop. 604 at 40; *see* SR at 32; Recommended Standards § 4.2.2.b.

Subsection (f). Under the heading "Location," IEPA proposed that "the coagulation and flocculation basin shall be as close together as possible." Prop. 604 at 40; *see* Recommended Standards § 4.2.2.c.

Section 604.510: Flocculation.

Subsection (a). IEPA proposed that "[f]or purposes of this section, flocculation refers to a process to enhance agglomeration or collection of smaller floc particles into larger, more easily settleable or filterable particles through gentle stirring by hydraulic or mechanical means." Prop. 604 at 41; *see* SR at 32; Recommended Standards § 4.2.3.

Subsection (b). Under the heading "Basin Design," IEPA proposed that "[i]nlet and outlet design shall minimize short-circuiting and destruction of floc. Series compartments are recommended to further minimize short-circuiting and to provide decreasing mixing energy with time. Basins shall be designed so that individual basins may be isolated without disrupting plant operation. A drain and/or pumps shall be provided to handle dewatering and sludge removal." Prop. 604 at 41; *see* SR at 32; Recommended Standards § 4.2.3.a.

Subsection (c). Under the heading "Detention," IEPA proposed that "[t]he detention time shall be adequate for floc formation. A detention time of at least 30 minutes with consideration to using tapering (*i.e*. diminishing velocity gradient) flocculation is recommended. The flow-through velocity should be not less than 0.5 nor greater than 1.5 feet per minute." Prop. 604 at 41; *see* SR at 32; Recommended Standards § 4.2.3.b.

The Board asked IEPA to clarify whether the detention time should be a minimum requirement rather than a recommendation as proposed. Board Questions at 10. IEPA responded that it intended the minimum detention time "to be a requirement." IEPA Resp. at 15.

Subsection (d). Under the heading "Equipment," IEPA proposed that "[a]gitators shall be driven by variable speed drives with the peripheral speed of paddles ranging from 0.5 to 3.0 feet per second. External, non-submerged motors are preferred." Prop. 604 at 41; *see* SR at 32; Recommended Standards § 4.2.3.c.

Subsection (e). Under the heading "Other designs," IEPA proposed that "[b]affling may be used to provide for flocculation in small plants only after Agency approval. The design should be such that the velocities and flows as provided in subsection (c) of this Section will be maintained." Prop. 604 at 41; *see* SR at 32; Recommended Standards § 4.2.3.d.

Subsection (f). Under the heading "Superstructure," IEPA proposed that "[a] superstructure over the flocculation basins may be required." Prop. 604 at 41; *see* SR at 32; Recommended Standards § 4.2.3.e.

Capt. Curry questioned what the term "superstructure" means. Curry Test. at 13. IEPA stated that "[s]uperstructure refers to a roofed in structure." Curry Resp. at 6. Both the Board and Capt. Curry questioned the criteria IEPA would consider in determining whether to require a superstructure over a flocculation basin. Board Questions at 10; Curry Test. at 13. "Most flocculation basins are outdoors unless the climate dictates otherwise." Curry Resp. at 6; IEPA Resp. at 16. IEPA "would not require a superstructure unless climate, or other airborne environmental factors, dictate otherwise." *Id*.

Subsection (g). Under the heading "Piping," IEPA proposed that "[f]locculation and sedimentation basins shall be as close together as possible. The velocity of flocculated water through pipes or conduits to settling basins shall be no less than 0.5 nor greater than 1.5 feet per second. Allowances must be made to minimize turbulence at bends and changes in direction." Prop. 604 at 41; *see* SR at 32; Recommended Standards § 4.2.3.f.

Subsection (h). IEPA proposed that "[c]onsideration should be given to the need for additional chemical feed in the future." Prop. 604 at 41; *see* Recommended Standards § 4.2.3.h.

Section 604.515: Sedimentation. IEPA proposed that "[s]edimentation refers to a process that allows particles to settle by gravity and typically precedes filtration. The detention time for effective clarification is dependent upon a number of factors related to basin design and the nature of the raw water. Prop. 604 at 41; *see* SR at 32; Recommended Standards § 4.2.4. IEPA proposed design criteria for conventional sedimentation units. Prop. 604 at 41; *see* SR at 32.

Subsection (a). IEPA proposed that "[a] minimum of four hours of settling time shall be provided. This may be reduced to two hours for lime-soda softening facilities treating only groundwater. The Agency may approve reduced detention time when equivalent effective

settling is demonstrated or when the overflow rate is not more than 0.5 gpm per square foot." Prop. 604 at 41; *see* SR at 32; Recommended Standards § 4.2.4.a.

Subsection (b). Under the heading "Inlet devices," IEPA proposed that "[i]nlets shall be designed to distribute the water equally and at uniform velocities by using open ports, submerged ports, and similar entrance arrangements. A baffle should be constructed across the basin close to the inlet end and should project several feet below the water surface to dissipate inlet velocities and provide uniform flows across the basin." Prop. 604 at 42; *see* SR at 32; Recommended Standards § 4.2.4.b.

Subsection (c). Under the heading "Velocity," IEPA proposed that "[t]he velocity through a sedimentation basin should not exceed 0.5 feet per minute. The basins must be designed to minimize short-circuiting. Fixed or adjustable baffles must be provided as necessary to achieve the maximum potential for clarification." Prop. 604 at 42; *see* SR at 32; Recommended Standards § 4.2.4.d.

The Board asked IEPA whether it would clarify subsection (c) by providing that "[t]he velocity through a sedimentation basin must ~~should~~ not exceed 0.5 feet per minute." Board Questions at 10. IEPA "has no objection to this proposal" (IEPA Resp. at 15), and the Board's order reflects this revision.

Subsection (d). Under the heading "Outlet devices," IEPA proposed that "[o]utlet weirs or submerged orifices shall maintain velocities suitable for settling in the basin and minimize short-circuiting. The use of submerged orifices is recommended to provide a volume above the orifices for storage when there are fluctuations in flow." Prop. 604 at 42; *see* SR at 32; Recommended Standards § 4.2.4.f.

The Board asked IEPA to comment on revising this subsection to make the recommendation a conditional requirement: "[o]utlet weirs or submerged orifices must maintain velocities suitable for settling in the basin and minimize short-circuiting. ~~The use of s~~Submerged orifices must be used if necessary ~~is recommended~~ to provide a volume above the orifices for storage when there are fluctuations in flow. . . ." Board Questions at 10. IEPA "has no objection to this proposal" (IEPA Resp. at 16) and the Board's order reflects this revision.

Subsection (d)(1). IEPA proposed that "[t]he rate of flow over the outlet weirs or through the submerged orifices shall not exceed 20,000 gallons per day per foot of the outlet launder or orifice circumference." Prop. 604 at 42; *see* SR at 32; Recommended Standards § 4.2.4.f..1.

Subsection (d)(2). IEPA proposes that "[s]ubmerged orifices should not be located lower than three (3) feet below the flow line." Prop. 604 at 42; *see* SR at 32; Recommended Standards § 4.2.4.f.2.

Subsection (d)(3). IEPA proposed that "[t]he entrance velocity through the submerged orifices shall not exceed 0.5 feet per second." Prop. 604 at 42; *see* SR at 32; Recommended Standards § 4.2.4.f.3.

Subsection (e). Under the heading "Overflow," IEPA proposed that "[a]n overflow weir or pipe designed to establish the maximum water level desired on top of the filters should be provided. The overflow shall discharge by gravity with a free fall at a location where the discharge can be observed." Prop. 604 at 42; *see* SR at 32; Recommended Standards § 4.2.4.g.

Subsection (f). Under the heading "Drainage," IEPA proposed that "[s]edimentation basins must be provided with a means for dewatering. Basin bottoms should slope toward the drain not less than one foot in twelve feet where mechanical sludge equipment is not required." Prop. 604 at 42; *see* SR at 32; Recommended Standards § 4.2.4.i.

Subsection (g). Under the heading "Flushing lines," IEPA proposed that "[f]lushing lines or hydrants shall be provided and must be equipped with backflow prevention devices approved by the Agency." Prop. 604 at 42; *see* SR at 32; Recommended Standards § 4.2.4.j.

Subsection (h). The Board addressed the issue of mechanical sludge removal equipment above under "Disputed Issues." *See supra* at 15-16.

Subsection (i). IEPA proposed requirements for the design of sludge removal systems. Subsection (i)(1) proposes that "sludge pipes must not be less than three inches in diameter and so arranged as to facilitate cleaning." Prop. 604 at 43; *see* SR at 32; Recommended Standards § 4.2.4.m.1. Subsection (i)(2) proposes that "entrance to sludge withdrawal piping must prevent clogging." Prop. 604 at 43; *see* SR at 32; Recommended Standards § 4.2.4.m.2. Subsection (i)(3) proposes that "valves must be located outside the tank for accessibility." Prop. 604 at 43; *see* SR at 32; Recommended Standards § 4.2.4.m.3. Subsection (i)(4) proposes that the system must provide that "the operator may observe and sample sludge being withdrawn from the unit." Prop. 604 at 43; *see* SR at 32; Recommended Standards § 4.2.4.m.4.

Section 604.520: Solids Contact Unit. In a solids contact unit, chemical coagulant is added before water enters the unit, and flocculation and coagulation then occur in a single basin. SR at 32; *see* Recommended Standards § 4.2.5; IEPA Resp. at 16; Curry Resp. at 6. As water flows from the bottom to the top of the unit, solids accumulate in a sludge blanket, and clarified water leaves the unit at the top. SR at 32; *see* IEPA Resp. at 16. IEPA reported that solids contact units have become "the most common clarification process." *Id*.

The Board asked IEPA whether it would be appropriate to include a brief description or definition of the process such as those provided in Section 604.505(a) for coagulation and Section 604.510(a) for flocculation. Board Questions at 11. IEPA cited its Statement of Reasons and stated that it does not believe a definition is necessary. IEPA Resp. at 16.

Subsection (a). IEPA proposed that "[a]dequate piping with sampling taps shall be provided to allow for the collection of samples from various depths of the units." Prop. 604 at 43; *see* SR at 32; Recommended Standards § 4.2.5.2.a.

Subsection (b). Under the heading "Chemical feed," IEPA proposed that "[c]hemicals must [be] satisfactorily mixed in accordance with Section 604.1100(b)." Prop. 604 at 43; *see* SR at 32; Recommended Standards § 4.2.5.3.

Subsection (c). IEPA proposed that "[t]he Agency may require a rapid mix device or chamber ahead of solids contact units to assure proper mixing of the chemicals applied." Prop. 604 at 43; *see* SR at 32; Recommended Standards § 4.2.5.4.

The Board asked IEPA to comment on whether construction requirements at subsections (c)(1) and (c)(2) apply only to a rapid mix device or chamber required by IEPA ahead of a solids contact unit. Board Questions at 11. If so, the Board asked whether the revision below would be acceptable to IEPA: "[t]he Agency may require a rapid mix device or chamber ahead of solids contact units to assure proper mixing of the chemicals applied. If required by the Agency, the mixing devices ~~employed shall~~must be constructed to. . . . *Id*. IEPA "has no objection to this proposal" (IEPA Resp. at 16), and the Board's order reflects this revision.

Subsections (c)(1) and (c)(2) propose that construction of the mixing devices must "provide good mixing of the raw water with previously formed sludge particles" and "prevent deposition of solids in the mixing zone." Prop. 604 at 43; *see* SR at 32; Recommended Standards §§ 4.2.5.4.a, 4.2.5.4.b.

Capt. Curry stated that there are various solids contact upflow clarifiers in use in Illinois. Curry Test. at 14. He argued that units "equipped with upflow draft tubes for high-rate sludge recirculation intermixed with raw water containing selected chemicals" do not require a separate rapid mix device or chamber. *Id*. IEPA acknowledged that "[s]ome units operate with chemical feed directly into the inlet pipe, but a separate rapid mixer may provide better coagulation for turbidity or color removal applications." Curry Resp. at 6.

Both the Board and Capt. Curry asked IEPA to clarify the circumstances in which it would require a rapid mix device or chamber ahead of the solids contact units. Board Questions at 11; Curry Test. at 14. Responding to the Board, IEPA stated that, if a rapid mix device or chamber ahead of the solids contact unit is "necessary to provide good mixing," then it would require one. IEPA Resp. at 16. IEPA stated that it typically "will look at similar existing installations or defer to the judgement of the consulting engineer on the need for an additional mixer." *Id*.

Subsection (d). Under the heading "Flocculation equipment" IEPA proposed that the equipment "shall be adjustable (speed and/or pitch); must provide for coagulation in a separate chamber or baffled zone within the unit; and should provide that the flocculation and mixing period to be not less than 30 minutes." Prop. 604 at 43 (subsections (1)- (3)); *see* SR at 32; Recommended Standards § 4.2.5.5.

The Board asked IEPA to comment on whether it would clarify subsection (d)(3) to provide that flocculation equipment "must ~~should~~ provide a ~~that the~~ flocculation and mixing period of at least ~~to be not less than~~ 30 minutes." Board Questions at 11. IEPA responded that it intends this provision to be a recommendation and not a requirement, so the proposed revision

would not reflect its intent. IEPA Reps. at 16. In light of IEPA's response, the Board's order does not include this revision.

Subsection (e). IEPA stated that it is necessary to remove sludge periodically from the bottom of the solids contact unit to maintain an optimum sludge blanket. SR at 32.

Subsection (e)(1). IEPA proposed that sludge removal design must provide that "sludge pipes must be not less than three inches in diameter and so arranged as to facilitate cleaning." Prop. 604 at 43; *see* SR at 32; Recommended Standards § 4.2.5.7.a.

Subsection (e)(2). IEPA proposed to require that "entrance to sludge withdrawal piping must prevent clogging." Prop. 604 at 43; *see* SR at 32; Recommended Standards § 4.2.5.7.a.2.

Subsection (e)(3). IEPA proposed to require that "valves must be located outside the tank for accessibility." Prop. 604 at 43; *see* SR at 32; Recommended Standards § 4.2.5.7.c.

Subsection (e)(4). IEPA proposed to require that the design must provide that "the operator may observe and sample sludge being withdrawn from the unit." Prop. 604 at 44; *see* SR at 32; Recommended Standards § 4.2.5.7.d.

The Board asked IEPA to comment on whether the revision below would clarify subsection (e). Board Questions at 11.

Sludge removal design must

1) Require sludge pipes ~~must~~ not less than three inches in diameter and ~~so~~ arranged ~~as~~ to facilitate cleaning;
2) Prevent clogging at the entrance to sludge withdrawal piping ~~must prevent clogging~~;
3) Locate valves ~~must be located~~ outside the tank for accessibility; and
4) Allow the operator to ~~may~~ observe and sample sludge being withdrawn from the unit.

IEPA "has no objection to this proposal" (IEPA Resp. at 17), and the Board's order reflects this revision.

Subsection (f). IEPA placed these requirements under the heading "Cross Connections."

Subsection (f)(1). IEPA proposed that "[b]low-off outlets and drains shall terminate in a location with an air gap of six inches for backflow protection." Prop. 604 at 44; *see* SR at 32; Recommended Standards § 4.2.5.8.a.

Subsection (f)(2). IEPA proposed that "[c]ross connection control shall be included for the potable water lines used to back flush sludge lines." Prop. 604 at 44; *see* SR at 32; Recommended Standards § 4.2.5.8.b.

Subsection (g). Under the heading "Detention Period," IEPA proposed that the period "must be established on the basis of the raw water characteristics and other local conditions that affect the operation of the unit." Prop. 604 at 44; *see* SR at 32-33; Recommended Standards § 4.2.5.9.

Subsection (g)(1). IEPA proposed that, "[w]hen treating surface water with upflow clarifiers using mechanical mixing, detention times shall be based on design flow rates and should be two to four hours." Prop. 604 at 44; *see* Recommended Standards § 4.2.5.9.a.

Subsection (g)(2). IEPA proposed that, "[w]hen softening groundwater with upflow clarifiers using mechanical mixing, detention times shall be based on design flow rates and should be one to two hours. Prop. 604 at 44; *see* Recommended Standards § 4.2.5.9.b.

For subsections (g)(1) and (g)(2), the Board asked IEPA to clarify whether "upflow clarifiers" are solids contact units. Board Questions at 11. If so, the Board asked whether it would it be acceptable to refer to them as "upflow solids contact clarifiers" in the regulations. *Id*. IEPA "has no objection to this proposal because upflow clarifiers are solids contact units. IEPA Resp. at 17. However, IEPA adds that this reference "deviates from commonly-used terminology." *Id*. In light of IEPA's response, the Board's order does not include this revision.

Subsection (g)(3). For units relying on helical flow instead of mechanical mixing, IEPA proposed to reduce detention time. SR at 32-33. Mr. Cook's testimony acknowledged that the Recommended Standards do not include a corresponding reduction. However, he stated that IEPA bases its proposal on "the performance and design of dozens of helical flow solids contact units operating in Illinois." Cook Test. at 4. Operators have reported to IEPA that these units "work better at higher loading rates and shorter detention times." SR at 33.

IEPA proposed in subsection (g)(3) that, "[w]hen treating surface water using cone shaped, helical upflow, solids contact clarifiers or softeners, the detention time shall be a minimum of 60 minutes." Prop. 604 at 44; *see* Cook Test. at 4; SR at 32-33.

Subsection (g)(4). IEPA proposed that, "[w]hen treating groundwater using cone shaped, helical upflow, solids contact softeners, the detention time shall be a minimum of 45 minutes." Prop. 604 at 44; *see* Cook Test. at 4; SR at 32-33.

Subsection (h). IEPA placed these requirements under the heading "Water Losses."

Subsection (h)(1). IEPA proposed that "[u]nits shall be provided with controls to allow adjusting the rate or frequency of sludge withdrawal." Prop. 604 at 44; *see* Recommended Standards § 4.2.5.11.a.

Subsection (h)(2). IEPA proposed that "[t]otal water losses must not exceed five percent for clarifiers and three percent for softening units." Prop. 604 at 44 (subsections (A) and (B)); *see* Recommended Standards § 4.2.5.11.b.

Subsection (h)(3). IEPA proposed that "[s]olids concentration of wasted sludge to waste must be three percent by weight for clarifiers and five percent by weight for softeners." Prop. 604 at 44 (subsections (A) and (B)); *see* Recommended Standards § 4.2.5.11.c.

Subsection (i). IEPA placed these requirements under the heading "Weirs and Orifices."

Subsection (i)(1). IEPA proposed requirements for upflow clarifiers using mechanical mixing. Subsection (A) proposes that "[t]he units must be equipped with either overflow weirs or orifices constructed so that water at the surface of the unit does not travel over 10 feet horizontally to the collection trough." Prop. 604 at 45; *see* Recommended Standards § 4.2.5.12.

Subsection (B) proposes that "[w]eirs shall be adjustable, at least equivalent in length to the perimeter of the tank." Prop. 604 at 45; *see* Recommended Standards § 4.2.5.12.a.

IEPA stated that loading rates are higher for weirs than for solids contact units because the reverse flow path keeps particles out of the effluent. SR at 33. Subsection (C)(i) proposes that "[w]eir loading rates shall not exceed 10 gpm per foot of weir length for units used for clarifiers." Prop. 604 at 45; *see* Recommended Standards § 4.2.5.12.b.1. Subsection (C)(ii) proposes that "[w]eir loading rates shall not exceed 20 gpm per foot of weir length for units used for softeners." Prop. 604 at 45; *see* Recommended Standards § 4.2.5.12.b.2.

Subsection (D) proposes that, "[w]here orifices are used the loading rates per foot of launder rates should be equivalent to weir loadings. Either shall produce uniform rising rates over the entire area of the tank." Prop. 604 at 45; *see* Recommended Standards § 4.2.5.12.c.

Subsection (i)(2). IEPA proposed requirements for cone shaped, helical upflow solids contact clarifiers or softeners. Mr. Cook acknowledged that the Recommended Standards do not include corresponding requirements. However, he stated that IEPA based its proposed loading rates on "the performance and design of dozens of helical flow, solids contact units operating in Illinois.'' Cook Test. at 4.

Subsection (A) proposes that "[w]eir loadings on cone shaped, helical upflow solids contact units that utilize reversing flow weirs shall not exceed 100 gpm per lineal foot of weir length for cone shaped helical upflow solids contact units or 200 gpm per foot of weir length for units used as softeners." Prop. 604 at 45 (subsections (i) and (ii)); *see* SR at 33.

The Board asked IEPA to explain the basis for these proposed loading rate limits. Board Questions at 11. IEPA stated that they are "based on manufacturer recommendations and operational experience from efficacy of existing units permitted by the Agency." IEPA Resp. at 17.

Subsection (B) proposes that, "[w]here orifices are used the loading rate per foot of launder rates should be equivalent to weir loadings. Either shall produce uniform rising rates over the entire area of the tank." Prop. 604 at 45; *see* SR at 33.

Subsection (j). Under the heading "Upflow Rates," IEPA proposed that, "[u]nless otherwise approved by the Agency pursuant to Section 604.145(b), the upflow rates shall not exceed 1.0 gpm per square foot of area at the sludge separation line for units used for clarifiers; and 1.75 gpm per square foot of area at the slurry separation line, for units used for softeners." Prop. 604 at 45 (subsections (1) and (2)); *see* SR at 33; Recommended Standards § 4.2.5.13.

Subsection (k). IEPA proposed that "[c]one shaped, helical upflow, solids contact units shall be equipped with one or more tangentially oriented inlets that introduce flow into the bottom cylindrical section of the unit. The inlets shall be equipped with a means for controlling the velocity of the water flowing into the unit." Prop. 604 at 46.

S.ection 604.525: Tube or Plate Settlers

Subsection (a). IEPA proposed that "[s]ettler units consisting of variously shaped tubes or plates which are installed in multiple layers and at an angle to the flow may be used for sedimentation, following flocculation." Prop. 604 at 46; *see* SR at 33; Recommended Standards §4.2.6.

Subsection (b). IEPA proposed general criteria for design of these units.

Subsection (b)(1). IEPA proposed that "[i]nlet and outlet design must maintain velocities suitable for settling in the basin and to minimize short-circuiting." Prop. 604 at 46; *see* SR at 33; Recommended Standards § 4.2.6.a.

Subsection (b)(2). IEPA proposed that "[p]late units must be designed to minimize maldistribution across the units. Prop. 604 at 46; *see* SR at 33; Recommended Standards § 4.2.6.a.

Subsection (b)(3). IEPA proposed that "[d]rain piping from settler units must be sized to facilitate a quick flush to the settlers units and to prevent flooding of other portions of the plant." Prop. 604 at 46; *see* SR at 33; Recommended Standards § 4.2.6.f.

Subsection (b)(4). IEPA proposed that "[o]utdoor installations must be protected against freezing, including sufficient freeboard above the top of the settlers." Prop. 604 at 46; *see* SR at 33; Recommended Standards § 4.2.6.b.

Subsection (b)(5). IEPA proposed that "[t]ubes must have a maximum application rate of 2 gpm per square foot of cross-sectional area, unless higher rates are shown through pilot plant or in-plant demonstration studies." Prop. 604 at 46; *see* SR at 33; Recommended Standards § 4.2.6.c.

Subsection (b)(6). IEPA proposed that "[p]lates must have a maximum application rate of 0.5 gpm per square foot, based on 80 percent of the projected horizontal plate area." Prop. 604 at 46; *see* SR at 33; Recommended Standards § 4.2.6.d.

Subsection (b)(7). IEPA proposed that "[f]lushing lines must be provided to facilitate maintenance and must be properly protected against backflow or back siphonage." Prop. 604 at 46; *see* SR at 33; Recommended Standards § 4.2.6.e.

Subsection (b)(8). IEPA proposed that "[i]nlets and outlets shall conform with Section 604.515(b) and (d) of this Part [Sedimentation]." Prop. 604 at 46; *see* SR at 33; Recommended Standards § 4.2.6.h.

Subsection (b)(9). IEPA proposed that "[t]he support system must be able to carry the weight of the settler units when the basin is drained plus any additional weight to support maintenance." Prop. 604 at 46; *see* SR at 33; Recommended Standards § 4.2.6.i.

Subsection (b)(10). IEPA proposed that "[p]rovisions must be made to allow the water level to be dropped, and water or air jet system for cleaning the settler units." Prop. 604 at 46; *see* SR at 33; Recommended Standards § 4.2.6.j.

Section 604.530: Other High Rate Clarification Processes. IEPA proposed that it

> may approve high rate clarification processes upon a demonstration of satisfactory performance under on-site pilot plant conditions or documentation of full-scale plant operation with similar raw water quality conditions. The demonstration of documentation must include justification for any reductions in detention times and/or increases in weir loading rates. High-rate clarification processes may include dissolved air flotation, ballasted flocculation, and contact flocculation/clarification. Prop. 604 at 46-47.

IEPA proposed this language because "there may be future advancements in the clarification treatment processes or new technology and methods may emerge that provide equivalent treatment." SR at 33.

Subpart F: Filtration

Community water supplies treating surface water or groundwater under the direct influence of surface water must provide filtration. Community water supplies removing iron or manganese must also provide filtration, regardless of their water source. SR at 33. In Subpart F, IEPA proposed design, operation, and maintenance standards based on the Recommended Standards for filtration. *Id.*, citing Recommended Standards § 4.3. Mr. Cook testified that the Recommended Standards include requirements for methods including diatomaceous earth filtration, slow sand filters, and direct filtration. Cook Test. at 5; *see* Recommended Standards §§ 4.3.3, 4.3.4, 4.3.5. IEPA did not propose standards for these methods because community water supplies in Illinois do not use them, and IEPA does not anticipate that any will use them. Cook Test. at 5.

Section 604.600: Filtration.

Subsection (a). IEPA proposed that "[a]pplication of any one type of filter must be supported by water quality data representing a reasonable period of time to characterize the variations in water quality. The Agency may require pilot treatment studies to demonstrate the applicability of the method of filtration proposed." Prop. 604 at 47; *see* SR at 34; Recommended Standards § 4.3.

Capt. Curry questioned what criteria IEPA would use in determining whether to require pilot treatment studies. Curry Test. at 14. He stated that the filters listed in proposed Section 604.600(b) "are considered to be conventional and in widespread use in North America." *Id*. IEPA responded that "[t]he types of filters in widespread use in Illinois will not require pilot studies." Curry Resp. at 7.

Subsection (b). IEPA proposed a list of acceptable filters, which include "rapid rate gravity filters, rapid rate pressure filters, deep bed rapid rate gravity filters, and biologically active filters". Prop. 604 at 47 (subsections (1) – (4)); *see* SR at 34; Recommended Standards § 4.3.

Capt. Curry questioned whether IEPA would provide criteria for use of membrane filtration, but IEPA's response did not provide them. *Id*.; *see* Curry Resp. at 6-7; *see also* Recommended Standards at xxxii-xxxv (Interim Standard on Membrane Technologies for Public Water Supplies), Recommended Standards § 4.3.h.

Section 604.605: Rapid Rate Gravity Filters. Rapid rate gravity filters consist of multiple gravel and sand layers, through which water travels by gravity. Prefiltered water enters at the top, and filtered water leaves through the bottom. These filters are open to the atmosphere. SR at 34.

Subsection (a). IEPA proposes that "[t]he use of rapid rate gravity filters shall require pretreatment." Prop. 604 at 47; *see* SR at 34; Recommended Standards § 4.3.1.1.

The Board asked IEPA to explain what constitutes pretreatment. IEPA responded that this requirement relies on the corresponding Recommended Standard, which requires pretreatment without providing a description or definition. IEPA Resp. at 17; *see* Recommended Standards § 4.3.1.1. The Board also asked IEPA to comment on whether it would be appropriate to specify the applicable pretreatment processes and include cross references. Board Questions as 12. Although IEPA noted pretreatment requirements in both 35 Ill. Adm. Code 611.250 and proposed Section 604.210, it argued that cross references "may create confusion due to differences in source water and applicable pretreatment processed." IEPA Resp. at 17; *see* 35 Ill. Adm. Code 611.250 (Filtration); Prop. 604 at 17 (Surface Water Quality). In light of IEPA's response, the Board declines to include cross references to pretreatment processes in this subsection.

Subsection (b). Section 653.116(a) of IEPA's rules establishes "[t]he nominal filter rate for single and multi media rapid rate gravity filters" at 2 gal/min/sq ft. 35 Ill. Adm. Code 653.116(a). Section 653.116(b) allows increased rates of "3 gal/min/sq/ft for single media filters and 5 gal/min/sq/ft for multi-media filters" for systems providing continuous turbidity

monitoring and surface wash equipment. 35 Ill. Adm. Code 653.116(b). "Filtration rates shall be reduced when finished water turbidity exceeds the standard in 35 Ill. Adm. Code 604.202." 35 Ill. Adm. Code 653.116(c).

In proposed Section 604.605(b), IEPA proposed that, "[f]or community water supplies treating surface water, groundwater under the direct influence of surface water, or using lime soda softening treatment, the normal filtration rates shall not exceed 3 gal/min/sqft for single media filters and 5 gal/min/ft^2 for multi-media filters. Filtration rates shall be reduced when treated water turbidity exceeds the standards in 35 Ill. Adm. Code 611." Prop. 604 at 47; *see* 35 Ill. Adm. Code 653.116(b); Cook Test. at 4; SR at 34; Recommended Standards § 4.3.1.2. Mr. Cook testified that, because filters are required to provide turbidity monitoring and surface wash equipment, IEPA did not propose the 2 gal/min/sq ft rate for filters that do not have them. Cook Test. at 4.

CLCJAWA argued that this proposal may require significant unnecessary expense when a CWS can document that a higher filtration rate is achievable. PC 8 at 2. CLCJAWA proposed the following language at the end of the first sentence after the numeric filtration rate limits: "unless filter performance in compliance with the appropriate water quality regulations is demonstrated." *Id*.

IEPA's response revised subsection (b) as follows:

> For community water supplies treating surface water, groundwater under the direct influence of surface water, or using lime soda softening treatment, unless otherwise approved by the Agency pursuant to Section 604.145(b), the nominal filtration rates shall not exceed 3 gal/min/~~sqft~~ft^2 for single media filters and 5 gal/min/ft^2 for multi-media filters. Filtration rates shall be reduced when treated water turbidity exceeds the standards in 35 Ill. Adm. Code 611. Resp. 7-8 at 7.

The Board's order reflects this revision.

Subsection (c). IEPA proposed that, "[f]or community water supplies treating groundwater and not using lime soda softening treatment, the rate of filtration must not exceed 4 gal/min/ft^2 of filter area." Prop. 604 at 47; *see* 35 Ill. Adm. Code 653.116(b); Cook Test. at 4; SR at 34; Recommended Standards § 4.3.1.2. Mr. Cook testified that IEPA limits the rate to this level because "these units may be enclosed pressure filters." Cook Test. at 4.

Responding to CLCJAWA's comment on achieving higher filtration rates, IEPA revised subsection (c) as follows: "[f]or community water supplies treating groundwater and not using lime soda softening treatment, unless otherwise approved by the Agency pursuant to Section 604.145(b), the rate of filtration must not exceed 4 gal/min/ft^2 of filter area." Resp. 7-8 at 7. The Board's order reflects this revision.

Subsection (d). IEPA placed these requirements under the heading "Number."

Subsection (d)(1). IEPA proposed that "[a] minimum of two units must be provided. Each unit must be capable of meeting the plant design capacity or the projected maximum daily demand at the approved filtration rate." Prop. 604 at 47; *see* SR at 34; Recommended Standards § 4.3.1.3.

Subsection (d)(2). IEPA proposed that, "[w]here more than two filters are provided, the filters must be capable of meeting the plant design capacity at the approved filtration rate with one filter removed from service." Prop. 604 at 48; *see* SR at 34; Recommended Standards § 4.3.1.3.

Subsection (d)(3). IEPA proposed that, "[w]here declining rate filtration is provided, the variable aspect of filtration rates, and the number of filters must be considered when determining the design capacity for filters." Prop. 604 at 48; *see* SR at 34; Recommended Standards § 4.3.1.3.

Subsection (e). Under the heading "Structural details and hydraulics," IEPA proposed that the design of the filter structure must provide

> vertical walls within the filter; no protrusion of the filter walls into the filter media; cover by superstructure; head and walking room to permit normal inspection and operation; minimum depth of filter box of 8.5 feet; minimum water depth over the surface of the filter media of three feet; trapped effluent to prevent backflow of air to the bottom of the filters; prevention of floor drainage to the filter with a minimum 4 inch curb around the filters; prevention of flooding by providing overflow; maximum velocity of treated water in pipe and conduit to filters of two ft/sec; cleanouts and straight alignment for influent pipes or conduits where solids loading is heavy, or following lime soda softening; construction to prevent cross connections, short circuiting, or common walls between potable and non-potable water; and wash water drain capacity to carry maximum flow. Prop. 604 at 48 (subsections (1) – (13)); *see* SR at 34; Recommended Standards § 4.3.1.4.

Subsection (f). IEPA proposed that wash water troughs must be constructed so that the "bottom elevation is above the maximum level of expanded media during washing; a two-inch freeboard is provided at the maximum rate of wash; the top edge is level and is all at the same elevation; spaced so that each trough serves the same number of square feet of filter area; and the maximum horizontal travel of suspended particles to reach the trough does not exceed three feet." Prop. 604 at 48-49 (subsections (1) – (5)); *see* SR at 34; Recommended Standards § 4.3.1.5.

Subsection (g). IEPA first proposed that filter media must consist of clean silica sand or other media free from detrimental contamination or bacterial contaminants. Prop. 604 at 49; *see* SR at 34; Recommended Standards § 4.3.1.6. IEPA also proposed that all filter media must meet the following requirements.

Subsection (g)(1). IEPA proposed that the filter media must have a "total depth of not less than 24 inches and not more than 30 inches, unless otherwise approved by the Agency pursuant to Section 604.145(b)." Prop. 604 at 49; *see* Recommended Standards § 4.3.1.6.a.

Capt. Curry commented that IEPA's proposed "depth limitation is not objectionable in itself." Curry Test. at 15. However, he referred to plants using filter media with a greater depth and questioned whether those plants will be required to obtain IEPA approval. *Id*. He also questioned what criteria IEPA would use to determine whether to approve deeper filter media. *Id*.

IEPA responded by amending this subsection to provide that filter media must have "a total depth of not less than 24 inches; ~~and not more than 30 inches, unless otherwise approved by the Agency pursuant to Section 604.145(a)~~." Curry Resp. at 7. The Board's order reflects this revision.

Subsection (g)(2). IEPA proposed that the filter media must have "a uniformity coefficient of the smallest material not greater than 1.65." Prop. 604 at 49; *see* Recommended Standards § 4.3.1.6.b.

Subsection (g)(3). IEPA proposed that the filter media must have "a minimum of 12 inches of media with an effective size range of 0.45 mm to 0.55 mm." Prop. 604 at 49; *see* Recommended Standards § 4.3.1.6.c.

Subsection (g)(4). IEPA addresses various specific filter media. Subsection (A) proposes that "[f]ilter anthracite shall consist of hard, durable anthracite coal particles of various sizes. Blending of non-anthracite material is not acceptable." Prop. 604 at 49; *see* Recommended Standards § 4.3.1.6.d.1. IEPA proposed specifications for the anthracite, including effective size and uniformity coefficient, specific gravity, acid solubility, and Mho's scale of hardness. Prop. 604 at 49 (subsection (i) – (vi)); *see* Recommended Standards § 4.3.1.6.d.1.

Subsection (B) proposes specifications for sand, including effective size, uniformity coefficient, specific gravity, and acid solubility. Prop. 604 at 50 (subsections (i) – (iv)); *see* Recommended Standards § 4.3.1.6.d.2.

Subsection (C) proposes that "[h]igh density sand shall consist of hard durable, and dense grain garnet, ilmenite, hematite, magnetite, or associated minerals of those ores that will resist degradation during handling and use." Prop. 604 at 50; *see* Recommended Standards § 4.3.1.6.d.3. IEPA proposed specifications for high density sand, including specific gravity, effective size, uniformity coefficient, and acid solubility. Prop. 604 at 50 (subsections (i) – (iv)); *see* Recommended Standards § 4.3.1.6.d.3.

Subsection (D) proposes that "[g]ranulated activated carbon as a single media may be considered for filtration only after pilot or full scale testing and with prior approval of the Agency." Prop. 604 at 50; *see* Recommended Standards § 4.3.1.6.d.4. IEPA proposed that the design must meet the basic specifications in subsections (f)(1) through (f)(3); provide for free

chlorine residual and adequate contact time; provide for periodic treatment of filter material to control bacterial and other growth; and provide for frequent replacement or regeneration. Prop. 604 at 50 (subsections (i) – (iv)); *see* Recommended Standards § 4.3.1.6.d.4.

The Board asked IEPA to clarify whether in subsection (g)(4)(D)(i), the cross reference to specifications for filter media should be subsections (g)(1) through (g)(3) instead of subsections (f)(1) through (f)(3). Board Questions at 12. IEPA responded that this provision should refer to subsection (g)(1) through (g)(3), and the Board's order reflects this revision. IEPA Resp. at 18.

CLCJAWA comments that "periodic treatment of filter material to control bacterial and other growth" in subsection (g)(4)(D)(iii) is "not a familiar concept" and requests that IEPA explain it. PC 8 at 2. In its response, IEPA "believes this provision could be removed" (Resp. 7-8 at 7), and the Board's order reflects this revision.

Subsection (E) proposes that "[o]ther media types must be approved by the Agency." Prop. 604 at 50; *see* Recommended Standards § 4.3.1.6.d.5.

The Board asked IEPA if it intends that "[o]ther media types or characteristics must be approved by the Agency" under 35 Ill. Adm. Code 604.145(b). Board Questions at 12. IEPA responded that it did not intend for Section 604.145(b) to apply to this determination. IEPA Resp. at 18. IEPA stated that its approval "in this case does not rely on economic or technical feasibility factors. For example, other media type has included proprietary media." *Id*.

Subsection (g)(5). IEPA proposed design specifications for supporting media based on the type of filter material.

Subsection (A) proposes that "[a] three inch layer of torpedo sand must be used as a supporting media for filter sand where supporting gravel is used, and must have effective size of 0.8 mm to 2.0 mm, and uniformity coefficient not greater than 1.7. Prop. 604 at 51; *see* Recommended Standards § 4.3.1.6.e.1.

Under the heading "Gravel," subsection (B) proposes in subsection (i) that, "[w]hen gravel is used as the supporting media it must consist of cleaned and washed, hard, durable, rounded silica particles and must not include flat or elongated particles." Prop. 604 at 51; *see* Recommended Standards § 4.3.1.6.e.2. Subsection (ii) proposes that "[t]he coarsest gravel must be 2.5 inches in size when the gravel rests directly on a lateral system, and must extend above the top of the perforated laterals." Prop. 604 at 51; *see* Recommended Standards § 4.3.1.6.e.2. Subsection (iii) proposes a minimum of four layers of gravel and a depth distribution based on size of the gravel. Prop. 604 at 51; *see* Recommended Standards § 4.3.1.6.e.2. Subsection (iv) proposes that "[r]eduction of gravel depths and other size gradations may be approved by the Agency upon justification for slow sand filtration or when proprietary filter bottoms are specified." Prop. 604 at 51; *see* Recommended Standards § 4.3.1.6.e.2.

Subsection (h). IEPA placed these requirements under the heading "Filter bottoms and strainer systems."

Subsection (h)(1). IEPA proposed that "[w]ater quality must be reviewed prior to the use of porous plate caps to prevent clogging and failure of the underdrain system." Prop. 604 at 51.

The Board asked IEPA to clarify whether water quality should be reviewed prior to use of "porous plate bottoms" and not "porous plate caps" as proposed. Board Questions at 12. IEPA responded that it proposes to use the term "porous plate bottoms" (IEPA Resp. at 18), and the Board's order reflects this revision.

Subsection (h)(2). IEPA proposed that design of manifold type collection systems must

> minimize loss of head in the manifold and laterals; ensure even distribution of washwater and even rate of filtration over the entire area of the filter; provide the ratio of the area of the final opening of the strainer systems to the area of the filter at about 0.003; provide the total cross sectional area of the laterals at about twice the total area of the final openings; provide the cross sectional area of the manifold at 1.5 to 2 times the total area of the laterals; and lateral perforations without strainers must be directed downward. Prop. 604 at 51-52 (subsections (A) – (F)); *see* Recommended Standards § 4.3.1.7.

Subsection (h)(3). IEPA proposed that "[t]he Agency may approve departures from these standards for high rate filters and for proprietary bottoms." Prop. 604 at 52; *see* Recommended Standards § 4.3.1.7.

Subsection (i). IEPA proposed that the following appurtenances must be provided for every filter: "influent and effluent sampling traps; a gauge indicating loss of head; a meter indicating the instantaneous rate of flow; a pipe for filtering to waste that has a six inch or larger air gap, or other Agency approved cross connection control measure; a turbidimeter; flow rate controller capable of providing gradual rate increases when placing the filters back into operation; [and] a hose and storage rack for washing filter walls. Prop. 604 at 52 (subsections (1) – (7)); *see* Recommended Standards § 4.3.1.10.

Noting that subsection (i)(5) requires that each filter have a turbidimeter, Capt. Curry stated that surface water treatment rules require continuous recording nephelometers for filters treating surface water. Curry Test. at 15. He recommended revising subsection (i)(5). *Id*. IEPA "has no objection" to his proposal and revised subsection (i)(5) to require "a continuously recording Nephelometer capable of measuring and recording filter effluent turbidity at maximum 15 minute intervals, and with alarm capability to notify the Operator if filtered water turbidity exceeds 0.3 NTU (Nephelometric Turbidity Units)." Curry Resp. at 7. The Board's order reflects this revision.

Noting the requirement in subsection (i)(6) that each filter have a flow rate controller, Capt. Curry commented that this appears to refer to an automatic device. Curry Test. at 16. He added that he is "not aware of any plants that have some type of automated flow rate controller that provides gradual rate of increase." *Id*. He argued that "[m]ost plants manually control the filter effluent valve to select the desired filtration rate during the filter-to-waste portion of the

cycle and/or to allow gradual increase of filtration rate following backwash." *Id*. He suggests revising subsection (i)(6). *Id*. IEPA "has no objection" to his proposal and revised subsection (i)(6) to require "an adjustable valve to allow the Operator to gradually control the flow rate increase when placing the filters back into operation." Curry Resp. at 7. The Board's order reflects this revision.

Subsection (j). Under the heading "Backwash," IEPA proposed provisions for washing filters.

Subsection (j)(1). IEPA proposed that "[t]he community water supply system must use filtered water provided at the required rate by washwater tanks or a dedicated washwater pump to wash the filters." Prop. 604 at 52; *see* Recommended Standards § 4.3.1.11.b.

Subsection (j)(2). Under the heading "Backwash rate," subsection (A) proposes "a minimum rate of 15 gal/min/ft^2, consistent with water temperatures and specific gravity of the filter media." Prop. 604 at 52; *see* Recommended Standards § 4.3.1.11.a.

Subsection (B) recommends "a rate sufficient to provide for a 50 percent expansion of the filter bed is recommended." Prop. 604 at 52; *see* Recommended Standards § 4.3.1.11.a.

The Board asked IEPA to comment on whether it should require rather than recommend this rate. Board Questions at 12. IEPA responded that it "has no objection to using required over recommended" (IEPA Resp. at 18), and the Board's order reflects this revision.

Subsection (C) proposes "a reduced rate of 10 gal/min/ft^2 for full depth anthracite or granulated activated carbon filters upon approval by the Agency." Prop. 604 at 53; *see* Recommended Standards § 4.3.1.11.a.

Subsection (j)(3). IEPA proposed that "[w]ashwater pumps in duplicate must be provided unless an alternate means of obtaining washwater is available." Prop. 604 at 53; *see* Recommended Standards § 4.3.1.11.c.

Subsection (j)(4). IEPA proposed that "[t]he main washwater line must have a regulator or valve to obtain the desired rate of filter wash with the washwater valves on the individual filters open wide." Prop. 604 at 53; *see* Recommended Standards § 4.3.1.11.e.

Subsection (j)(5). IEPA proposed that "[t]he main washwater line or backwash waste line must have a rate of flow indicator, preferably with a totalizer, located so that it can be easily read by the operator during the washing process." Prop. 604 at 53; *see* Recommended Standards § 4.3.1.11.f.

Subsection (j)(6). IEPA proposed that "[r]apid changes in backwash water flow must be prevented." Prop. 604 at 53; *see* Recommended Standards § 4.3.1.11.g; PC 8 at 2; Resp. 7-8 at 7.

Subsection (j)(7). IEPA proposed that "[b]ackwash shall be operator initiated, and automated systems shall be operator adjustable." Prop. 604 at 53; *see* Recommended Standards § 4.3.1.11.h.

Capt. Curry stated that an operator needs to be present to begin and end the backwash cycle. Curry Test. at 16. He proposed to revise subsection (j)(7). *Id*. IEPA "has no objection" to his change and revises the subsection to require that "[b]ack wash shall be completed with an operator in attendance to initiate the backwash cycle and to control the return-to-service procedure to assure that the effluent turbidity is less than 0.3 NTU when the filter is placed back into operation for discharge to the clearwell." Curry Resp. at 7-8. The Board's order reflects this revision.

Subsection (j)(8). IEPA proposed that "[a]ppropriate measures for cross-connection control must be provided." Prop. 604 at 53; *see* Recommended Standards § 4.3.1.11.i.

Subsection (k). IEPA proposed that "[s]urface or subsurface wash facilities are required except for filters used exclusively for iron, radionuclides, arsenic or manganese removal, and wash facilities may include a system of fixed nozzles or a revolving-type apparatus." Prop. 604 at 53; *see* Recommended Standards § 4.3.1.8.

IEPA proposed that these devices must be designed with "water pressure of at least 45 psi; a properly installed vacuum breaker or other approved device to prevent back siphonage if connected to the treated water system; and flow rate of 2.0 gpm/ft^2 of filter area with fixed nozzles or 0.5 gpm/$ft^2$with revolving arms." Prop. 604 at 53 (subsections (1) – (3)); *see* Recommended Standards § 4.3.1.8.

Subsection (l). IEPA proposed that air scouring meeting various requirements "can be utilized in place of surface wash." Prop. 604 at 53; *see* Recommended Standards § 4.3.1.9.

The Board asked IEPA whether the following clarification would be acceptable: "[a]ir scouring can be used in place of surface wash~~. The~~ if the air scouring meets~~must meet~~ the following requirements:~~.~~" Board Questions at 12. IEPA has "no objection to this proposal" (IEPA Resp. at 18), and the Board's order reflects this revision.

Subsection (l)(1). IEPA proposed that "[a]ir flow for air scouring the filter must be 3 – 5 f^3/min/ft^2 of filter area when the air is introduced in the underdrain; a lower air rate must be used when the air scour distribution system is placed above the underdrain." Prop. 604 at 53; *see* Recommended Standards § 4.3.1.9.a.

Subsection (l)(2). IEPA proposed that "[a] method for to avoid filter media loss during backwashing must be provided." Prop. 604 at 53; *see* Recommended Standards § 4.3.1.9.b.

Subsection (l)(3). IEPA proposed that "[a]ir scouring must be followed by a fluidization wash sufficient to restratify the media." Prop. 604 at 54; *see* Recommended Standards § 4.3.1.9.c.

Subsection (l)(4). IEPA proposed that "[a]ir must be free from contamination." Prop. 604 at 54; *see* Recommended Standards § 4.3.1.9.d.

Subsection (l)(5). IEPA proposed that, "[i]f air scour distribution systems are placed at the media and supporting bed interface, the air scour nozzles must be designed to prevent medial from clogging." Prop. 604 at 54; *see* Recommended Standards § 4.3.1.9.e.

The Board asked IEPA to comment on whether the following revision of subsection (l)(5) based on Section 4.3.1.9 of the Recommended Standards would be acceptable: "[i]f air scour distribution systems are placed at the media and supporting bed interface, the air scour nozzles must be designed to prevent medial from clogging the nozzles or the air entering the air distribution system." Board Questions at 12. IEPA has "no objection to this proposal" (IEPA Resp. at 18), and the Board's order reflects this revision.

Subsection (l)(6). IEPA proposed that "[p]iping for the air distribution system must not be flexible hose or other soft material." Prop. 604 at 54; *see* Recommended Standards § 4.3.1.9.f.

Subsection (l)(7). IEPA proposes that air delivery piping must not "pass down through the filter media" and must not "have any arrangement in the filter design which would allow short circuiting between the applied unfiltered water and the filtered water." Prop. 604 at 54 (subsections (A) and (B)); *see* Recommended Standards § 4.3.1.9.g.

Subsection (l)(8). IEPA proposed that, "[w]hen air scouring is being utilized, the backwash rate must be variable and must not exceed 8 gal/min, unless a higher rate is necessary to remove scoured particles from filter media surfaces." Prop. 604 at 54; *see* Recommended Standards § 4.3.1.9.i.

Subsection (l)(9). IEPA proposed that "[a]ir scouring piping shall not be installed in the underdrain unless the underdrain was designed to accommodate the piping." Prop. 604 at 54; *see* Recommended Standards § 4.3.1.9.j.

Section 604.610: Rapid Rate Pressure Filters. "The normal use of these filters is for iron and manganese removal." Recommended Standards § 4.3.2.

Subsection (a). IEPA proposed that "[p]ressure filters shall not be used in the filtration of surface water, groundwater under the direct influence of surface water, or water treated by lime soda softening." Prop. 604 at 54; *see* Recommended Standards § 4.3.2.

Subsection (b). IEPA proposed that "[t]he rate of filtration must not exceed 4 gal/min/ft^2 of filter area unless otherwise approved by the Agency pursuant to Section 604.145(b)." Prop. 604 at 54; *see* Recommended Standards § 4.3.2.2. Mr. Cook testified that, for clarity, IEPA proposed the same maximum loading rate for gravity and pressure filters. Cook Test. at 4; *see* Prop. 604 at 47 (proposed Section 604.605(c)). Mr. Cook also testified that a community water supply could rely on the results of a pilot study to demonstrate satisfactory results at a higher

rate. Cook Test. at 5. However, he added that "[o]nly a few groundwater systems in Illinois are permitted to operate at filtration rates above 4 gal/min/sq. ft." *Id*.

Subsection (c). IEPA proposed that "[m]inimum criteria relative to structural details, hydraulics, and filter media provided for rapid rate gravity filters also apply to pressure filters where appropriate." Prop. 604 at 54; *see* Recommended Standards § 4.3.2.1.

Noting that minimum criteria apply "where appropriate," the Board asked IEPA to clarify whether Sections 604.605(e) and (g) are the appropriate criteria. Board Questions at 12. If so, the Board asked whether it would be acceptable to IEPA to have subsection (c) include a cross reference to those sections. *Id*. IEPA responded that "these are the appropriate criteria. IEPA did not object to a cross reference if "where appropriate" remains in this subsection. IEPA Resp. at 18-19. The Board's order reflects this revision.

Subsection (d). IEPA placed these requirements under the heading "Number."

Subsection (d)(1). IEPA proposed that "[a] minimum of two units must be provided. Each unit must be capable of meeting the plant design capacity or the projected maximum daily demand at the approved filtration rate." Prop. 604 at 54.

Subsection (d)(2). IEPA proposed that, "[w]here more than two filters units are provided, the filters must be capable of meeting the plant design capacity at the approved filtration rate with one filter removed from service." *Id*. at 55.

Subsection (e). IEPA proposed that rapid rate pressure filters must be designed to provide for

> loss of head gauges on the inlet and outlet pipes of each battery of filters; an easily readable meter or flow indicator on each battery of filters; filtration and backwashing of each filter individually; minimum sidewall shell height of five feet, unless otherwise approved by the Agency pursuant to Section 604.145(b); the top of the washwater collectors to be at least 18 inches above the surface of the media; an underdrain system to collect the filtered water and to uniformly distribute the backwash water at a rate not less than 15 gal/min/ft^2 of filter area; backwash flow indicators and controls that are readable while operating the control valves; an air release valve on the highest point of each filter; when the filter exceeds 36 inches in diameter, a manhole at least 24 inches in diameter; means of observing backwash discharge water; and a six inch or larger air gap, or other Agency approved cross connection measure. Prop. 604 at 55 (subsections (1) – (11)); *see* Recommended Standards § 4.3.2.3.

Subsection (f). IEPA proposed that "[r]apid rate pressure filters should have a flow indicator on each filtering unit." Prop. 604 at 55; *see* Recommended Standards § 4.3.2.3.b.

Section 604.615: Deep Bed Rapid Rate Gravity Filters. IEPA proposed that "[d]eep bed rapid rate gravity filters refers to rapid rate gravity filters with filter material depths equal to

or greater than 48 inches, and filter media sizes are typically larger than those listed in Section 604.605(g)(4) of this Part. Prop. 604 at 55; *see* Recommended Standards § 4.3.6.

Subsection (a). IEPA proposed that, "[b]efore a community water supply may use deep bed rapid rate filters, a pilot study must be completed and approved by the Agency." Prop. 604 at 55; *see* SR at 34-35; Recommended Standards § 4.3.6.

The Board asked IEPA to clarify whether IEPA's approval relates to results of the pilot study, the use of deep bed filter, or both. Board Questions at 12. If necessary, the Board asked IEPA to propose revisions to subsection (a). *Id*. IEPA responded that its approval relates to both and that its "proposed language accurately conveys the intended meaning." IEPA Resp. at 19.

Subsection (b). IEPA proposed that "[t]he final filter design must be based on the pilot plant studies and must comply with all applicable portions of Section 604.605 of this Part." Prop. 604 at 56; *see* SR at 35; Recommended Standards § 4.3.6.

Section 604.620: Biologically Active Filtration. IEPA proposed that

> [b]iologically active filtration refers to the filtration of surface water or a groundwater with iron, manganese or significant natural organic material, which includes the establishment, and maintenance of biological activity within the filtration media. The objectives of biologically active filtration may include control of disinfection byproduct precursors, increased disinfectant stability, reduction of substrates for microbial regrowth, breakdown of small quantities of synthetic organic chemicals, reduction of ammonia-nitrogen and oxidation of iron and manganese. Biological activity can have an adverse impact on turbidity, particle and microbial pathogen removal, disinfection practices, head loss development and filter run times and distribution system corrosion. Prop. 604 at 56; *see* Recommended Standards § 4.3.7.

Capt. Curry stated that ammonia-N is not biologically reduced but is biochemically oxidized. Curry Test. at 17. He proposed to refer to "oxidation of ammonia-nitrogen, iron, and manganese." *Id*. IEPA responded that "the use of reduction as opposed to oxidation is equally valid" in this context. Curry Resp. at 8. However, IEPA "has no preference' and "defers to the Board." *Id*. In light of IEPA's position that a reference to oxidation is equally valid, the Board revises this subsection as recommended in the comment, and the Board's order reflects this revision.

The Board noted that IEPA's proposal does not explicitly require any measure to minimize the identified adverse impacts of biological activity. Board Questions at 13. The Board asked IEPA to comment on whether the pilot study required in subsection (a) is expected to address these potential impacts or whether subsection (a) should require the pilot study to address them. *Id*. IEPA responded that the objectives of these studies are case specific. Before conducting a study, applicants submit a protocol, which would address potential adverse impacts. IEPA Resp. at 19.

Subsection (a). IEPA proposed that, "[b]efore use of biologically active filters, the community water supply must conduct a pilot study and obtain Agency approval. Pilot study objectives must be clearly defined and must ensure the microbial quality of the filtered water under all anticipated conditions of operation." Prop. 604 at 56; *see* SR at 35-36; Recommended Standards § 4.3.7.

The Board asked IEPA to clarify whether its approval relates to the results of the pilot study, the use of biologically active filters, or both. Board Questions at 13. IEPA responded that its approval relates to both and that its "proposed language accurately conveys the intended meaning." IEPA Resp. at 19.

Subsection (a)(1). IEPA proposed that "[t]he pilot study must be of sufficient duration to ensure establishment of full biological activity; often greater than three months is required." Prop. 604 at 56; *see* Recommended Standards § 4.3.7.

Subsection (a)(2). IEPA proposed that "[t]he pilot study must establish empty bed contact time, biomass loading, and any other parameters required by the Agency." Prop. 604 at 56; Recommended Standards § 4.3.7.

Capt. Curry stated that substrate loading per unit volume is typically the controlling factor for sizing attached growth bio-reactors. Curry Test. at 17. He proposed to revise subsection (a)(2). *Id*. IEPA "concurs with this recommendation" and revises the subsection to require that "[t]he pilot study must establish empty bed contact time, surface filtration hydraulic loading rate, substrate loading rate per unit filter media volume, and treatment efficiency for removal or reduction of concentration of parameters targeted for the pilot study." *Id*. The Board's order reflects this revision.

Subsection (b). IEPA proposed that "[t]he final filter design must be based on the pilot plant studies and must comply with Section 604.605 of this Part [Rapid Rate Gravity Filters]." Prop. 604 at 56; *see* SR at 35; Recommended Standards § 4.3.7.

Subpart G: Disinfection

Disinfection ensures that source water is biologically safe, and Subpart G proposes disinfection requirements for all classifications of water systems. SR at 35; *see* Cook Test. at 5. Mr. Cook testified that IEPA based its proposed requirements on Part 653 of its rules and Section 4.4 of the Recommended Standards. Cook Test. at 5.

Section 604.700: Disinfection Requirement.

Subsection (a). IEPA proposed that

> [d]isinfection, in addition to continuous chlorination, is required for all sources utilizing surface water, groundwater under the direct influence of surface eater, groundwater obtained from unconfined fractured bedrock, groundwater with a total coliform presence, and groundwater treated in basins open to the atmosphere

> to meet the inactivation of pathogens treatment objectives as provided in Section 604.720 and 35 Ill. Adm. Code Part 611. Prop. 604 at 56; *see* SR at 35-36; Cook Test. at 5; Recommended Standards § 4.4.

IEPA stated that "[t]hese sources of water have questionable sanitary quality." SR at 35.

The Board questioned whether subsection (a) should apply to "all community water supplies" instead of "all sources." Board Questions at 13. IEPA responded that its proposal accurately conveys its intent, "because a CWS may have more than one source." IEPA Resp. at 20.

The Board asked IEPA to explain the rationale for requiring disinfection in addition to continuous chlorination for the listed sources of raw water. Board Questions at 13. IEPA responded that disinfection destroys or inactivates pathogenic organisms while "[c]ontinuous chlorination is necessary to 1) limit biological growth in the distribution system, 2) reduce risk of waterborne disease in case pathogens penetrate the distribution system, and 3) provide an indicator of intrusion or other localized event." IEPA Resp. at 19-20.

The Board also asked IEPA whether it had considered relying on coliform testing or other standards to determine whether to require disinfection in addition to chlorination. Board Questions at 13. IEPA responded that this would not be appropriate "because coliform testing only provides a representation of water quality at the time of sample collection. Disinfection provides a protective barrier from contamination of the source water." IEPA Resp. at 20. IEPA added that coliform testing does not provide this protection. *Id*

Finally, the Board asked IEPA if it had considered whether water that has been disinfected in addition to being chlorinated may have any adverse effects on receiving waters when users discharge into them. Board Questions at 13. IEPA responded that "dechlorination equipment for discharges are required to comply with an NPDES permit," which is addressed in Subtitle C of the Board's rules. IEPA Resp. at 20.

Subsection (b). IEPA proposed that "[d]isinfection may be accomplished with, but is not limited to, chlorine, chloramines, chlorine dioxide, ozone, or ultraviolet light. Chloramines shall not be used as a primary disinfectant, unless otherwise approved by the Agency pursuant to Section 604.145(b)." Prop. 604 at 56; *see* SR at 36; Recommended Standards § 4.4.

Capt. Curry referred to a plant that does not use a free chlorine residual and relies entirely on chloramine disinfection, which it selected in order to minimize disinfection by-products and to control manganese. Curry Test. at 17. If this plant had achieved disinfection and had no water quality violations, he questioned whether IEPA would approve continued use of chloramines. *Id*. IEPA responded that, if IEPA had approved this practice, it "it should not have to request additional formal approval." Curry Resp. at 8.

Subsection (c). IEPA proposed that "[c]ontinuous chlorination is required for all community water supplies unless the chlorine residual requirements of Section 604.725 are met or the community water supply is exempt under Section 17(b) of the Act [415 ILCS 5/17(b)

(2016)]." Prop. 604 at 57; *see* SR at 36; Recommended Standards § 4.4. Section 611.240(g) requires chlorination, but IEPA believes that "it fits better" in proposed Subpart G. 35 Ill. Adm. Code 611.240(g); SR at 67; *see* Prop. 611 at 37 (repealing Section 611.240(g)).

Subsection (d). IEPA proposed that "[n]otification of a change in in disinfection practices and the schedule for the changes must be made known to the public; particularly to hospitals, kidney dialysis facilities and fish breeders, as chlorine dioxide and its byproducts may have similar effects as chloramines." Prop. 604 at 57; *see* SR at 36; Recommended Standards § 4.4.8.4.

Capt. Curry commented that this subsection intends to provide public notice to the public and should be revised to reflect this intent. Curry Test. at 17. The Board asked IEPA to clarify whether CWSs must also notify IEPA of any changes in disinfection practices. Board Questions at 13. IEPA responded that "[w]ater systems notify the Agency and the public of routine changes in chlorination practices to comply with reporting under Part 611 (e.g., Revised Total Coliform Rule reporting)." IEPA Resp. at 20; Curry Resp. at 9. IEPA added that "[t]his is an established practice." Curry Resp. at 9.

The Board asked IEPA to comment on whether other Board regulations specify public notification suitable to meet this proposed requirement. Board Questions at 13. IEPA responded that Board regulations "do not specify public notification requirements." IEPA Resp. at 20. The Board asked IEPA to comment on whether the rules should specify notification requirements and IEPA responded that "[a]dditional notification requirements do not need to be specified in subsection (d)." Board Questions at 13; IEPA Resp. at 20.

Section 604.705: Chlorination Equipment.

Subsection (a). IEPA rules now require that "[d]esign documents for chlorination shall be prepared and submitted in accordance with 35 Ill. Adm. Code 602 [Permits]." 35 Ill. Adm. Code 653.601(a). Under the heading "Procedure for Submitting Plans and Specifications," IEPA proposed the same requirement as subsection (a). Prop. 604 at 57.

Subsection (b). IEPA proposes requirements for chlorination equipment.

Subsection (b)(1). IEPA rules now require that chlorination equipment must be "large enough to satisfy the immediate chlorine demand and give a measurable residual of at least 2.0 mg/l of total chlorine under all operating conditions after contact." 35 Ill. Adm. Code 653.601(b)(2). In subsection (b)(1), IEPA proposes the same requirement. Prop. 604 at 57.

Subsection (b)(2). IEPA rules now require that chlorination equipment must be

> capable of feeding chlorine to the water being treated at a dosage rate of at least 5.0 mg/l except when the water has a high chlorine demand. Factors in determining chlorine demand are: pH; water temperature; contact time; presence in the water of substances having chlorine demand such as hydrogen sulfide, iron, manganese and nitrogenous compounds including ammonia; and supplemental

> treatment such as aeration which reduces chlorine demand." 35 Ill. Adm. Code 653.601(b)(3) (subsections (A) – (E)).

In subsection (b)(2), IEPA proposes the same requirement. Prop. 604 at 57.

The Board asked IEPA to comment on what it considers water having a "high chlorine demand." Board Questions at 13. IEPA responded that it "considers high chlorine demand waters to be those where a 5.0 mg/L metering pump does not sufficiently supply a chlorine residual at the regulatory limits. Waters with a high chlorine demand require a higher minimum pump capacity." IEPA Resp. at 21, citing 35 Ill. Adm. Code 653.601(b)(3). The Board also asked IEPA to comment on whether the rule should specify a level of chlorine demand at which the minimum dosage rate of 5.0 mg/L no longer applies. Board Questions at 13. IEPA states that its proposal "accurately conveys the intended meaning." IEPA Resp. at 21.

Subsection (b)(3). IEPA rules now require that duplicate chlorination equipment must be provided "when operating conditions do not allow repair of the chlorinator during off-pumping periods." 35 Ill. Adm. Code 653.601(d)(2). In subsection (b)(3), IEPA proposed the same requirement. Prop. 604 at 57.

Subsection (b)(4). IEPA rules now require that "[s]tandby chlorination equipment shall be installed and operational at water supplies treating surface water." 35 Ill. Adm. Code 653.601(d)(3). In subsection (b)(4), IEPA proposed that chlorination equipment must "be provided in duplicate, installed and operational, at water supplies treating surface water, groundwater under the direct influence of surface water, and groundwater with a history of total coliform positive results." Prop. 605 at 57.

The Board asked IEPA to clarify whether duplicate chlorination equipment "provided" under subsection (b)(3) could satisfy the requirement that duplicate equipment be "installed and operational" under subsection (b)(4). Board Questions at 14. IEPA responded that "[s]ubsection (b)(3) applies to all chlorine feed applications unless subsection (b)(4) applies" to supplies treating surface water or groundwater under the direct influence of surface water. IEPA Resp. at 21.

Subsection (b)(5). IEPA rules now require that "[s]pare parts consisting of at least the commonly expendable parts such as glassware, fittings, hose clamps and gaskets shall be available for emergency repairs." 35 Ill. Adm. Code 653.601(d)(4). In subsection (b)(5), IEPA proposed that chlorination equipment must include at least the same identified spare parts for emergency repairs. Prop. 604 at 58.

Section 604.710: Points of Application. IEPA proposed that "[p]rovisions must be made for the capability to add a disinfectant into or prior to any aeration, settling, or filtration process, unless the process involves biological treatment in which case the disinfectant must be added after the biological treatment." Prop. 604 at 58; *see* SR at 36; Recommended Standards § 4.4.2. Disinfectant must follow biological treatment because the disinfectant would kill microorganisms in the biological filtration. SR at 36.

Section 604.715: Contact Time.

Subsection (a). IEPA rules now require that "[a] minimum chlorine contact time of 60 minutes shall be provided for all surface water supplies and for ground water supplies using surface water-type treatment, springs, or infiltration lines, or water obtained from creviced rock aquifers with less than 50 feet of cover." 35 Ill. Adm. Code 653.603(a).

As subsection (a), IEPA proposed that,

> [u]nless otherwise approved by the Agency pursuant to Section 604.145(b), a minimum chlorine contact time of 60 minutes shall be provided for all sources utilizing surface water, groundwater under the direct influence of surface water, groundwater with basins open to the atmosphere, and groundwater obtained from unconfined, fractured bedrock. The baffling factor must be greater than or equal to 0.3 to prevent short circuiting. Prop. 604 at 58; *see* SR at 36-37; Cook Test. at 5; Recommended Standards § 4.4.2

The Board asked IEPA to comment whether it would clarify subsection (a) to require that "a minimum chlorine contact time of 60 minutes must be provided at all plants treating surface water, groundwater under the direct influence of surface water, groundwater with basins open to the atmosphere, and groundwater obtained from unconfined, fractured bedrock." Board Questions at 14. IEPA "has no objection to this proposal" (IEPA Resp. at 21), and the Board's order reflects the revision.

Capt. Curry stated that the following method has historically been used in Illinois to calculate contact time:

$$\text{Hydraulic retention time} = \frac{\text{water volume in basin in gallons}}{\text{flow rate in gallons per minute}} = \text{minutes}$$

Capt. Curry questioned how a PWS would determine the 60-minute minimum contact time when accounting for the proposed baffling factor of 0.3. Curry Test. at 18. IEPA responded that it would use Capt. Curry's method to determine minimum contact time. Curry Resp. at 9. In his supplemental testimony, Capt. Curry concurred with IEPA's proposed minimum 0.3 baffle correction factor. Curry Supp. Test. at 7-8. He proposed revising subsection (a) to provide as follows

> Unless otherwise approved by the Agency pursuant to Section 601.145(b), a minimum chlorine contact time of 60 minutes shall be provided for all sources utilizing surface water, groundwater under the direct influence of surface water, groundwater with basins open to the atmosphere, and groundwater obtained from unconfined, fractured bedrock. The equivalent baffling factor must be greater than 0.3 to prevent short circuiting. The 60 minute contact time shall be calculated based on the following formula:
>
> $$\frac{\text{Maximum pumping rate out of basin, gpm}}{} = \text{minimum 60 minutes}$$

Actual basin operating water volume, gallons

Curry Sup. Test. at 7-8. IEPA "agrees with this change" (Curry Supp. Resp. at 1), and the Board's order reflects this revision.

The Board asked whether this formula accounts for the baffling factor as required by the proposal. Board Questions 2 at 1. IEPA responded that "[t]he baffling factor is separate from the 60-minute contact time and both are used to determine the CT value for inactivation of pathogens." IEPA Resp. 2 at 1.

Subsection (b). IEPA rules now provide that "[c]ontact time is measured as the time following filtration of surface or ground water, or chlorination of well water when there is no other treatment, and the time when the water reaches the first user." 35 Ill. Adm. Code 653.603(b).

Subsection (b)(1). IEPA proposed that, "[w]hen the treatment process includes filtration, contact time is measured as the time following filtration of the water until the water reaches the first user. Prop. 604 at 58.

Subsection (b)(2). IEPA proposed that, "[w]hen the treatment process does not include filtration, contact time is measured as the time following chlorination of the water until the water reaches the first user." Prop. 604 at 58.

Section 604.720: Inactivation of Pathogens. Board rules now require at least 3-log removal or inactivation of giardia lamblia and at least 4-log removal or inactivation of viruses. 35 Ill. Adm. Code 611.220(a). However, the rules do not specify the minimum inactivation required to meet the 3-log and 4-log requirements. Cook Test. at 6; SR at 37. IEPA stated that the inactivation potion of its proposed Section 604.720 reflects the minimum recommendation of the Guidance Manual for Compliance with Filtration and Disinfection Requirements for Public Water Supplies Using Surface Water Sources. *Id*.

Mr. Cook testified that "[c]ommunity water supplies, where applicable, must meet both the inactivation requirements and the 60-minute contact time requirement." Cook Test at. 5

Subsection (a). IEPA proposed that, "[a]t plants treating surface water or groundwater under the direct influence of surface water, [a] disinfectant must be added to provide a minimum 0.5-log inactivation of Giardia lamblia cysts; and [a] disinfectant must be added to provide a minimum 2-log inactivation of viruses." Prop. 604 at 58 (subsections (1) and (2)).

Subsection (b). IEPA proposed that, "[a]t plants treating groundwater obtained from unconfined fractured bedrock, groundwater with a total coliform presence, and groundwater treated in basins open to the atmosphere, [a] 4-log virus inactivation is required; and [a] second method of inactivation is required in addition to continuous chlorination. Additional methods of inactivation must be approved by the Agency, and may include, but are not limited to, chlorine dioxide, ozone, ultraviolet light, gravity filtration and membrane filtration." Prop. 604 at 58-59;

see Cook Test. at 6; SR at 37. Mr. Cook characterized this as a "multi-barrier approach." Cook Test. at 6.

Subsection (c). IEPA proposed that "[t]he methodology to determine inactivation of pathogens must be done in accordance with the Disinfection Profiling and Benchmark Guidance Manual, August 1999 USEPA Reference for methodology and C x T tables, incorporated by reference in 35 Ill. Adm. Code 601.115." Prop. 604 at 59; *see* PC 8 at 2.

Subsection (d). IEPA proposed that "[f]actors to be considered in determining inactivation include pH, ammonia concentration, temperature, disinfectant residual, flow rate, volume of basins/piping and baffling factors. Tracer studies should be performed to determine baffling factors." Prop. 604 at 59; *see* PC 8 at 2; Resp. 7-8 at 7.

Capt. Curry stated that the baffle correction factor "is the ratio of the time taken for 10% of a tracer to reach the outlet (known as T_{10}) to the system's theoretical average detention time." Curry Test. at 18. He stated that the selection procedure for this factor has been "elusive," and he is not aware of a system that has performed a tracer study. *Id*. at 19. He suggested revising subsection (d) and including a standard for determining a baffling factor. *Id*

IEPA responded that "it has no objection to this change" and suggests incorporating the standard cited by Capt. Curry by reference. Curry Resp. at 9. IEPA revises subsection (d) as follows: "Factors to be considered in determining inactivation include, but are not limited to: pH, ~~ammonia concentration,~~ temperature, form of disinfectant ~~disinfection~~ residual, disinfectant residual concentration, flow rate, volume of basins/piping, and baffling factors. Baffling factor shall be determined in accord with "Improving Clearwell Design for CT Compliance" or a tracer study approved by the Agency. ~~Tracer studies should be perfomed to determine baffling factors.~~" *Id*., citing Crozes, G.F., et al.; Improving Clearwell Design for CT Compliance, AWWA Research Foundation (1999). The Board's order reflects this revision. In response to a Board request, IEPA provided a copy of the standard proposed for incorporation by reference (IEPA Resp. 2 at 1), and the Board's proposed Section 601.115(b) adds this standard to its incorporations by reference.

Section 604.725: Residual Chlorine. Mr. Cook testified that "[m]aintenance of a chlorine residual in the distribution system is necessary as an indicator to show the absence of cross-connections, absence of significant biofilm growth, and to prevent the possibility of legionella bacteria growing in premise plumbing." Cook Test. at 5-6.

Subsection (a). The Board addressed residual chlorine concentrations above under "Disputed Issues." *See supra* at 16-27.

Subsection (b). IEPA rules now provide that "[c]hlorine residual test shall be made at frequent and regular intervals to determine the amount and type of residuals existing at different points in the distribution system." 35 Ill. Adm. Code 653.604(b). IEPA proposed that "[c]ommunity water supplies shall monitor chlorine residual to determine the amount and type of residuals existing at different points in the distribution system." Prop. 604 at 59; *see* SR at 38; IEPA Post-Hrg. Cmts. at 6.

Subsection (c). IEPA proposed that "[c]ommunity water supplies shall not mix water sources with free chlorine and combined chlorine residual." Prop. 604 at 59; *see* SR at 38. IEPA stated that, "[w]hen these waters mix, the chlorine residual can fluctuate, causing the residual to drop below the required levels. This can lead to water quality issues and customer complaints." SR at 38; *see* IEPA Post-Hrg. Cmts. at 6.

Section 604.730: Continuous Chlorine Analyzers. Mr. Cook testified that the Safe Drinking Water Act requires that community water supplies relying on surface water or groundwater under the direct influence of surface water must continuously monitor for chlorine at the entrance to their distribution system. Cook Test. at 6. Mr. Cook testified that IEPA's proposal revision "adds some groundwater systems to the monitoring requirement." Cook Test. at 6.

IEPA originally proposed that "[c]ommunity water supplies that rely on chlorination for disinfection pursuant to Section 604.700(a) present in the source water must have continuous chlorine residual analyzers and other equipment that automatically shuts down the facility when chlorine residuals at the entry point to the distribution system are below the limits established in Section 604.725." Prop. 604 at 59; *see* 35 Ill. Adm. Code 611.533(b); SR at 38; Recommended Standards § 4.4.4.e.

CWLP asked IEPA to clarify the meaning of the phrase "present in the source water." CWLP Questions at 3 (Question 12a). IEPA responded by striking the phrase from the section. IEPA Resp. at 39. The Board's order reflects this revision.

Responding to CWLP, IEPA stated that this proposal requires all plants treating surface water to have their analyzer shut down production when the analyzer shows residual concentrations below IEPA's proposed requirements. CWLP Questions at 3 (Question 12b); IEPA Resp. at 39; *see* PC 7 at 3 (Question 12a). Mr. Cook stated that, if a facility does not now have this equipment, IEPA's proposal "would require a change to their control system to shut down the high-service pumps." Tr.1 at 61. Mr. Cook did not "know what percentage of facilities do not currently have automatic shutdown on their chlorine analyzers." *Id*.

Capt. Curry testified that automatic shutdown involves an alarm from a continuous recording chlorine residual analyzer that shuts down connected raw water pumps, chemical treatment systems, sludge blowdown valves, filter effluent valves, and treated water high service pumps. Curry Test. at 20. He added that he is not aware of any treatment plants now complying with this proposed requirement. *Id*. Plants now have a visible or audible alarm that notifies the operator, who manually shuts down the plant. *Id*. Capt. Curry suggested revising this section so that it takes effect 180 days after adoption. *Id*. at 21. He argued that it will take time for plant operators to be notified of this requirement and to modify controls and practices. *Id*.

CWLP asked IEPA whether it considered the frequency or impacts of chlorine analyzer failure on a CWS. CWLP Questions at 3 (Question 12b; *see* PC 7 at 3 (Question 11b); PC 8 at 3. IEPA responded that it considered this failure, but it stated that "manually controlling operations

and verifying adequate disinfectant residuals would be an option if an analyzer failure occurred." IEPA Resp. at 39.

CWLP asked IEPA to provide the cost of automatic shutdown equipment required by this proposal. CWLP Questions at 3 (Question 12e); Tr.1 at 62. IEPA stated that, under proposed Section 604.700(a), this requirement would apply only to approximately 10 percent of the 1,742 CWSs. IEPA Hrg. Resp. at 2; *see* Curry Resp. at 10. IEPA reported that "[m]ost of these CWSs already have continuous chlorine analyzers to comply with surface water treatment rule requirements. Most of the systems that have analyzers also have alarm capability, but it is estimated that no systems currently have the ability to automatically shut down the treatment process based upon a low chlorine residual." *Id*. IEPA added that, while fewer than 100 CWSs would need to purchase an analyzer, they cost approximately $5,000. *Id*. "Whether adding alarm capacity or automatic shut-down of the high-service pumps, controls are estimated to be an additional $500 per water plant." *Id*. CWLP asked IEPA whether it considered the alternative "of requiring an alarm with the requirement to manually check residual levels and determine a course of action." CWLP Questions at 3 (Question 12d).

IEPA acknowledged that, because shutdown controls could also include low-service and chemical feed pumps, "the wiring and control costs would vary greatly and could be expensive." IEPA Hrg. Resp. at 2. Accordingly, IEPA revised its proposed Section 604.730 as follows.

> Community water supplies that rely on chlorination for disinfection pursuant to Section 604.700(a) ~~present in the source water~~ must have continuous chlorine residual analyzers ~~and other equipment that automatically shuts down the facility when~~ with alarm capability that alerts the community water supply if chlorine residuals at the entry point to the distribution system are below the limits established in Section 604.725. Curry Resp. at 10; *see* Resp. 7-8 at 3-4, 8.

The Board's order reflects this revision.

The Board asked IEPA to "comment on the actions that must be taken by the owner of operator of a CWS when the residual chlorine alarm is triggered." Board Questions 2 at 1. IEPA responded that "[t]he operator should investigate and remedy the cause of the alarm." IEPA Resp. 2 at 1. If operators establish an alarm set point above the minimum requirement, IEPA anticipates that they would have "flexibility to respond." *Id*.

The Board also asked IEPA to comment on whether the rules should specify response actions. Board Questions 2 at 1. IEPA responded that "[r]emedies and response actions will vary and should be left to the community water supply in consultation with the Agency." IEPA Resp. 2 at 1.

Section 604.735: Chlorinator Piping. IEPA proposed requirements for piping from the chlorinator to the chlorine application point. SR at 38. These requirements not currently in either IEPA's or the Board's rules. *Id*.

Subsection (a). Under the heading "Cross-Connection Protection," IEPA proposed in subsection (a)(1) that "[t]he chlorinator piping must be designed to prevent contamination of the treated water." Prop. 604 at 59; *see* SR at 38; Recommended Standards § 4.4.5.1.

Subsection (a)(2) proposes that, "[f]or all systems required to disinfect pursuant to Section 604.700, piping must be arranged to prevent back flow or back siphonage between multiple points of chlorine application." Prop. 604 at 59; *see* SR at 38; Recommended Standards § 4.4.5.1.

Subsection (a)(3) proposes that "[t]he water supply to each eductor[9] must have a separate shut off valve." Prop. 604 at 59; *see* SR at 38; Recommended Standards § 4.4.5.1.

Subsection (b). IEPA place these requirements under the heading "Pipe Material."

Subsection (b)(1). IEPA proposed that "[t]he pipes carrying elemental liquid or dry gaseous chlorine under pressure must be Schedule 80 seamless steel tubing or other materials recommended by The Chlorine Institute in Pamphlet 6, Piping Systems for Dry Chlorine, incorporated by reference in 35 Ill. Adm. Code 601.115. Theses pipes must not be PVC." Prop. 604 at 60; SR at 38; Recommended Standards § 4.4.5.2.

Subsection (b)(2). IEPA proposed that "[r]ubber, PVC, polyethylene, or other materials recommended by the Chlorine Institute must be used for chlorine solution piping and fittings." Prop. 604 at 60; SR at 38; Recommended Standards § 4.4.5.2.

The Board asked IEPA to clarify whether the Chlorine Institute has specific recommendations for chlorine solution piping and fittings. Board Questions at 14. IEPA responded that the Chlorine Institute's Pamphlet 6, incorporated by reference in 35 Ill. Adm. Code 601.115, "has specific recommendations for chlorine solution piping and fittings." IEPA Resp. at 21.

Subsection (b)(3). IEPA proposed that "[n]ylon products are not acceptable for any part of the chlorine solution piping system." Prop. 604 at 60; SR at 38; Recommended Standards § 4.4.5.2.

Subpart H: Softening

Softening water removes hardness (calcium and magnesium). Johnson Test. at 2. Softening reduces accumulation of scale in water fixtures and appliances and improves laundry and bathing by reducing soap consumption. SR at 39; *see* Johnson Test. at 2. Softening also

[9] An "eductor" is "[a] device used to mix a chemical with water. The water is forced through a constricted section of pipe (venturi) to create low pressure, which allows the chemical to be drawn into the stream of water or granular media to be removed from a vessel." *The Water Dictionary* at 190 (2nd ed., 2010), incorporated by reference at 35 Ill. Adm. Code 601.115(b); *see* 35 Ill. Adm. Code 601.105(c).

provides aesthetic improvements to water and "potentially removes some contaminants." SR at 39.

Neither Board nor IEPA rules now includes requirements for softening, and IEPA proposes Subpart H to provide design standards for community water supplies that elect to provide either lime softening or cation exchange softening. SR at 7, 39; Johnson Test. at 2.

Section 604.800: Lime or Lime-soda Process. IEPA based its proposed standards for lime or lime-soda processes on Section 4.5.1 of the Recommended Standards "with little variation." SR at 39.

Subsection (a). IEPA proposed that "[d]esign standards for rapid mix, flocculation, and sedimentation are in Subpart E of this Part [Clarification]." Prop. 604 at 60; Recommended Standards § 4.5.1.

Subsection (b). IEPA proposed that, "[w]hen split treatment is used an accurate means of measuring and splitting the flow must be provided." Prop. 604 at 60; Recommended Standards § 4.5.1.1 (Hydraulics).

Subsection (c). IEPA proposed that, "[b]efore installation of lime or lime-soda processes, the community water supply shall determine the carbon dioxide content of the raw water to evaluate the efficacy of installing aeration treatment." Prop. 604 at 60; Recommended Standards § 4.5.1.2 (Aeration).

Subsection (d). IEPA proposed that "[l]ime shall be fed directly into the rapid mix basin or mixing chamber." Prop. 604 at 60; Recommended Standards § 4.5.1.3 (Chemical feed point).

Subsection (e). IEPA proposed that "[r]apid mix detention time shall be no longer than 30 seconds with adequate velocity gradients to keep the lime particles dispersed." Prop. 604 at 60; Recommended Standards § 4.5.1.4 (Rapid mix).

Subsection (f). IEPA proposed that "[e]quipment for stabilization of water softened by the lime or lime sods process is required." Prop. 604 at 60; Recommended Standards § 4.5.1.5 (Stabilization).

Subsection (g). IEPA proposed that "[t]he use of excess lime is not an acceptable substitute for disinfection." Prop. 604 at 60; Recommended Standards § 4.5.1.8 (Disinfection).

Subsection (h). IEPA proposed that "[t]he plant processes must be manually started following shut down." Prop. 604 at 60; Recommended Standards § 4.5.1.9 (Plant start-up).

Section 604.805: Cation Exchange Process. IEPA based its proposed standards for the cation exchange process on Section 4.5.2 of the Recommended Standards "with little variation." SR at 39.

Subsection (a). IEPA proposed that "[p]re-treatment pursuant to Section 604.1010(b) or (c) of this Part is required when the content of iron, manganese, or a combination of the two is 1 mg/l or more. Prop. 604 at 60; Recommended Standards § 4.5.2.1 (Pre-treatment requirements).

Subsection (b). IEPA proposed that design requirements must provide "[a]utomatic regeneration based on volume of water softened." Prop. 604 at 61; Recommended Standards § 4.5.2.2 (Design). Subsection (b)(2) proposes that design must provide "[a] manual override on all automatic controls." *Id.*

Subsection (c). IEPA proposed that "[t]he design capacity for hardness removal must not exceed 20,000 grains per cubic foot when resin is regenerated with 0.3 pounds of salt per 1000 grains of hardness removed." Prop. 604 at 61; Recommended Standards § 4.5.2.3 (Exchange capacity).

Subsection (d). IEPA proposed that "[t]he depth of the exchange resin shall not be less than three feet." Prop. 604 at 61; Recommended Standards § 4.5.2.4 (Depth of resin).

Subsection (e). Under the heading "Flow Rates," IEPA proposes in subsection (e)(1) that "[t]he rate of softening must not exceed seven gallons per minute per square foot of bed area." Prop. 604 at 61; Recommended Standards § 4.5.2.5 (Flow rates). Subsection (e)(2) proposes that "[t]he backwash rate shall be six to eight gallons per minute per square foot of bed area." *Id.* Subsection (e)(3) proposes that "[r]ate of flow controllers or the equivalent must be installed." *Id.*

Subsection (f). IEPA proposed that "[t]he freeboard must be calculated based on the size and specific gravity of the resin and the direction of the water flow. Unless otherwise approved by the Agency pursuant to Section 604.145(b), the washwater collector must be 24 inches above the top of the resin on down flow units." Prop. 604 at 61; Recommended Standards § 4.5.2.6 (Freeboard).

Subsection (g). IEPA proposed that "[t]he bottoms, strainer systems and support for the exchange resin must conform to criteria provided for rapid rate gravity filters in Sections 604.605(f) and 604.605(g). Prop. 604 at 61; Recommended Standards § 4.5.2.7 (Underdrains and supporting gravel).

Subsection (h). IEPA proposed that "[b]rine shall be evenly distributed over the entire surface of both upflow and downflow units." Prop. 604 at 61; Recommended Standards § 4.5.2.8 (Brine distribution).

Subsection (i). IEPA proposed that "[b]ackwash, rinse and air relief discharge pipes must be installed to prevent any possibility of back siphonage." Prop. 604 at 61; Recommended Standards § 4.5.2.9 (Cross connection control).

Subsection (j). IEPA placed these requirements under the heading "Bypass piping and equipment."

Subsection (j)(1). IEPA proposed that "[b]ypass must be provided around softening units to produce a blended water of desirable hardness." Prop. 604 at 61; Recommended Standards § 4.5.2.10.

Subsection (j)(2). IEPA proposed that "[t]otalizing meters must be installed on the bypass line and on each softener unit." *Id*.

Subsection (j)(3). IEPA proposed that "[t]he bypass line must have a shutoff valve. An automatic proportioning or regulating device is recommended." Prop. 604 at 62; Recommended Standards § 4.5.2.10.

Subsection (k). IEPA proposed that, "[w]hen the applied water contains a chlorine residual, the cation exchange resin must be a type that is not damaged by residual chlorine." Prop. 604 at 62; Recommended Standards § 4.5.2.11 (Additional limitations).

Subsection (l). IEPA placed these requirements under the heading "Sampling Taps."

Subsection (l)(1). IEPA proposed that "[s]mooth-nosed sampling taps must be provided for the collection of representative samples." Prop. 604 at 62; Recommended Standards § 4.5.2.12 (Sampling taps).

Subsection (l)(2). IEPA proposed that "[t]he taps must be located to provide for sampling of the softener influent, effluent and blended water." *Id*.

Subsection (l)(3). IEPA proposed that "[t]he sampling taps for the blended water must be at least 20 feet downstream from the point of blending." *Id*.

Subsection (l)(4). IEPA proposed that "[p]etcocks are not acceptable as sampling traps." *Id*.

Subsection (m). IEPA placed these requirements under the heading "Brine and salt storage tanks."

Subsection (m)(1). IEPA proposed that "[s]alt dissolving or brine tanks and wet salt storage tanks must be covered and must be corrosion resistant." Prop. 604 at 62; Recommended Standards § 4.5.2.13.a.

Subsection (m)(2). IEPA proposed that "[t]he make-up water inlet must be protected from back siphonage. Water for filling the tank must be distributed over the entire surface by pipes above the maximum brine level in the tank. An automatic declining level control system on the make-up water line is recommended." Prop. 604 at 62; Recommended Standards § 4.5.2.13.b.

Subsection (m)(3). IEPA proposed that "[w]et salt storage tanks must be equipped with manholes or hatchways for access and for direct dumping of salt from truck or railcar. Openings must be provided with raised curbs and watertight covers having overlapping edges similar to

those required for finished water reservoirs." Prop. 604 at 62; Recommended Standards § 4.5.2.13.c.

Subsection (m)(4). IEPA proposed that "[o]verflows, where provided, must be protected with corrosion resistant screens and must terminate with either a turned down bend having a proper free fall discharge or a self-closing flap valve." Prop. 604 at 62; Recommended Standards § 4.5.2.13.d.

Subsection (m)(5). IEPA proposed that "[t]he salt must be supported on graduated layers of gravel placed over a brine collection system." Prop. 604 at 62; Recommended Standards § 4.5.2.13.f.

Subsection (m)(6). IEPA proposed that "[a]lternative designs which are conducive to frequent cleaning of the wet salt storage tank may be approved by the Agency." Prop. 604 at 62; Recommended Standards § 4.5.2.13.g.

Subsection (m)(7). IEPA proposed that "[t]otal salt storage must provide for at least 30 days of operation." Prop. 604 at 62; Recommended Standards § 4.5.2.14.

Subsection (n). IEPA proposed that, "[p]ursuant to Subpart I [Stabilization], corrosion control shall be provided." Prop. 604 at 63; Recommended Standards § 4.5.2.16.

Subsection (o). IEPA proposed that "[s]uitable disposal must be provided for brine waste." Prop. 604 at 63; Recommended Standards § 4.5.2.17.

The Board asked IEPA to clarify what constitutes "suitable disposal" of brine waste. Board Questions at 14. IEPA responded that it means what is allowable under Board rules and state or federal law. IEPA Resp. at 22. The Board asked IEPA to comment on whether the regulations should include a cross reference to the Board's waste disposal regulations under Subtitle G. Board Questions at 14. IEPA responded that a cross reference is not appropriate, as brine could be disposed of under several authorities. IEPA Resp. at 22.

Subsection (p). IEPA proposed that "[p]ipes and contact materials must be resistant to the aggressiveness of salt. Plastic and red brass are acceptable piping materials. Steel and concrete must be coated with a non-leaching protective coating which is compatible with salt and brine." Prop. 604 at 63; Recommended Standards § 4.5.2.18.

Subsection (q). IEPA proposed that "[d]ry bulk salt storage must be enclosed and separated from other operating areas to prevent damage to equipment." Prop. 604 at 63; Recommended Standards § 4.5.2.19.

Subpart I: Stabilization

In Subpart I, IEPA proposed corrosion control requirements, which are not now included in either the Board's or IEPA's regulations. SR at 39.

Aggressive water can corrode distribution pipes and water fixtures, which may cause lead to leach from service lines and customer fixtures. SR at 39. Mr. Cook testified that corrosion has received more attention since events in Flint, Michigan, where the city changed its water source without applying corrosion control treatment. Cook Test. at 7. This released lead from service lines and resulted in elevated lead concentrations in consumer taps. *Id*. In addition, "[w]ater that is neither stable nor aggressive can result in deposits in water mains and plumbing." SR at 39. These deposits may reduce flow within pipes and fixtures. *Id*.

IEPA's proposed Section 604.245 requires that source water permit applications evaluate treatment necessary to reduce corrosion. Proposed Section 604.250 requires the same evaluation for applications to change treatment. Cook Test. at 7; *see* Prop. 604 at 10, 13. When source or treatment changes, a community water supply must perform increased lead and copper monitoring for 18 months before becoming eligible for reduced monitoring. Cook Test. at 7. Community water supplies exceeding a lead or copper action level must follow requirements in USEPA's Lead and Copper Rule and its March 2016 guidance manual, "Optimal Corrosion Control Treatment Evaluation Technical Recommendations for Primary Agencies and Public Water Supplies." *Id*.

Section 604.900: General Stabilization Requirements. In his supplemental testimony, Capt. Curry argued that "it is not sufficient to describe the 'parameters' and exclude necessary procedures and information about how the parameters are to be evaluated to assure delivery of stable water." *Id*. He recommended revising Section 604.900 "to include known methods for monitoring water stability." *Id*.

IEPA responded that various methods and techniques could be used to determine corrosion and deposition of calcium carbonate scale. Curry Supp. Resp. at 2. IEPA added that numerical values can be used as guidance with some of these methods. *Id*. IEPA re-drafted its original Section 604.900 to include these water stability tests. Curry Supp. Resp. at 3. The Board summarizes each of the re-drafted subsections below.

Subsection (a). IEPA proposed in subsection (a) that "[w]ater distributed by community water supplies must be stable so as not to cause a violation of 35 Ill. Adm. Code 601.101(a)." Curry Supp. Resp. at 3.

Subsection (b). IEPA's original subsection (a) proposed that "[t]he following water quality parameters of finished water must be evaluated to ensure that water quality parameters minimize corrosion throughout the distribution system of the community water supply: alkalinity; calcium carbonate hardness; pH; sulfate; calcium; total dissolved solids; oxidation reduction potential; conductivity; orthophosphate, if applicable; chloride; iron; and manganese." Prop. 604 at 63 (subsections (1) – (12)); *see* SR at 39-40. IEPA stated that it uses these data in a variety of formulas to calculate the stability of water. SR at 40.

Capt. Curry suggested revising IEPA's original subsection (a) to express alkalinity, total hardness, and calcium hardness as calcium carbonate ($CaCO_3$). Curry Test. at 30. He also suggested adding temperature as a water quality parameter because it affects Calcium Carbonate

Precipitation Potential (CCPP) and because potential for nitrification increases at higher temperatures. *Id.*

Capt. Curry added that the chloride:sulfate ratio affects corrosivity. Curry Test. at 23, citing Att. 1. He stated that the Larson-Skold Index evaluates "the potential for the corrosion of cast-iron pipes transporting water from the Great Lakes." Curry Test. at 23, citing Att. 3. He recommended that all systems measure these "initially once monthly for 6 consecutive months and then once annually if stable conditions are demonstrated to exist." *Id*. at 22; Curry Supp. Test. at 8. For systems that use adjustment of pH and other parameters for corrosion control, he recommended testing CCPP once weekly. Curry Test. at 22; Curry Supp. Test. at 8-9. Calcium carbonate can limit the ability to adjust pH by forming deposits. Curry Test. at 22-23; *see* Curry Supp. Test. at 8.

In its re-drafted Section 604.900, IEPA proposed in subsection (b) that

> [t]he following water quality parameters of finished water must be evaluated to ensure that water quality parameters minimize corrosion and minimize deposition of excessive calcium carbonate ($CaCO_3$) scale throughout the distribution system of the community water supply:
>
> 1) alkalinity (as $CaCO_3$);
> 2) total hardness (as $CaCO_3$);
> 3) calcium hardness (as $CaCO_3$);
> 4) temperature;
> 5) pH;
> 6) chloride;
> 7) sulfate;
> 8) total dissolved solids;
> 9) oxidation reduction potential;
> 10) conductivity;
> 11) iron;
> 12) manganese;
> 13) orthophosphate, if applicable; and
> 14) silica, if applicable. Curry Supp. Resp. at 3.

Subsection (c). IEPA proposed re-drafting subsection (c) to provide that

> [t]he following may be used to determine the corrosivity of water distributed by community water supplies:
>
> 1) Lead and Copper
>
> A) Optimal Corrosion Control Treatment Evaluation Technical Recommendations for Primacy Agencies and Public Water Supplies, USEPA (March 2016), Office of Water (4606M), EPA 816-B-16-003;

B) Chloride Sulfate Mass Ratio (CSMR), calculated as follows:

$$CSMR = \frac{\text{Cl-, expressed as mg/L}}{SO_4\text{-2, expressed as mg/L}}$$

C) Coupon and pipe loop studies

2) Iron and Steel

Larson-Skold Index (L-SI), calculated as follows:
$L\text{-}SI = (Cl + SO_4) / Alkalinity$
All parameters expressed as mg/L of equivalent $CaCO_3$

3) Iron Steel and Concrete

A) Calcium Carbonate Precipitation Potential (CCPP) as referenced in 2330C Standard Methods for Examination of Water and Wastewater, 22nd edition incorporated by reference in 35 Ill. Adm. Code 611.102;
B) The Alkalinity Difference Technique as described in 2330C Standard Methods for Examination of Water and Wastewater, 22nd edition;
C) The Marble Test as described in 2330C Standard Methods for Examination of Water and Wastewater, 22nd edition. Curry Supp Resp. at 4.

In 35 Ill. Adm. Code 601.115, the Board proposes to incorporate by reference the USEPA technical recommendation listed in proposed subsection (c)(1)(A).

In his post-hearing comments, Capt. Curry states that saturation with calcium carbonate has generally been determined through physical testing commonly known as the Marble Test. When phosphates are present in the water, only an empirical study will accurately indicate scaling potential. Curry Post-Hrg. Cmt. at 3, citing Schock, Michael and Darren A. Lytle, Water Quality & Treatment: A Handbook on Drinking Water, AWWA (6th ed. 2011). He proposed to revise Section 604.900(c)(3):

B) For water containing phosphates

1) The Alkalinity Difference Technique as described in 2330B.3.b and 2230.C.2.b Standard Methods for Examination of Water and Wastewater, 22nd edition. The Calcium Carbonate Precipitation Potential (CCPP) is the difference between the initial and equilibrated water's alkalinity (or calcium) values, when expressed as $CaCO_3$.

2) The Marble Test as described in 2330C.2.c Standard Methods for Examination of Water and Wastewater, 22nd edition. The Marble Test is similar to the Alkalinity Difference Technique. The Calcium Carbonate Precipitation Potential (CCPP) equals the change in alkalinity (or calcium) values during equilibration, when expressed as $CaCO_3$. Curry Post. Hrg. Cmt. at 2.

IEPA states that it "has no objection to the proposed regulatory language" (IEPA Reply at 2), and the Board's order reflects this revision.

In his post-hearing comments, Capt. Curry proposed adding the following Board Note "to simplify the calculation procedure for water operators not familiar with converting Cl and SO_4 concentrations to equivalent $CaCO_3$.

Simplified procedure for calculating LS-I

$$\text{LS-I} = \frac{(1.41)(\text{mg/L } Cl^-) + (1.04)(\text{mg/L } SO_4^{-2})}{\text{mg/L alkalinity (as } CaCO_3)}$$

Cl^- expressed as mg/L Chloride
SO_4^{-2} expressed as mg/L Sulfate. Curry Post-Hrg. Cmt. at 6.

His comment includes calculations for conversion of Cl^- and SO_4^{-2} to equivalent $CaCO_3$. *Id*. at 6-7.

IEPA states that it "has no objection to the proposed regulatory language" (IEPA Reply at 2), and the Board's order adds this Board Note.

Subsection (d). In the re-drafted Section 604.900 responding to Capt. Curry's testimony and supplemental testimony, IEPA proposed to add a subsection (d) providing that

[t]he following may be used to determine deposition of excess calcium carbonate ($CaCO_3$) scale:

A) Calcium Carbonate Precipitation Potential (CCPP) as referenced in 2330B Standard Methods for Examination of Water and Wastewater, 22nd edition incorporated by reference in 35 Ill. Adm. Code 611.102;

B) The Alkalinity Difference Technique ("Marble Test") as described in 2330D Standard Methods for Examination of Water and Wastewater, 22nd edition. Curry Supp. Resp. at 4-5.

In his post-hearing comments, Capt. Curry proposed to account for water containing phosphates by revising subsection (B) as he had revised subsection (c)(3)(B). Curry Post-Hrg.

Cmt. at 2. IEPA "has no objection to the proposed regulatory language" (IEPA Reply at 2), and the Board's order reflects this revision.

For this subsection, Capt. Curry also proposes two Board Notes, the first of which states that:

> Calcium Carbonate Precipitation Potential (CCPP) can be calculated using computer software that is in the public domain, and there is not any cost for downloading and using the software. Access to TT (Trussell Technologies) Software www.trusselltech,com/downlaods?category=6 (CCPP is not applicable to protection or corrosion of lead and copper plumbing materials, and is not applicable for water containing phosphates.) (Schock, Michael Lytle, Darren A. (2011); "*Chapter 20. Internal Corrosion and Deposition Control", Water Quality & Treatment, A Handbook on Drinking Water, 6th ed., James K. Edzwald, Editor, American Water Works Association*.) Curry Post-Hrg. Cmt at 4.

He stated that the software includes various programs, includes CCPP, and models chemical addition. *Id*. IEPA stated that it "has no objection to the proposed regulatory language" (IEPA Reply at 2), and the Board's order includes this Board Note with clarifying changes.

Capt. Curry's second proposed Board Note states that

> "[t]he basic procedure for estimating Calcium Carbonate Precipitation Potential (CCPP) using the Alkalinity Difference Technique and using the Marble test, both referenced in Standard Methods for Examination of Water and Wastewater, 22nd edition, is described as "Calcium Carbonate Saturation," contained in Simplified Procedures for Water Examination, Manual fo Water Supply Practices M12 (Fifth Edition, 2002), American Water Works Association.
>
> Based on results of the "Calcium Carbonate Saturation" test, CCPP can be calculated as follows:
>
> CCPP = Final mg/L alkalinity (as $CaCO_3$) – Initial mg/L alkalinity (as $CaCO_3$)
>
> Water is unsaturated with respect to calcium carbonate and may be corrosive if the final alkalinity result is greater than the initial alkalinity result, a positive value in the above equation. (If there is alkalinity gain in the final alkalinity test, it indicates tendency to dissolve calcium carbonate scale.)
>
> Water is oversaturated with calcium carbonate scale and may deposit calcium carbonates coating in the water mains if the final alkalinity result is less than the initial alkalinity result, a negative value in the above equation. (If there is alkalinity loss in the final alkalinity test, it indicates tendency to precipitate calcium carbonate scale.)

If the final and initial alkalinity values are the same, the water is stable and in equilibrium with calcium carbonate.

(CCPP is not applicable to protection or corrosion of lead and copper plumbing materials.)

Caution: Recommend verifying the alkalinity titration endpoint by using a pH meter to verify the pH of the titrated alkalinity sample, since titration endpoint visual color change may be individually variable. If uncertain, consider pH 4.50 to represent the endpoint. *See* "Alkalinity Test" in Standard Methods for Examination of Water and Wastewater, 22nd edition. Curry Post-Hrg. Cmt. at 5

IEPA stated that it "has no objection to the proposed regulatory language" (IEPA Reply at 2), and the Board's order includes this Board Note with clarifying changes.

Subsection (e). In its original subsection (b), IEPA proposed that "[a]cceptable stability treatments include, but are not limited to the following: carbon dioxide addition; acid addition; phosphate addition; split treatment; alkali chemical; carbon dioxide reduced by aeration; calcium hydroxide; sodium silicate; and sodium bicarbonate." Prop. 604 at 63-64 (subsections (1) – (9); *see* SR at 40; Recommended Standards § 4.9.

Regarding phosphate addition in the original subsection (b)(3), Capt. Curry questioned whether it should list orthophosphate and sodium silicate as corrosion inhibitors. Curry Test. at 30. IEPA responded that "orthophosphate" is addressed by the general term "phosphate," and that "sodium silicate" is listed in subsection (b)(8). Curry Resp. at 11

Regarding alkali chemical treatment in the original subsection (b)(5), Capt. Curry questioned whether the subsection should list calcium hydroxide, soda ash (sodium carbonate), and sodium bicarbonate as examples. Curry Test. at 30. IEPA responded that the general term "alkali chemicals" encompasses calcium hydroxide. Curry Resp. at 11. IEPA's original proposal listed calcium hydroxide as subsection (b)(7) and sodium bicarbonate as subsection (b)(9). *Id*. IEPA stated that, if the Board wishes to clarify subsection (b)(5), it could revise it to list "calcium hydroxide." *Id*.

In the re-drafted Section 604.900 proposed in response to Capt. Curry's testimony and supplemental testimony, IEPA proposed in subsection (e) that

[a]cceptable stability treatments include, but are not limited to the following:

1) carbon dioxide addition;
2) acid addition;
3) phosphate addition;
4) split treatment;
5) alkali chemical
    i) hydrated lime
    ii) sodium carbonate

iii) sodium bicarbonate
6) carbon dioxide reduced by aeration;
7) calcium hydroxide; and
8) sodium silicate addition. Curry Supp. Resp. at 5; *see* Board Questions 2 at 1; IEPA Resp. 2 at 2.

In his post-hearing comments, Capt. Curry stated that he inadvertently did not include sodium hydroxide in his prior comments and that it should be added as subsection (d)(5)(iv). Curry Post-Hrg. Cmt. at 6. Sodium hydroxide is also known as caustic soda and "is commonly fed after filtration to adjust (increase) pH and alkalinity." *Id*. IEPA stated that it "has no objection to the proposed regulatory language" (IEPA Reply at 2), and the Board's order reflects this revision as subsection (e)(5)(D).

Subsection (f). IEPA originally proposed in subsection (c) that, "[w]hen chemical addition is used for stabilization, the community water supply must comply with requirements of Subpart K [Chemical Application]." Prop. 604 at 64; *see* Prop. 604 at 70-82. In the re-drafted Section 604.900, IEPA proposed the same language as subsection (f). Curry Supp. Resp. at 5.

Section 604.905: Carbon Dioxide Addition.

Subsection (a). IEPA proposed that "[r]ecarbonation basin design must provide a total detention time of 20 minutes; and a depth that will provide a diffuser submergence of not less than 7.5 feet nor greater submergence than recommended by the manufacturer." Prop. 604 at 64 (subsections (1) and (2)); *see* Recommended Standards § 4.9.1.a.

Capt. Curry testified that there are proprietary systems providing carbon dioxide addition through a carbonic acid/water solution fed under pressure without requiring a separate recarbonation basin. Curry Test. at 30. He suggested revising this section to allow use of "proprietary carbonic acid feed systems that can be used for lowering pH of lime softened water before it enters the filters." *Id*. IEPA responded by proposing to revise subsection (a) as follows: "Unless carbon dioxide addition is provided in the form of a carbonic acid and water solution under pressure, ~~R~~recarbonation basin design must provide . . . " Curry Resp. at 11. The Board's order reflects this revision.

Subsection (b). IEPA proposed that, "[w]here liquid carbon dioxide is used, carbon dioxide must be prevented from entering the atmosphere within the plant from the recarbonation process." Prop. 604 at 64; *see* Recommended Standards § 4.9.1.c.

Subsection (c). IEPA proposed that "[r]ecarbonation tanks must be located outside or be sealed and vented to the outside with adequate seals and adequate purge flow of air." Prop. 604 at 64; *see* Recommended Standards § 4.9.1.d.

Subsection (d). IEPA proposed that "[t]he recarbonation basin must be designed to allow for draining and sludge removal." Prop. 604 at 64; *see* Recommended Standards § 4.9.1.e.

Section 604.910: Phosphates. IEPA proposed that "[p]hosphate solution must be kept covered and disinfected by carrying approximately 10mg/L free chlorine residual unless the phosphate is not able to support bacterial growth and the phosphate is being fed from the covered shipping container. Phosphate solutions having a pH of 2.0 or less may also be exempted from this requirement by the Agency." Prop. 604 at 64; *see* Recommended Standards § 4.9.3.b.

Section 604.915: Split Treatment. IEPA proposed that "[a] lime softening water treatment plant can be designed using 'split treatment' in which raw water is blended with lime softened water to partially stabilize the water prior to secondary clarification and filtration. Treatment plants designed to utilize 'split treatment' should also contain facilities for further stabilization by other methods." Prop. 604 at 65; *see* Recommended Standards §4.9.4.

Subpart J: Other Treatment

Subpart J includes standards for processes "that provide treatment benefits where used but are not common enough to warrant being included in individual Subparts." Johnson Test. at 2; *see* SR at 40.

Section 604.1000: Presedimentation. Mr. Johnson testified that surface water sources with a high amount of particulate matter require removal before the water receives further treatment. Johnson Test. at 2-3. IEPA stated that technological change has made presedimentation less common, and IEPA did not propose to require it. SR at 41. If a community water supply performs presedimentation, this section applies. *Id*.

Subsection (a). Under the heading "Basin design," IEPA proposed that "presedimentation basins shall have the capability for dewatering, which may include hopper bottoms or a continuous mechanical sludge removal apparatus." Prop. 504 at 65; *see* Recommended Standards § 4.2.1.a.

Section 4.2.1.a of the Recommended Standard provides that "presedimentation basins should have hopper bottoms or be equipped with continuous mechanical sludge removal apparatus, and provide arrangements for dewatering."

The Board asked IEPA to clarify whether "arrangements for dewatering" refers to the dewatering of sludge removed from presedimentation. Board Questions at 14. If so, the Board asked IEPA to comment on any revision to subsection (a) that would reflect the Recommended Standards. *Id*.

IEPA responded by recommending the following revision: "presedimentation basins shall have the capability for dewatering.~~,~~ These basins~~which~~ may include hopper bottoms or a continuous mechanical sludge removal apparatus." IEPA Resp. at 22. The Board's order reflects this revision.

Subsection (b). Under the heading "Inlet," IEPA proposed that "short circuiting must be prevented." Prop. 604 at 65; *see* Recommended Standards § 4.2.1.b.

Subsection (c). Under the heading "Bypass," IEPA proposed that "provisions for bypassing presedimentation basins must be included." Prop. 604 at 65; *see* Recommended Standards § 4.2.1.c.

Subsection (d). IEPA proposed that "[d]etention time shall be adequate. Unless otherwise approved by the Agency pursuant to Section 604.145(b), three hours detention is the minimum period." Prop. 604 at 65; *see* Recommended Standards § 4.2.1.d.

Section 604.1005: Anion Exchange. Mr. Johnson testified that anion exchange is employed primarily to reduce the concentration of nitrate or nitrite to a level below the Maximum Contaminant Level. Johnson Test. at 3. IEPA stated that the process is not commonly used and that neither the Board's nor IEPA's rules now regulate it. SR at 40-41; *see* Recommended Standards § 4.6 (Anion Exchange Treatment).

Subsection (a). Under the heading "Pre-treatment Requirements," IEPA proposed that "[p]re-treatment pursuant to Section 604.1010 is required when a combination of iron and manganese exceeds 0.5 mg/L." Prop. 604 at 65; *see* Recommended Standards § 4.6.1.

Subsection (b). IEPA placed these requirements under the heading "Anion Exchange Treatment Design."

Subsection (b)(1). IEPA proposed that "[a]utomatic regeneration based on volume of water treated shall be used unless manual regeneration is justified and is approved by the Agency." Prop. 604 at 65; *see* Recommended Standards § 4.6.2.a.

Subsection (b)(2). IEPA proposed that, "[i]f a portion of the water is bypassed around the units and blended with treated water, the following requirements must be met: (A) the maximum blend ratio allowable must be determined based on the highest anticipated raw water nitrate level; and (B) a totalizing meter and a proportioning or regulating device or flow regulating valves must be provided on the bypass line." Prop. 604 at 65; *see* Recommended Standards § 4.6.2.b.

Subsection (b)(3). IEPA proposed that "[a] manual override shall be provided on all automatic controls." Prop. 604 at 65; *see* Recommended Standards § 4.6.2.a.

Subsection (b)(4). IEPA proposed that "[a]dequate freeboard must be provided to accommodate the backwash flow rate of the unit, ensuring the resin will not overflow. The freeboard must be calculated based on the size and specific gravity of the resin." Prop. 604 at 65; *see* Recommended Standards § 4.6.7.

Subsection (b)(5). IEPA proposed that "[t]he system shall be designed to include an adequate under drain and supporting gravel system and brine distribution equipment." Prop. 604 at 66; *see* Recommended Standards § 4.6.8.a.

Subsection (b)(6). Under the heading "Sampling Taps," IEPA proposed that "'[s]mooth-nosed sampling taps must be provided for the collection of representative samples. The taps

must be located to provide for sampling of the softener influent, effluent, and blended water. The sampling taps for the blended water must be at least 20 feet downstream from the point of blending. Petcocks are not acceptable as sampling taps." Prop. 604 at 66 (subsection (A) – (D)); *see* Recommended Standards §§ 4.6.8.b, 4.5.2.12.

Subsection (b)(7). Under the heading "Brine and salt storage tanks," IEPA proposed in subsection (A) that "[s]alt dissolving or brine tanks and wet salt storage tanks must be covered and must be corrosion resistant." Prop. 604 at 66; *see* Recommended Standards §§ 4.6.8.b, 4.5.2.13.a. Subsection (B) proposes that "[t]he make-up water inlet must be protected from back siphonage. Water for filling the tank must be distributed over the entire surface by pipes above the maximum brine level in the tank. An automatic declining level control system on the make-up water line is recommended." Prop. 604 at 66; *see* Recommended Standards §§ 4.6.8.b, 4.5.2.13.b

Subsection (C) proposes that "[w]et salt storage basins must be equipped with manholes or hatchways for access and for direct dumping of salt from truck or railcar. Openings must be provided with raised curbs and watertight covers having overlapping edges similar to those required for finished water reservoirs." Prop. 604 at 66; *see* Recommended Standards §§ 4.6.8.b, 4.5.2.13.c. Subsection (D) proposes that "[o]verflows, where provided, must be protected with corrosion resistant screens and must terminate with either a turned downed bend having a proper free fall discharge or a self-closing flap valve." Prop. 604 at 66; *see* Recommended Standards §§ 4.6.8.b, 4.5.2.13.d.

Subsection (E) proposes that "[t]he salt must be supported on graduated layers of gravel placed over a brine collection system." Prop. 604 at 66; *see* Recommended Standards §§ 4.6.8.b, 4.5.2.13.f. Subsection (F) proposes that "[a]lternative designs which are conducive to frequent cleaning of the wet salt storage tank may be approved by the Agency." Prop. 604 at 66; *see* Recommended Standards §§ 4.6.8.b, 4.5.2.13.g. Subsection (G) proposes that "[t]otal salt storage must provide for at least 30 days of operation." Prop. 604 at 66; *see* Recommended Standards §§ 4.6.8.b, 4.5.2.14.

The Board noted that requirements for sampling taps under subsection (b)(6) and for brine and salt storage under subsection (b)(7) are the same as corresponding requirements under Section 604.805, Cation Exchange Process. Board Questions at 14. The Board asked IEPA to comment on whether it would be acceptable to replace subsections (b)(6) and (b)(7) with cross-references to Sections 604.805(l) and (m), respectively. *Id*. IEPA responded that its proposed language accurately conveys its intent, and it does not recommend the suggested revision. IEPA Resp. at 22.

Subsection (c). Under the heading "Exchange Capacity," IEPA proposed that "[t]he design capacity for nitrate removal must not exceed 10,000 grains per cubic foot when the resin is regenerated at 15 pounds of salt per cubic foot of resin." Prop. 604 at 67; *see* Recommended Standards § 4.6.3.

Subsection (d). Under the heading "Number of Units," IEPA proposed that "[a]t least two units shall be provided. The treatment capacity must be capable of producing the maximum

day water demand at a level below the nitrate/nitrite MCL, with one exchange unit out of service." Prop. 604 at 67; *see* Recommended Standards § 4.6.4.

The Board asked IEPA to clarify whether "maximum day water demand" refers to the maximum average daily demand. Board Questions at 15. If not, the Board asked IEPA to explain how those two terms differ. *Id*. IEPA responded by replacing "maximum day water demand" with "maximum average daily demand" (IEPA Resp. at 22), and the Board's order reflects this revision.

Subsection (e). Under the heading "Type of Media," IEPA proposed that "[t]he anion exchange media must be of the nitrate selective type." Prop. 604 at 67; *see* Recommended Standards § 4.6.5.

Subsection (f). IEPA placed these requirements under the heading "Flow Rates."

Subsection (f)(1). IEPA proposed that '[t]he treatment flow rate shall not exceed 5 gallons per minute per square foot of bed area." Prop. 604 at 67; *see* Recommended Standards § 4.6.6.

Subsection (f)(2). IEPA proposed that "[t]he backwash flow rate shall be approximately 4.0 to 6.0 gallons per minute per square foot of bed area." Prop. 604 at 67; *see* Recommended Standards § 4.6.6.

The Board asked IEPA to comment whether it would clarify subsection (f)(2) to require that "the backwash flow rate must ~~shall~~ be between ~~approximately~~ 4.0 and ~~to~~ 6.0 gallons per minute per square foot of bed area." Board Questions at 15. IEPA "has no objection to this proposal" (IEPA Resp. at 23), and the Board's order reflects this revision.

Subsection (f)(3). IEPA proposed that "[t]he regeneration rate shall be approximately 1.0 gallon per minute per square foot of bed area with a fast rinse approximately equal to the service flow rate." Prop. 604 at 67; *see* Recommended Standards § 4.6.6.

Subsection (g). Under the heading "Cross Connection Control," IEPA proposed that "[b]ackwash, rinse and air relief discharge pipes shall be installed to prevent any possibility of back-siphonage." Prop. 604 at 67; *see* Recommended Standards § 4.6.9.

Subsection (h). Under the heading "Construction Materials," IEPA proposed that "[p]ipes and contact materials must be resistant to the aggressiveness of salt. Plastic and red brass are acceptable materials. Steel and concrete must be coated with a non-leaching protective coating which is compatible with salt and brine." Prop. 604 at 67; *see* Recommended Standards § 4.6.10.

Subsection (i). Under the heading "Housing," IEPA proposed that "[d]ry bulk salt storage shall be enclosed and separated from other operating areas to prevent damage to equipment." Prop. 604 at 67; *see* Recommended Standards § 4.6.11.

Subsection (j). Under the heading "Preconditioning of Media," IEPA proposed that, "[p]rior to startup of the equipment, the media must be regenerated with no less than two bed volumes of water containing sodium chloride followed by an adequate rinse." Prop. 604 at 67; *see* Recommended Standards § 4.6.12.

Section 604.1010: Iron and Manganese Control.

Subsection (a). IEPA proposed that, "[e]xcept as provided in 35 Ill. Adm. Code 611.300(e), treatment is required to meet the iron and manganese MCL as stated in Section 611.300(b)." Prop. 604 at 67; *see* 35 Ill. Adm. Code 611.300 (Old MCLs for Inorganic Chemical Contaminants); SR at 41; Recommended Standards § 4.8 (Iron and Manganese Control).

Subsection (b). IEPA placed these requirements under the heading "Removal of iron and manganese by oxidation, detention and filtration."

Subsection (b)(1). IEPA proposed that "oxidation shall be by aeration, as indicated in Subpart D, unless the community water supply demonstrates chemical oxidation provides equivalent results to aeration. Chemicals that may be used for oxidation include chlorine, sodium permanganate, potassium permanganate, ozone, or chlorine dioxide." Prop. 604 at 68; *see* Johnson Test. at 3; SR at 41; Recommended Standards § 4.8.1.1.

The Board asked IEPA to clarify whether chemical oxidation must be approved by IEPA under Section 604.145(b). Board Questions at 15. IEPA responded that the proposed Section 604.145(b) "only applies when expressly cited in Part 604." IEPA Resp. at 23.

Subsection (b)(2). Under the heading "Detention," IEPA proposed in subsection (A) that "[a] minimum detention time of 30 minutes must be provided following aeration to insure that the oxidation reactions are as complete as possible. This minimum detention may be omitted only where a pilot plant study indicates no need for detention." Prop. 604 at 68; *see* SR at 41; *see* Recommended Standards § 4.8.1.2.a.

Capt. Curry indicated that effective aeration and filtration of iron requires sufficient reaction time for complete oxidation. Curry Test. at 31, citing O'Connor, John T.; Water Quality and Treatment, A Handbook of Public Water Supplies, AWWA (1971). He suggested revising subsection (b)(2)(A) to provide that

> [a] minimum detention time of 30 minutes shall be provided following aeration to insure that the oxidation reactions are complete prior to filtration. This minimum detention time may be modified only where a pilot plant study indicates completion of oxidation reactions in less time. For new treatment plants, the time required for complete oxidation of iron after being aerated should be determined by bench scale pilot studies. Curry. Test. at 31.

He argued that a bench scale study "is a relatively simple procedure." *Id*.

IEPA concurred with this recommendation and revised subsection (b)(2)(A) as follows: "A minimum detention time of 30 minutes must be provided following aeration to insure that the oxidation reactions are as complete ~~as possible~~ prior to filtration. This minimum detention time may be ~~omitted~~ modified only where a pilot study indicates ~~no need for detention~~ completion of oxidation reactions in less time. Curry Resp. at 11-12.

The Board also addressed Capt. Curry's comment on the use of a clarification unit or settling basin prior to filtration above under "Disputed Issues." *See supra* at 27.

In subsection (b)(2)(B), IEPA proposed that "[t]he reaction tank/detention basin shall be provided with an overflow, vent and access hatch in accordance with Subpart M [Storage]." Prop. 604 at 68; *see* SR at 41; Recommended Standards § 4.8.1.2.a.

Subsection (b)(3). Under the heading "Filtration," IEPA proposed that "'[f]ilters must conform to Subpart F [Filtration]." Prop. 604 at 68; *see* SR at 41; Recommended Standards § 4.8.1.3.

Subsection (c). IEPA placed these requirements under the heading "Removal by manganese greensand or manganese coated media filtration."

Subsection (c)(1). IEPA proposed that "[p]ermanganate or chlorine must be added to the water upstream of the filter per the manufacturer's recommendation." Prop. 604 at 68; *see* Johnson Test. at 3; SR at 41; Recommended Standards § 4.8.3.a.

Subsection (c)(2). IEPA proposed that "[a]n anthracite media cap of at least six inches must be provided over manganese greensand." Prop. 604 at 68; *see* SR at 41; Recommended Standards § 4.8.3.c.

Subsection (c)(3). IEPA proposed that "[n]ormal backwash rate is 8 gallons per minute per square foot with filters containing manganese greensand and 15 gallons per minute with manganese coated media." Prop. 604 at 68; *see* SR at 41; Recommended Standards § 4.8.3.e.

Subsection (c)(4). IEPA proposed that "[s]ample taps must be provided prior to application of permanganate; immediately ahead of filtration; at points between the anthracite media and the manganese greensand; halfway down the manganese greensand; and at the filter effluent." Prop. 604 at 68 (subsections (A) – (E)); *see* SR at 41; Recommended Standards § 4.8.3.g.

Subsection (d). IEPA placed these requirements under the heading "Sequestration of iron and/or manganese by polyphosphates."

Subsection (d)(1). IEPA proposed that "[s]equestration by polyphosphates shall not be used when the combination of iron and manganese exceeds 1.0 mg/L." Prop. 604 at 69; *see* Johnson Test. at 3; SR at 41; Recommended Standards § 4.8.6.

Subsection (d)(2). IEPA proposed that "[p]hosphate solution must be kept covered and disinfected by approximately 10 mg/L free chlorine residual unless the phosphate is not able to support bacterial growth and the phosphate is being fed from the covered shipping container." Prop. 604 at 69; *see* SR at 69; Recommended Standards § 4.8.6.b.

Capt. Curry recommended revising subsection (d)(2) with additional language from IEPA's proposed Section 604.910, which also addresses phosphate storage. Curry Test. at 33; *see* Prop. 604 at 64. IEPA "concurs that these two sections should be consistent" with one another and revises subsection (d)(2) as follows: "Phosphate solution must be kept covered and disinfected by carrying approximately 10 mg/L free chlorine residual unless the phosphate is not able to support bacterial growth and the phosphate is being fed from the covered shipping container. Phosphate solutions having a pH of 2.0 or less may also be exempted from this requirement by the Agency." Curry Resp. at 13. The Board's order reflects this revision.

Subsection (d)(3). IEPA proposed that "[p]olyphosphates shall not be applied ahead of iron and manganese removal treatment. The point of application must be prior to aeration, oxidation or disinfection." Prop. 604 at 69; *see* SR at 41; Recommended Standards § 4.8.6.c.

Subsection (d)(4). IEPA proposed that "[t]he phosphate feed point shall be located as far ahead of the oxidant feed point as possible." Prop. 604 at 69; *see* SR at 41; Recommended Standards § 4.8.6.d.

Subsection (e). IEPA placed these requirements under the heading "Sequestration of iron and/or manganese by sodium silicates."

Subsection (e)(1). IEPA proposed that "[s]equestration by sodium silicate shall not be used when iron, manganese or combination thereof exceeds 2 mg/L." Prop. 604 at 69; *see* Johnson Test. at 3; SR at 41; Recommended Standards § 4.8.7.a.

Subsection (e)(2). IEPA proposed that "[a] full-scale demonstration will be required to determine the suitability of sodium silicate for the particular water and the minimum feed needed." Prop. 604 at 69; *see* SR at 41; Recommended Standards § 4.8.7.

The Board asked IEPA to clarify whether the use of sequestration of iron or manganese by sodium silicates must be approved by IEPA under Section 604.145(b). Board Questions at 15. IEPA responded that the proposed Section 604.145(b) "only applies when expressly cited in Part 604." IEPA Resp. at 23.

Subsection (e)(3). IEPA proposed that "[c]hlorine or chlorine dioxide addition must accompany the sodium silicate addition." Prop. 604 at 69; *see* SR at 41; Recommended Standards § 4.8.7.

Subsection (e)(4). IEPA proposed that "[s]odium silicate must not be applied ahead of iron or manganese removal treatment." Prop. 604 at 69; *see* SR at 41; Recommended Standards § 4.8.7.e.

Section 604.1015: Taste and Odor Control. Mr. Johnson testified that controlling taste and odor in water from a surface water source makes the finished water more aesthetically acceptable to customers. Johnson Test. at 3.

Subsection (a). Section 611.121(b)(1) of the Board's rules provides that "[d]rinking water delivered to any user at any point in the distribution system must contain no impurity that could reasonably be expected to cause offense to the sense of sight, taste, or smell." 35 Ill. Adm. Code 611.121(b)(1). IEPA proposed to repeal Section 611.121(b) (Prop. 611 at 33) but proposed to adopt the same requirements in a new Section 601.101(b)(1). Prop. 601 at 1.

Subsection (a) proposes that "[c]ontrol of taste and odor is required when necessary to meet the requirements of 35 Ill. Adm. Code 611.101(b)." Prop. 604 at 69; *see* 35 Ill. Adm. Code 611.121(b)(1); Prop. 601 at 1; Recommended Standards § 4.10; SR at 41-42; *see also* SR at 67.

Subsection (b). IEPA proposed to list acceptable taste and odor control treatments, which include "chlorination; chlorine dioxide; powdered activated carbon; granular activated carbon; copper sulfate or other copper compounds; aeration; potassium permanganate; ozonation; or ultra violet with hydrogen peroxide." Prop. 604 at 69-70 (subsections (1) – (9)); *see* SR at 42; Recommended Standards § 4.10.

Section 604.1020: Powdered Activated Carbon. Mr. Johnson testified that powdered activated carbon is a treatment for taste and odor control. Johnson Test. at 3. It can also be used for organics removal, and IEPA placed it within its own section. SR at 42. Neither the Board's nor IEPA's regulations now address the design, operation, and maintenance of treatment with powdered activated carbon. *Id*.

Subsection (a). IEPA proposed that "[p]owdered activated carbon must be added in the treatment process to provide maximum contact time." Prop. 604 at 70; *see* Recommended Standards § 4.10.4.a.

The Board asked IEPA to comment whether it would clarify subsection (a) and align it with the Recommended Standards to require that "[p]owdered activated carbon must be added as early as possible in the treatment process to provide maximum contact time to allow the effective and economical use of the chemical." Board Questions at 16. IEPA "has no objection to this proposal" (IEPA Resp. at 23), and the Board's order reflects this revision.

Subsection (b). IEPA proposed that "[a]ctivated carbon shall not be applied near the point of chlorine or other oxidant application." Prop. 604 at 70; *see* Recommended Standards § 4.10.4.a.

Subsection (c). IEPA proposed that "[t]he carbon may be added as a pre-mixed slurry or by means of a dry feed machine as long as the carbon is properly wetted." Prop. 604 at 70; *see* Recommended Standards § 4.10.4.b.

Subsection (d). IEPA proposed that "[c]ontinuous agitation or resuspension equipment shall be provided to keep the carbon from depositing in the slurry storage tank." Prop. 604 at 70; *see* Recommended Standards § 4.10.4.c.

Subsection (e). IEPA proposed that "[p]rovisions must be made for adequate dust control." Prop. 604 at 70; *see* Recommended Standards § 4.10.4.d.

Subsection (f). IEPA proposed that, "[w]hen feeding powdered activated carbon for taste and odor control provisions must be made for adding from 0.1 milligrams per liter to at least 40 milligrams per liter." Prop. 604 at 70; *see* Recommended Standards § 4.10.4.e.

Capt. Curry testified that "[i]t is not considered practical to feed powdered activated carbon at dosage as low as 0.1 mg/L, and it is not considered to be practical to determine the impact on water quality a dosage as low as 0.1 mg/L." Curry Test. at 32. He recommended eliminating IEPA's proposed minimum dosage. *Id*. He added that IEPA's proposal represents a 400 to 1 feed ration. He stated that commercial feeders generally have a 10 to 1 ratio, and some newer systems can provide a 50 to 1 ratio. He also cited a system at which an 80 mg/L dosage was required to address taste and odor. *Id*. Capt. Curry's testimony did not propose an alternate limit or range for feeding powdered activated carbon.

IEPA responded that it "concurs with this recommendation" and revises subsection (f) as follows: "When feeding powdered activated carbon for taste and odor control provisions must be made for adding ~~from 0.1 milligrams per liter to~~ at least 40 milligrams per liter." Curry Resp. at 12. The Board's order reflects this revision.

Subsection (g). IEPA proposed that "[p]owdered activated carbon must be handled as a potentially combustible material." Prop. 604 at 70; *see* Recommended Standards § 4.10.4.f. Subsection (f)(1) proposes that "[o]ther chemicals shall not be stored in the same compartment." *Id*. Subsection (f)(2) proposes that "[a] separate room shall be provided for carbon feed installations." *Id*.

Capt. Curry testified that General Carbon Corporation manufactures powdered activated carbon. Its Safety Data Sheet characterizes the material as weakly explosive and combustible dust that can penetrate electrical equipment and cause shorts and lead to fires. Curry Test. at 32. Capt. Curry recommended re-drafting subsection (g) to protect the safety of plant operators.

IEPA "concurs with this recommendation" and revised subsection (g) as follows. Curry Resp. at 12. The Board's order reflects this revision.

g) Powdered activated carbon must be handled as a potentially combustible material.

1) A separate room shall be provided for carbon feed equipment, including a door to allow isolation of the room~~Other chemicals shall not be stored in the same compartment~~.

2) The~~A~~ separate room shall be as nearly fireproof as possible~~provided for carbon feed installations~~.
3) Other chemicals shall not be stored in the same room as powdered activated carbon.
4) Carbon feeder rooms shall be equipped with explosion-proof electrical outlets, lights, and motors. *Id*.

Subpart K: Chemical Application

In this subpart, IEPA first proposed general requirements for application of all chemicals. SR at 42; *see* Cook Test. at 7. In subsequent sections, IEPA proposes requirements for specific chemicals or types of chemicals. SR at 42.

Section 604.1100: General Chemical Application Requirements.

Subsection (a). Under the heading "Permit requirement," IEPA proposed that "[n]o chemicals may be applied to treat drinking water unless specifically permitted by the Agency." Prop. 604 at 70; *see* Recommended Standards § 5.0.

Subsection (b). IEPA proposed that "[c]hemicals shall be applied to the water at such points and by such means as to assure maximum efficiency of treatment; assure maximum safety to consumer; provide maximum safety to operators; assure satisfactory mixing of the chemicals with the water; provide maximum flexibility of operation throughout various points of application, when appropriate; and prevent backflow or back siphonage between multiple points of feed through common manifolds." Prop. 604 at 70-71 (subsections (1) – (6)); *see* Recommended Standards § 5.0.2.

Subsection (c). IEPA proposed requirements for the general design of equipment.

Subsection (1). IEPA proposed that "feeders will be able to apply, at all times, the necessary amounts of chemicals at an accurate rate, throughout the range of feed." Prop. 604 at 71; *see* Recommended Standards § 5.0.3.a.

Subsection (2). IEPA proposed that "chemical contact materials and surfaces are resistant to the aggressiveness of the chemical solution. Prop. 604 at 71; *see* Recommended Standards § 5.0.3.b.

Subsection (3). IEPA proposed that "corrosive chemicals are introduced to minimize potential for corrosion." Prop. 604 at 71; *see* Recommended Standards § 5.0.3.c.

Subsection (4). IEPA proposed that "chemicals that are incompatible are not stored or handled together." Prop. 604 at 71; *see* Recommended Standards § 5.0.3.d.

Subsection (5). IEPA proposed that "all chemicals are delivered from the feeder to the point of application in separate conduits." Prop. 604 at 71; *see* Recommended Standards § 5.0.3.e.

Subsection (6). IEPA proposed that "chemical feeders and pumps must operate at no lower than 20 percent of the feed range unless two fully independent adjustment mechanisms such as pump rate pulse and stroke length are fitted when the pump must operate at no lower than 10 percent of the rated maximum." Prop. 604 at 71; *see* Recommended Standards § 5.0.3.g.

Subsection (d). IEPA proposed that "[a]ll chemical containers shall bear the name, address and telephone number of the supplier, along with a functional name or identification and strength of the chemical." Prop. 604 at 71; *see* 35 Ill. Adm. Code 653.202(a); SR at 42.

Subsection (e). IEPA proposed that "[s]torage containers must be reserved for use of one chemical only." Prop. 604 at 71. IEPA states that a community water supply must not rinse a container of one chemical and then store a different chemical in it. SR at 42. "The two chemicals could be incompatible and when mixed, hazardous to the community water supply personnel." *Id*. at 42-43.

Subsection (f). IEPA proposed that "[c]hemicals shall not be fed in excess of the maximum dosage as stated in the NSF/ANSI Standard 60 [Drinking Water Treatment Chemicals – Health Effects], incorporated by reference in Section 601.115." Prop. 604 at 71; *see* 35 Ill. Adm. Code 653.202(b).

Section 604.1105: Feed Equipment and Chemical Storage.

Subsection (a). IEPA placed these requirements under the heading "Solution feed equipment."

Subsection (a)(1). IEPA proposed that "[c]orrosion resistant containers shall be provided for solution feeders." Prop. 604 at at 71; *see* 35 Ill. Adm. Code 653.601(e)(2)(A); SR at 43.

Subsection (a)(2). IEPA proposed that "[c]ontainers shall have non-corrodible covers with overhanging edges. Opening shall be constructed to prevent contamination." Prop. 604 at 72; *see* 35 Ill. Adm. Code 653.601(e)(2)(B); SR at 43.

Subsection (a)(3). IEPA proposed that "[s]cales or a volumetric measuring device shall be provided for determining the amount of solution fed." Prop. 604 at 72; *see* 35 Ill. Adm. Code 653.601(e)(2)(C); SR at 43.

Subsection (b). IEPA placed these requirements under the heading "Feeder redundancy."

Subsection (b)(1). IEPA proposed that

> [w]here chemical feed is necessary for the protection of the supply, such as chlorination, coagulation or other essential processes: a minimum of two feeders must be provided with each having adequate capacity to provide the maximum dosage necessary; and the standby unit or a combination of units of sufficient size to meet capacity shall be provided to replace the largest unit when out of service.

Prop. 604 at 72 (subsections (A) and (B)); *see* Recommended Standards § 5.1.1.a; SR at 43.

Subsection (b)(2). IEPA proposed that "[a] separate feeder must be used for each chemical applied." Prop. 604 at 72; *see* Recommended Standards § 5.1.1.b; SR at 43.

Subsection (b)(3). IEPA proposed that "[e]ach chemical feeder and day tank must be identified with their content." Prop. 604 at 72. Although this requirement is not included in the Recommended Standards, IEPA added it to prevent mixing of chemicals. SR at 43.

Subsection (b)(4). IEPA proposed that "[s]pare parts must be available on site for all feeders and chemical booster pumps to replace parts which are subject to wear and damage." Prop. 604 at 72; *see* Recommended Standards § 5.1.1.c; SR at 43.

Subsection (c). IEPA placed these requirements under the heading "Control."

Subsection (c)(1). IEPA proposed requirements for automatically operated facilities. Subsection (A) proposes that "[t]he automatic controls must be designed to allow override by manual controls." Prop. 604 at 72; *see* Recommended Standards § 5.1.2.a; SR at 43. Subsection (B) proposes that "[c]hemical feeders must be electrically interconnected with the well or service pump so that they will not operate if the well or service pump is not operating." Prop. 604 at 72. Although this requirement is not included in the Recommended Standards, IEPA added it "to ensure that the chemicals are injected only when the well or service pump operates and chemicals are injected proportional to the flow." SR at 43. IEPA argues that the Recommended Standards include a similar requirement for fluoride and that it should apply to all chemical feeders. *Id*.

Subsection (c)(2). IEPA proposed that "[c]hemical feed rates must be proportional to the flow stream to achieve the appropriate dose of chemical application." Prop. 604 at 72; *see* Recommended Standards § 5.1.2.b; SR at 43.

Subsection (c)(3). IEPA proposed that "[a] means to measure water flow stream being dosed shall be provided to determine chemical feed rates." Prop. 604 at 72; *see* Recommended Standards § 5.1.2.c; SR at 43.

Subsection (c)(4). IEPA proposed that "[p]rovisions shall be made for measuring the quantities of chemicals used." Prop. 604 at 72; *see* Recommended Standards § 5.1.2.d; SR at 43.

Subsection (c)(5). Under the heading "Weighing scales," IEPA proposed in subsection (A) that "[w]eighing scales must be capable of providing reasonable precision in relation to average daily dose." Prop. 6-4 at 73; *see* Recommended Standards § 5.1.2.e.4; SR at 43.

The Board asked IEPA to comment on "reasonable" precision for weighing scales. Board Questions at 15. IEPA responded that "[r]easonable is an objective standard provided by the Recommended Standards to measure the desired gas, liquid, or solid." IEPA Resp. at 23.

Subsection (B) proposes that, "[u]nless otherwise approved by the Agency pursuant to Section 604.145(b), treatment chemicals in gaseous state must be weighted." Prop. 604 at 73; *see* Recommended Standards § 5.1.2.e.1; SR at 43. Subsection (C) proposes that "[f]luoride solution fed from supply drums or carboys must be weighed." Prop. 604 at 73; *see* Recommended Standards § 5.1.2.e.2; SR at 43. Subsection (D) proposes that "[v]olumetric dry chemical feeders must be weighed unless otherwise approved by the Agency pursuant to Section 604.145(b)." Prop. 604 at 73; *see* Recommended Standards § 5.1.2.e.3; SR at 43.

Subsection (d). IEPA proposed that "[d]ry chemical feeders shall: measure chemicals volumetrically or gravimetrically; provide adequate water and agitation of the chemical within the slurry tank; and completely enclose chemicals to prevent emission of dust to the operating room." Prop. 604 at 73 (subsections (1) – (3)); *see* Recommended Standards § 5.1.3; SR at 43.

Subsection (e). IEPA placed these requirements under the heading "Positive displacement solution pumps."

Subsection (e)(1). IEPA proposed that these pumps "may be used to feed liquid chemicals, but must not be used to feed chemical slurries." Prop. 604 at 73; Recommended Standards § 5.1.4.a; SR at 43.

Subsection (e)(2). IEPA proposed that "[p]umps must be capable of operating at the required maximum rate against the maximum head conditions found at the point of injection." Prop. 604 at 73; *see* Recommended Standards § 5.1.4.b; SR at 43.

Subsection (e)(3). IEPA proposed that "[c]alibration tubes or mass flow monitors which allow for direct physical measurement of actual feed rates must be provided." Prop. 604 at 73; *see* Recommended Standards § 5.1.4.c; SR at 43.

Subsection (f). IEPA proposed that "[l]iquid chemical feeders must be such that chemical solutions cannot be siphoned or overfed into the water supply by: assuring discharge at a point of positive pressure; providing vacuum relief; or providing a suitable air gap or anti-siphon device." Prop. 604 at 73 subsections (1) – (3); *see* Recommended Standards § 5.1.5; SR at 43.

Subsection (g). IEPA proposed that

> [c]ross-connection control must be provided to assure that: the make-up water lines discharging to liquid storage tanks must be properly protected from backflow; no direct connection may exist between any sewer and an overflow or drawn from a chemical feed system; and all overflows and drains from a chemical field system must have an airgap above the sewer or overflow rim of a receiving sump. Prop 604 at 73-74 (subsections (1) – (3)); *see* Recommended Standards § 5.1.6.

Subsection (h). IEPA proposed that "[c]hemical feed equipment location must be readily accessible for servicing, repair, and observation of operation." Prop. 604 at 74; *see* Recommended Standards § 5.1.7.a; SR at 43.

Subsection (i). IEPA proposed that "[m]ake-up water lines must be: obtained from the finished water supply, or from a location sufficiently downstream of any chemical feed point to assure adequate mixing; and ample in quantity and adequate in pressure." Prop. 604 at 74 (subsections (1) and (2)); *see* Recommended Standards §§ 5.1.4.a, 5.1.4.e; SR at 43-44.

Subsection (j). IEPA placed these requirements under the heading "Storage of chemicals."

Subsection (j)(1). IEPA proposed that "[s]pace shall be provided for: at least 30 days of chemical supply; convenient and efficient handling of chemicals; dry storage conditions; and a minimum storage volume of 1.5 times the gross shipping volume." Prop. 604 at 74 (subsections (A) – (D)); *see* Recommended Standards § 5.1.9.a.; SR at 44.

Subsection (j)(2). IEPA proposed that "[o]ffloading areas must be clearly labeled to prevent accidental cross-contamination." Prop. 604 at 74; *see* Recommended Standards § 5.1.9.b; SR at 44.

Subsection (j)(3). IEPA proposed that "[c]hemicals shall not be stored in confined spaces." Prop. 604 at 74. Although this requirement is not included in the Recommended Standards, IEPA added it to prevent injury or environmental contamination if there is an accidental release. SR at 44.

Subsection (j)(4). IEPA proposed that "[c]hemicals must be stored in covered or unopened shipping containers, unless the chemical is transferred into an approved storage unit." Prop. 604 at 74; *see* Recommended Standards § 5.1.9.c; SR at 44.

Subsection (j)(5). IEPA proposed that "[f]eed equipment and storage chemicals shall be stored inside a building unless otherwise approved by the Agency pursuant to Section 604.145(b)." Prop. 604 at 74. Although this requirement is not included in the Recommended Standards, IEPA added it to prevent injury or environmental contamination if there is an accidental release. SR at 44.

Subsection (j)(6). IEPA proposed that "[l]iquid chemical storage tanks must have a liquid level indicator." Prop. 604 at 74; *see* Recommended Standards § 5.1.9.d.1; SR at 44.

Subsection (j)(7). Under the heading "Secondary Containment," IEPA proposed in subsection (A) that "[l]iquid chemical storage tanks must have secondary containment consisting of an overflow and a receiving basin capable of receiving accidental spills or overflows without uncontrolled discharge." Prop. 604 at 75; *see* Recommended Standards § 5.1.9.d.2.

Subsection (B) proposes that "[a] common receiving basin may be provided for each group of compatible chemicals that provides sufficient containment volume to prevent accidental

discharge in the event of failure of the largest tank. Groups of compatible chemicals are as follows: acids, bases, salts and polymers, absorption powders, oxidizing powders and compressed gases." Prop 604 at 75. Although this requirement is not included in the Recommended Standards, IEPA added it to prevent injury or environmental contamination if there is an accidental release. SR at 44.

Subsection (j)(8). IEPA proposed that "[v]ents from storage tanks shall have a corrosion resistant 24 mesh screen." Prop. 604 at 75.

Subsection (k). Under the heading "Bulk Liquid Storage Tanks," IEPA addressed those facilities but excluded subsurface storage tanks. SR at 44; *see* Recommended Standards § 5.1.10.e.

Subsection (k)(1). IEPA proposed that "[a] uniform strength of chemical solution must be maintained. Continuous agitation must be provided to maintain slurries in suspension." Prop. 604 at 75; *see* Recommended Standards § 5.1.10.a; SR at 44.

Subsection (k)(2). IEPA proposed that "[a] means to assure continuity of chemical supply shall be provided." Prop. 604 at 75; Recommended Standards § 5.1.10.b; SR at 44.

Subsection (k)(3). IEPA proposed that "[m]eans must be provided to measure the liquid level in the tank." Prop. 604 at 75; *see* Recommended Standards § 5.1.10.c; SR at 44.

Subsection (k)(4). IEPA proposed that "[l]iquid storage tanks including any access openings shall be kept securely covered." Prop. 604 at 75; *see* Recommended Standards § 5.1.10.d; SR at 44.

Subsection (k)(5). IEPA proposed that "[o]veflow pipes, when provided, shall be turned downward with the end screened, have a free fall discharge, and be located where noticeable." Prop. 604 at 75 subsections (A) – (C)); *see* Recommended Standards § 5.1.10.f; SR at 44.

Subsection (k)(6). IEPA proposed that "[l]iquid storage tanks must be vented, but not through vents in common with other chemicals or day tanks." Prop. 604 at 75; *see* Recommended Standards § 5.1.10.g; SR at 44.

Subsection (k)(7). IEPA proposed that "[e]ach liquid storage tank shall be provided with a valved drain in accordance with subsection (g) [cross-connection]." Prop. 604 at 75; *see* Recommended Standards §§ 5.1.10.h, 5.1.10.i; SR at 44.

Subsection (k)(8). IEPA proposed that "[s]olution tanks must be located and protective curbings provided so that chemicals from equipment failure, spillage or accidental drainage must not enter the water in conduits, treatment or storage basins. Chemicals shall be stored as required by subsection (j)(5)." Prop. 604 at 75; *see* Recommended Standards § 5.1.10.j.

Subsection (l). IEPA placed these requirements under the heading "Day tanks[10]."

Subsection (l)(1). IEPA proposed that "[d]ay tanks must be provided where bulk storage of liquid chemical is provided." Prop. 604 at 76; *see* Recommended Standards § 5.1.11.a; SR at 44.

Subsection (l)(2). IEPA proposed that "[d]ay tanks must meet all the requirements of subsection (k) [Bulk Liquid Storage Tanks], except that shipping containers do not require overflow pipes and subsection drains." Prop. 604 at 76; *see* Recommended Standards § 5.1.11.b.

Subsection (l)(3). IEPA proposed that "[d]ay tanks must be scale-mounted, or have a calibrated gauge painted or mounted on the side if liquid level can be observed in a gauge tube or through sidewalls of the tank. In opaque tanks, a gauge rod may be used. The ratio of the area of the tank to its height must be such that unit readings are meaningful in relation to the total amount of chemical fed during a day." Prop. 604 at 76; *see* Recommended Standards § 5.1.11.d. Although IEPA based this subsection on the Recommended Standards, it added the final sentence addressing short, large diameter tanks. IEPA argued that these tanks can make it difficult to measure the amount of chemical feed accurately. SR at 44.

Subsection (l)(4). IEPA proposed that, "[e]xcept for fluosilicic acid, hand pumps may be provided for transfer from a shipping container. Where motor-driven transfer pumps are provided, a liquid level limit switch must be provided." Prop. 604 at 76; *see* Recommended Standards § 5.1.11; SR at 44.

Subsection (l)(5). IEPA proposed that "[t]anks and tank-refilling line entry points must be clearly labeled with the name of the chemical contained." Prop. 604 at 76; *see* Recommended Standards § 5.1.11.g; SR at 44.

Subsection (l)(6). IEPA proposed that "[f]illing of day tanks shall not be automated." Prop. 604 at 76; *see* Recommended Standards § 5.1.11h; SR at 44.

Subsection (m). IEPA proposed that "[f]eed lines shall be of durable, corrosion-resistant material; shall be protected against freezing; must be designed to prevent clogging; and shall be color coded and labeled in accordance with Section 604.120 [Piping Identification]." Prop. 604 at 76 (subsections (1) – (4)); *see* Recommended Standards § 5.1.12; SR at 44.

Subsection (n). Under the heading "Handling," IEPA proposed that "[p]rovision must be made for the proper transfer of dry chemicals from shipping containers to storage bins or hoppers, in such a way as to minimize the quantity of dust which may enter the room." Prop. 604 at 76; *see* Recommended Standards § 5.1.13.c; SR at 44.

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[10] A "day tank" is "[a] treatment chemical storage vessel that contains a diluted concentration in a feed volume suitable for a short period, typically 1 to 3 days." *The Water Dictionary* (2nd ed. 2010) at 145, incorporated by reference at 35 Ill. Adm. Code 601.115(b); *see* 35 Ill. Adm. Code 601.105(c).

Subsection (o). Under the heading "Housing," IEPA proposed in subsection (o)(1) that "[f]loor surfaces must be smooth and impervious, slip-proof and well drained." Prop. 604 at 76; *see* Recommended Standards § 5.1.14.a; SR at 44. Subsection (o)(2) proposes that "[v]ents from feeders, storage facilities and equipment exhaust must discharge to the outside atmosphere above grade and remote from air intakes." Prop. 604 at 76; *see* Recommended Standards § 5.1.14.b; SR at 44.

Section 604.1110: Protective Equipment.

Subsection (a). IEPA proposed that "[p]ersonal protective equipment shall be provided consistent with the requirements of the CWS safety plan developed pursuant to Section 604.160." Prop. 604 at 77; *see* Recommended Standards § 5.3.4.a; SR at 44-45.

Subsection (b). IEPA proposed that "[a] deluge shower and eyewashing device shall be installed where strong acids and alkalis are used or stored." Prop. 604 at 77; *see* Recommended Standard § 5.3.4.b; SR at 45.

Capt. Curry recommended adding the provisions below to subsection (b). He argued that these provisions protect operating personnel, follow standards of good practice, and comply with OSHA standards. Curry Test. at 33.

> The deluge shower and eye/face wash device shall be located in close proximity to the hazardous material. Comply with:
>
> 1) OSHA regulations contained at 29 CFR 1910.151.
> 2) ANSI Z358.1-2014.
>
> A) Within 10 seconds walking time from the location of the hazard (approximately 55 ft.).
> B) Installed on the same floor level as the hazard (i.e., access shall not require going up or down stairs or ramps).
> C) The path of travel shall be free of obstructions and as straight as possible.
>
> The water supply for the deluge shower shall comply with:
>
> 3) OSHA regulations contained at 29 CFR 1910.151
> 4) ANSI Z358.1-2014
>
> A) Water temperature between 60 and 100 deg. F, except in circumstances where a chemical reaction is accelerated by flushing fluid temperature if determined by consultation with product manufacturer safety advice to determine the optimum water temperature for each application.
> B) Deliver at least 20 gpm for 15 minutes.

The water supply for the eye/face wash device shall comply with:

5) OSHA regulations contained at 29 CFR 1910.151
6) ANSI Z358.1-2014

C) Water temperature between 60 and 100 deg. F, except in circumstances where a chemical reaction is accelerated by flushing fluid temperature if determined by consultation with product manufacturer safety advice to determine the optimum water temperature for each application.
D) Deliver at least 3 gpm for 15 minutes. *Id.*

Capt. Curry clarified that, if a distressed operator is exposed to extremely cold water after being exposed to a hazardous chemical, cardiac arrest could result. *Id.*

IEPA responded that its proposal "acknowledges the need for workplace safety with a general provision." Curry Resp. at 14. However, IEPA stated that "proper construction and water tempering for deluge showers has been a contentious point" for IEPA, IDPH, and regulated entities. *Id.* IEPA argued that it "must defer to the appropriate state and federal agencies who have the proper expertise. . . ." *Id.* "[T]hese plumbing appurtenances must be addressed by [the] Department [of Public Health] in a more complete and appropriate fashion." *Id.*

In light of IEPA's response, the Board asked IDPH how it is addressing the issue of deluge showers. Board Questions 2 at 2. Mr. Dewitt testified that IEPA's deference to IDPH "is appropriate and consistent with the law as safety showers are plumbing by definition and are addressed in the plumbing code at 77 Ill. Adm. Code 890.900." Tr.2 at 32. He indicated that relying on a registered plumbing contractor would eliminate any confusion about the proper design of these facilities. *Id.*

The Board also asked whether there are authorities or guidelines that the Board could refer to in its regulations or in a Board Note. Board Questions at 2. Mr. Dewitt responded that he believed it "is appropriate and permissible for the board to point to a specific regulation not under its purview and, for example, to say for requirements relating to the installation of emergency eye – emergency showers and eyewash station, see 77 Ill. Adm. Code 890.800." Tr.2 at 33.

The Board asked IEPA to comment whether it would be appropriate to add a Board Note addressing sources of safety information. Board Questions 2 at 2. IEPA "does not believe" a Board Note is necessary. IEPA Resp. 2 at 2. IEPA explained that these requirements "are beyond the scope" of its expertise. *Id.* IEPA also indicated that a Board Note may not be consistent with the IAPA. *Id.*

In his post-hearing comments, Capt. Curry stated that after the second hearing he communicated with Mr. Dewitt of IDPH regarding safety showers. Curry Post-Hrg. Cmt. at 7-8. To encourage safe operation, he proposed amending subsection (b) to provide that "[a] deluge

shower and eye washing device shall be installed where strong acids and alkalis are used and stored. The deluge shower and eye washing device, and water supply to those devices, shall comply with applicable provisions of 77 IAC 890 ("The Illinois Plumbing Code")." *Id*. IEPA stated that it "has no objection to the proposed regulatory language" (IEPA Reply at 2), and the Board's order reflects this revision.

Section 604.1115: Chlorine Gas.

Subsection (a). IEPA proposed that "[c]hlorinators that are housed separately from the chlorine storage must be in an adjacent room." Prop. 604 at 77; *see* Recommended Standards § 5.4.1.a; SR at 45.

Subsection (b). IEPA proposed that "[c]hlorinator rooms must be heated to 60°F, and be protected from excessive heat. Cylinders and gas lines must be protected from excessive temperatures." Prop. 604 at 77; *see* Recommended Standards § 5.4.1.c; SR at 45.

Subsection (c). IEPA proposed that "[c]hlorine gas feed and storage shall be enclosed and separated from other operating areas." Prop. 604 at 77; *see* Recommended Standards § 5.4.1.d. IEPA also proposed the following requirements to construct these feed and storage rooms.

Subsection (c)(1). IEPA proposed that "a shatter resistant inspection window shall be installed in an interior wall." Prop. 604 at 77; *see* Recommended Standards § 5.4.1.d.1.

Subsection (c)(2). IEPA proposed that "all openings between the room and the remainder of the plant shall be sealed." Prop. 604 at 77; *see* Recommended Standards § 5.4.1.d.2.

Subsection (c)(3). IEPA proposed that "doors shall be equipped with panic hardware, assuring ready means of exit and opening outward only to the building exterior." Prop. 604 at 77; *see* Recommended Standards § 5.4.1.d.3.

Subsection (c)(4). IEPA proposed that feed and storage rooms must include "a ventilating fan with a capacity to complete one air change per minute when the room is occupied, unless otherwise approved by the Agency pursuant to Section 604.145(b)." Prop. 604 at 77; *see* Recommended Standards § 5.4.1.d.4.

Subsection (c)(5). IEPA proposed that "the ventilating fan shall take suction near the floor and as great a distance as is practical from the door and air inlet, with the point of discharge located so as not to contaminate air inlets to any room or structure." Prop. 604 at 77; *see* Recommended Standards § 5.4.1.d.5.

Subsection (c)(6). IEPA proposed that "air inlets with corrosion resistant louvers shall be installed near the ceiling." Prop. 604 at 77; *see* Recommended Standards § 5.4.1.d.6.

Subsection (c)(7). IEPA proposed that "air intake and exhaust louvers shall facilitate airtight closure." Prop. 604 at 77; *see* Recommended Standards § 5.4.1.d.7.

Subsection (c)(8). IEPA proposed that "separate switches for the ventilating fan and for the lights shall be located outside and at the inspection window." Prop. 604 at 77; *see* Recommended Standards § 5.4.1.d.8. Subsection (A) proposes that "[o]utside switches must be protected from vandalism." *Id*. Subsection (B) proposes that "[a] signal light indicating ventilating fan operation shall be provided at each entrance when the fan can be controlled from more than one point." Prop. 604 at 78; *see* Recommended Standards § 5.4.1.d.8.

Subsection (c)(9). IEPA proposed that "vents from chlorinator and storage areas must be screened and discharge to the outside atmosphere, above grade." Prop. 604 at 78; *see* Recommended Standards § 5.4.1.d.9.

Subsection (c)(10). IEPA proposed that, "where floor drains are provided, the floor drains must discharge to the outside of the building and not be connected to other internal or external drainage systems." Prop. 604 at 78; *see* Recommended Standards § 5.4.1.d.10.

Subsection (c)(11). IEPA proposed that "provisions must be made to chemically neutralize chlorine gas where feed and/or storage is located near residential or developed areas in the event of any measured chlorine release. The equipment must be sized to treat the entire contents of the largest storage container on site." Prop. 604 at 78; *see* Recommended Standards § 5.4.1.d.11.

Capt. Curry questioned whether there is a distance from a developed area that triggers the requirement to install chlorine gas neutralization equipment. Curry Test. at 34. He argued that this subsection should provide a minimum distance to clarify applicability and assist CWSs. Curry Supp. Test. at 9. Also, because of the time and expense to construct this equipment, he suggested revising subsection (c)(11) to provide that "[e]xisting systems that do not have provision for neutralization of chlorine gas, but are required to provide this capability, on the date this part is adopted, shall install equipment for neutralization of chlorine gas within 4 months of the date of adoption of this part." *Id*.

In response to Capt. Curry's testimony and supplemental testimony, IEPA proposed to revise subsection (c)(11) to provide that "provisions must be made to chemically neutralize chlorine gas ~~where feed and/or storage is located near residential or developed areas~~ in the event of any measured chlorine release. The equipment must be sized to treat the entire contents of the largest storage container on site." Curry Supp. Resp. at 6. The Board's order reflects this revision. IEPA added that "[a] CWS operating before the effective date of this Part will not be required to modify or replace components to meet the requirements of this Section under the conditions outlined in Section 604.145(a)." IEPA did not propose to extend the effective date of this proposed requirement. Curry Resp. at 14.

Subsection (d). IEPA proposed that "[c]hlorine gas feed systems shall be of the vacuum type." Prop. 604 at 78; *see* Recommended Standards § 5.4.1.e.

Subsection (d)(1). IEPA proposed that these systems must include "vacuum regulators on all individual cylinders in service." Prop. 604 at 78; *see* Recommended Standards § 5.4.1.e.1.

Subsection (d)(2). IEPA proposed that "service water to eductors shall be of adequate supply and pressure to operate feed equipment within the needed chlorine dosage range for the proposed system." Prop. 604 at 78; *see* Recommended Standards § 5.4.1.e.2.

Subsection (e). IEPA proposed that "[a]ll chlorine gas feed lines located outside the chlorinator or storage rooms shall be installed in air tight conduit pipe." Prop. 604 at 77; *see* Recommended Standards § 5.4.1.g.

Subsection (f). IEPA proposed that "[f]ull and empty cylinders of chlorine gas shall meet the following requirements: housed only in the chlorine storage room; isolated from operating areas; and restrained in position." Prop. 604 at 78 (subsections (1)- (3)); *see* Recommended Standards § 5.4.1.h.

Subsection (g). IEPA proposed that "[c]ontinuous chlorine leak detection equipment equipped with both an audible alarm and a warning light is required." Prop. 604 at 78; *see* Recommended Standards § 5.3.3; SR at 45.

Section 604.1120: Acids and Caustics.

Subsection (a). IEPA proposed that "[a]cids and caustics must be kept in closed corrosion resistant shipping containers or bulk liquid storage tanks." Prop. 604 at 78; *see* Recommended Standards §5.4.2.a; SR at 45.

Subsection (b). IEPA proposed that "[a]cids and caustics must not be handled in open vessels." Prop. 604 at 78; *see* Recommended Standards §5.4.2.b; SR at 45.

Subsection (c). IEPA proposed that "[a]cids storage tanks shall be vented to the outside atmosphere." Prop. 604 at 78; *see* Recommended Standards §5.1.10.g; SR at 45.

Section 604.1125: Chlorine Dioxide.

Subsection (a). IEPA proposed that "[c]hlorine dioxide generation equipment must be factory assembled pre-engineered units with a minimum efficiency of 95 percent. The excess free chlorine must not exceed three percent of the theoretical stoichiometric concentration required." Prop. 604 at 79; *see* Recommended Standards § 4.4.8.1; SR at 45.

Subsection (b). IEPA proposed that "[c]hlorine gas and sodium chlorite feed and storage facilities must comply with Sections 604.1115 [Chlorine Gas] and 604.1130 [Sodium Chlorite], respectively. Sodium hypochlorite feed and storage facilities must comply with Section 604.1135 [Sodium Hypochlorite]." Prop. 604 at 79; *see* Recommended Standards § 4.4.8.2; SR at 45.

Subsection (c). IEPA proposed that "[t]he design must comply with all applicable portions of Sections 604.130(c) [Operational Testing Equipment], 604.705 [Chlorination Equipment], 604.710 [Points of Application], 604.715 [Contact Time], 604.720 [Inactivation of Pathogens], and 604.735 [Chlorinator Piping]." Prop. at 79; *see* Recommended Standards § 4.4.8.3; SR at 45.

Section 604.1130: Sodium Chlorite. Sodium chlorite is used chiefly to generate chlorine dioxide. SR at 45. Improper handling of sodium chlorite can result in fire or explosion. *Id*.

Subsection (a). IEPA placed these requirements under the heading "Storage."

Subsection (1). IEPA proposed that "[s]odium chlorite must be stored by itself in a separate room and preferably must be stored in an outside building detached from the water treatment facility." Prop. 604 at 79; *see* Recommended Standards § 5.4.3.a.1; SR at 45.

Subsection (2). IEPA proposed that "[t]he storage structures must be constructed of noncombustible materials." Prop. 604 at 79; *see* Recommended Standards § 5.4.3.a.2; SR at 45.

Subsection (3). IEPA proposed that "[t]he storage room must be available to keep the sodium chlorite area cool enough to prevent heat induced explosive decomposition of the chlorite." Prop. 604 at 79; *see* Recommended Standards § 5.4.3.a.3; SR at 45.

Subsection (b). IEPA proposed that "[p]rovisions for the clean-up of any sodium chlorite release must be included in the facilities emergency operation plan specified in Section 604.150." Prop. 604 at 79; *see* Recommended Standards § 5.4.3.b; SR at 45.

Subsection (c). Under the heading "Feeders," subsection (1) proposes that "[p]ositive displacement feeders must be provided." Prop. 604 at 79; *see* Recommended Standards § 5.4.3.c.1; SR at 45. Subsection (2) proposes that "[t]ubing for conveying sodium chlorite or chlorine dioxide solutions must be Type 1 PVC, polyethylene or materials recommended by the manufacturer." Prop. 604 at 79; *see* Recommended Standards § 5.4.3.c.2; SR at 45. Subsection (3) proposes that "[c]heck valves must be provided to prevent the backflow of chlorine into the sodium chlorite line." Prop. 604 at 79; *see* Recommended Standards § 5.4.3.c.5; SR at 45.

Section 604.1135: Sodium Hypochlorite. Storing sodium hypochlorite out of the sun and in cooler temperatures minimizes decomposition. SR at 45. IEPA added that venting a bulk tank of sodium hypochlorite out of the building protects operating personnel. *Id*. at 45-46.

IEPA proposed that "[s]torage of sodium hypochlorite must be: protected from excess temperatures; sited out of the sunlight in a cool area; and must be vented to the outside of the building." Prop. 604 at 79-80 (subsections (a) – (c)); *see* Recommended Standards § 5.4.4.a.2; SR at 45-46.

Section 604.1140: Ammonia.

Subsection (a). IEPA proposes that "[a]mmonia for chloramine formation may be added to water either as a water solution of ammonium sulfate, or as aqua ammonia (ammonia gas in water solution), or as anhydrous ammonia (purified 100% ammonia in liquid or gaseous form)." Prop. 640 at 80; *see* Recommended Standards § 5.4.5; SR at 46. Subsequent subsections propose specific requirements for each of these forms. Prop. 604 at 80-81.

Subsection (b). IEPA placed these requirements under the heading "Ammonium sulfate."

Subsection (b)(1). IEPA proposed that "[t]he water solution made by addition of ammonium sulfate solid to water must include agitation. Provision should be made for removal of the agitator after dissolving the solid." Prop. 604 at 80; *see* Recommended Standards § 5.4.5.1; SR at 46.

Capt. Curry cited numerous plants at which the agitator remains in the tank without resulting in any problems. Curry Test. at 35. He questioned whether there is any reason to remove the agitator after mixing each batch of the ammonium sulfate solution. *Id*. He recommended striking the second sentence of IEPA's proposed subsection (b)(1). *Id*.

IEPA "concurs with this recommendation" (Curry Resp. at 14), which is reflected in the Board's order.

Subsection (b)(2). IEPA proposed that "[t]he tank and dosing equipment contact surfaces shall be made of corrosion resistant non-metallic materials." Prop. 604 at 80; *see* Recommended Standards § 5.4.5.1; SR at 46.

Capt. Curry argued that "[u]se of stainless steel mixer shafts and propellers is considered to be common practice." Curry Test. at 35. He suggested a subsection (b)(3) adding this requirement to IEPA's proposal. *Id*.

IEPA responded by proposing a subsection (b)(3) providing that "[t]he submerged portion of the mixer shaft and propeller shall be made of 304 or 316 stainless steel that is resistant to corrosion by ammonium sulfate solution," (Curry Resp. at 14), and the Board's order reflects this addition.

Subsection (c). IEPA placed these requirements under the heading "Aqua ammonia (ammonium hydroxide)."

Subsection (c)(1). IEPA proposed that "[a]qua ammonia feed pumps and storage must be enclosed and separated from other operating areas." Prop. 604 at 80; *see* Recommended Standards § 5.4.5.2; SR at 46.

Subsection (c)(2). IEPA proposed that the aqua ammonia room must be equipped as required in Section 604.1115 with five changes. Subsection (A) proposes that "[a] corrosion resistant, closed, unpressurized tank must be used for bulk storage, vented through an inert liquid trap to a high point outside." Prop. 604 at 80; *see* Recommended Standards § 5.4.5.2.a.

Subsection (B) proposes that "[t]he bulk liquid storage tank must be protected from excessive heat to prevent ammonia vaporization." Prop. 604 at 80; *see* Recommended Standards § 5.4.5.2.c. Subsection (C) proposes that "[a]n exhaust fan must be installed to withdraw air from high points in the room and makeup air must be allowed to enter at a low point." Prop. 604 at 80; *see* Recommended Standards § 5.4.5.2.d.

Subsection (D) proposes that "[t]he aqua ammonia feed pump, regulators, and lines must be fitted with pressure relief vents discharging outside the building away from any air intake and with water purge lines leading back to the headspace of the bulk storage tank." Prop. 604 at 80; *see* Recommended Standards § 5.4.5.2.e. Subsection (E) proposes that "[t]he aqua ammonia must be conveyed direct from storage to the treated water stream injector without the use of a carrier water stream unless the carrier stream is softened." Prop. 604 at 81; *see* Recommended Standards § 5.4.5.2.f.

Subsection (d). Anhydrous ammonia is available as liquefied gas at moderate pressure in cylinders or as a cryogenic liquid. "The liquid causes severe burns on skin contact." Recommended Standards § 5.4.5.3.

Subsection (d)(1). Under the heading "Anhydrous Ammonia," IEPA proposed that "anhydrous ammonia and storage feed systems (including heaters where provided) must be enclosed and separated from other works areas and constructed of corrosion resistant materials." Prop. 604 at 81; *see* Recommended Standards § 5.4.5.3.a; SR at 46.

Subsection (d)(2). IEPA proposed that "[a]ny pressurized ammonia feed lines outside the ammonia room must be installed in air tight conduit." Prop. 604 at 81; *see* Recommended Standards § 5.4.5.3.b; SR at 46.

Subsection (d)(3). IEPA proposed that "[a]n exhaust fan must be installed to withdraw air from high points in the room and makeup air must be allowed to enter at a low point." Prop. 604 at 81; *see* Recommended Standards § 5.4.5.3.c; SR at 46.

Subsection (d)(4). IEPA proposed that "[l]eak detection systems must be installed, operated and maintained in each area through which ammonia is piped." Prop. 604 at 81; *see* Recommended Standards § 5.4.5.3.d; SR at 46.

Subsection (d)(5). IEPA proposed that "[s]pecial breaker/regulator provisions must be installed to prevent backflow of water into cylinders or storage tanks." Prop. 604 at 81; *see* Recommended Standards § 5.4.5.3.e; SR at 46.

Subsection (d)(6). IEPA proposed that "[c]arrier water systems where provided to convey anhydrous ammonia to the injection point shall use softened water." Prop. 604 at 81; *see* Recommended Standards § 5.4.5.3.f; SR at 46.

Subsection (d)(7). IEPA proposed that "[p]rovisions must be made to chemically neutralize anhydrous ammonia where feed and/or storage is located near residential or developed

areas in the event of any anhydrous ammonia release." Prop. 604 at 81; *see* Recommended Standards § 5.4.5.3.i; SR at 46.

Section 604.1145: Potassium Permanganate. Community water supplies use potassium permanganate to oxidize chemicals in water and form a precipitate. SR at 46.

Subsection (a). IEPA proposed that "[a] source of heated water should be available for dissolving potassium permanganate." Prop. 604 at 81; *see* Recommended Standards § 5.4.6.a; SR at 46.

CLCJAWA commented that this proposed subsection effectively requires a water heater regardless of the source temperature. PC 8 at 3. CLCJAWA suggested revising the subsection to require that "[s]ource water temperature shall be sufficient to dissolve potassium permanganate." *Id*.

Capt. Curry cited his experience with "numerous potassium permanganate feed systems that have successfully operated without using heated water for dissolving potassium permanganate." Curry Test. at 35. He argued that, "if potassium permanganate is batched at solution strength compatible with the solubility at the temperature of water being used, and taking into account the temperature in the feed line environment, the potassium permanganate remains in solution (dissolved)." *Id*. He suggested that clogged feed lines have resulted from adding an amount of potassium permanganate that exceeded the solubility of the water based on temperature or from using the "free-flowing" grade instead of "technical" grade material. *Id*. In addition, Capt. Curry questioned whether IEPA's proposal considered the use of dry feeders by a number of larger plants. *Id*.

IEPA "concurs with this recommendation" and revised subsection (a) as follows:

> Potassium permanganate may be fed with gravimetric feeders or from batched solutions fed from day tanks. For batched solutions:
>
> a) the potassium permanganate added cannot exceed the solubility limits based on temperature; and~~A source of heated water should be available for dissolving potassium permanganate.~~ Curry Resp. at 15; Resp. 7-8 at 8.

The Board's order reflects this revision.

Subsection (b). IEPA proposed that "mechanical mixers shall be provided." Prop. 604 at 81; *see* Recommended Standards § 5.4.6.b; SR at 46.

Section 604.1150: Fluoride.

Subsection (a). Section 611.125 of the Board's rules requires that "[a]ll CWSs that are required to add fluoride to the water must maintain a fluoride ion concentration, reported as F, of 0.7 mg/L in its distribution system. 35 Ill. Adm. Code 611.125 (effective Nov. 9, 2015); *see* SR

at 46. Section 653.701(b) of IEPA's rules requires that fluoridation equipment must "have the capacity to maintain the fluoride content in the finished water between 0.9 and 1.2 mg/L." 35 Ill. Adm. Code 653.701(b).

With the heading "Basis of Design," IEPA proposed to update subsection (a) to provide that "[e]quipment shall have the capacity to maintain the fluoride content in the finished water at 0.7 mg/L." Prop. 604 at 81; *see* SR at 46.

CWLP questioned whether this proposed requirement is technically feasible. CWLP asked whether it is "physically or scientifically possible for any equipment to maintain a fluoride level of precisely 0.7 mg/l at all times." CWLP Questions at 3-4 (Question 13). Finally, CWLP asked IEPA why it had not proposed a range of values such as that found in 35 Ill. Adm. Code 653.701(b). CWLP Questions at 3 (Question 14).

IEPA responded that its proposal reflects state law requiring "that the owners or official custodians of public water supplies follow the recommendations on optimal fluoridation for community water levels as proposed and adopted by the U.S. Department of Health and Human Services and the Centers for Disease Control and Prevention" and IEPA and Board rules. IEPA Resp. at 40, citing 415 ILCS 40/7a (2016) (Public Water Supply Regulation Act); *see* Public Act 97-43, eff. June 28, 2011; Tr.1 at 64. The Public Water Supply Regulation Act no longer states this requirement as a range, and Section 611.125 requires a concentration of 0.7 mg/L. IEPA Resp. at 40; *see* Tr.1 at 64.

Subsection (b). IEPA placed these requirements under the heading "Chemical feed equipment."

Subsection (b)(1). IEPA proposed that "[a] free chlorine residual of 10 mg/L shall be maintained in solutions prepared from dry chemicals. This chlorine residual shall not replace the chlorination requirement of Section 604.725." Prop. 604 at 81; *see* 35 Ill. Adm. Code 653.701(d)(5); SR at 46.

Subsection (b)(2). IEPA proposed that "[c]hlorine shall not be added to hydrofluosilicic acid solutions." Prop. 604 at 82; *see* 35 Ill. Adm. Code 653.701(d)(6); SR at 46.

CLCJAWA commented that the term "hydrofluosilicic acid" is no longer widely used. PC 8 at 3. It stated that the CDC and NSF as well as some suppliers use the term "fluorosilicic acid." *Id*. CLCJAWA suggested clarifying this proposed subsection by providing alternate names. *Id*. IEPA responds that it "does not oppose this suggestion," (Resp. 7-8 at 8), and the Board's order reflects this revision

Subsection (b)(3). IEPA proposed that "[a]t least two diaphragm operated anti-siphon devices shall be provided on all fluoride saturator or flurosilicic acid feed systems." Prop. 604 at 82; *see* Recommended Standards § 5.4.7.b.1; SR at 46. Subsection (A) proposes that "[o]ne diaphragm operated anti-siphon device shall be located on the discharge side of the feed pump." Prop. 604 at 82; *see* Recommended Standard § 5.4.7.b.1.a.

Subsection (B) proposes that "[a] second diaphragm operated anti-siphon device shall be located at the point of application unless a suitable air gap is provided." Prop. 604 at 82; *see* Recommended Standard § 5.4.7.b.1.b.; SR at 46. Because IEPA proposed an exception to providing a second device, the Board struck "at least two" from subsection (b)(3) and proposes providing these devices "as follows."

Subsection (c). IEPA placed these requirements under the heading "Chemical feed methods."

Subsection (c)(1). IEPA proposed that "[f]luoride compound shall not be added before lime-softening or ion exchange softening." Prop. 604 at 82; *see* Recommended Standards § 5.4.7.b.5; SR at 46.

Capt. Curry testified that "[c]oagulant chemicals used for lime softening and/or turbidity removal may reduce the concentration of fluoride." Curry Test. at 36. He argued that PWSs should avoid chemical interference in order to produce the required fluoride concentration. *Id*. He suggested revising IEPA's proposed subsection (c)(1). *Id*.

IEPA "concurs with this recommendation" and revises subsection (c)(1) as follows: Fluoride compound shall not be added prior to filters at plants that lime soften or coagulate for turbidity removal, and shall not be added prior to ~~before lime sods softening or~~ ion exchange softeners." *Id*. The Board's order reflects this revision.

Subsection (c)(2). IEPA proposed that "[t]he point of application if into a horizontal pipe, shall be in the lower half of the pipe, preferably at a 45 degree angle from the bottom of the pipe and protrude into the pipe one third of the pipe diameter." Prop. 604 at 82; *see* Recommended Standards § 5.4.7.b.6; SR at 46.

Subsection (c)(3). IEPA proposed that "[w]ater used for sodium fluoride dissolution shall be softened if hardness exceeds 75 mg/L as calcium carbonate." Prop. 604 at 82; *see* Recommended Standards § 5.4.7.b.8; SR at 46.

Subsection (c)(4). IEPA proposed that "[s]aturators shall be provided with a meter and backflow protection on the makeup water line." Prop. 604 at 82; *see* Recommended Standards § 5.4.7.b.11; SR at 46.

Subsection (d). Under the heading "Secondary controls," IEPA proposed that "systems for fluoride chemical feed devices shall be provided as a means of reducing the possibility for overfeed. These may include flow or pressure switches, break boxes, or other devices." Prop. 604 at 82; Recommended Standards § 5.4.7.c; SR at 46-47.

Subsection (e). IEPA proposes that "[s]amples shall be submitted monthly to a certified laboratory to determine compliance with 35 Ill. Adm. Code 611.125 [Fluoridation Requirement]." Prop. 604 at 82; *see* 35 Ill. Adm. Code 653.703(a) (Fluoride Sampling); SR at 47.

Subpart L: Pumping Facilities

Section 653.107 of IEPA's regulations addresses booster pumps but does not generally address pumping facilities. SR at 47; *see* 35 Ill. Adm. Code 653.107. IEPA based this subpart on Part 6 of the Recommended Standards. SR at 47; *see* Recommended Standards §§ 6.0 -6.6 (Pumping Facilities).

Section 604.1200: General. IEPA proposed that "[p]umping facilities must be designed to maintain the sanitary quality of pumped water." Prop. 604 at 82; *see* Johnson Test. at 3; Recommended Standards § 6.0; SR at 47. IEPA stated that its proposed location requirements at Section 604.110 and proposed security requirements at Section 604.170 both apply to pumping facilities. SR at 47; *see* Prop. 604 at 6, 15. IEPA argued that these requirements help to ensure water quality. SR at 47.

The Board asked IEPA to clarify whether the term "sanitary quality of pumped water" means the quality of either raw water or finished water. Board Questions at 15. If so, the Board asked whether it would be acceptable to amend this section to provide that "[p]umping facilities must be designed to maintain the ~~sanitary~~ quality of pumped water." *Id*. IEPA "has no objection to this proposal" (IEPA Resp. at 24), and the Board's order reflects this revision.

Section 604.1205: Pumping Stations.

Subsection (a). IEPA proposed that both raw and finished water-pumping station must meet a number of requirements.

Subsection (a)(1). IEPA proposes that stations must "have adequate space for the installation of additional units if needed, and for the safe servicing of all equipment." Prop. 604 at 82; *see* Johnson Test. at 3; Recommended Standards § 6.2.a; SR at 47.

Subsection (a)(2). IEPA proposed that the stations must "be of durable construction, fire and weather resistant and with outward opening doors." Prop. 604 at 83; *see* Johnson Test. at 3; Recommended Standards § 6.2.b; SR at 47.

Subsection (a)(3). IEPA proposed that the stations "must not create a confined space." Prop. 604 at 83; *see* SR at 47. Mr. Johnson testified that this requirement promotes operator safety. Johnson Test. at 3.

Subsection (a)(4). IEPA proposed that the stations must "have floors that slope to a suitable drain." Prop. 604 at 83; *see* Johnson Test. at 3; Recommended Standards § 6.2.e; SR at 47.

Subsection (a)(5). IEPA proposed that the stations must "provide a suitable outlet for drainage from pump glands without discharging onto the floor." Prop. 604 at 83; *see* Johnson Test. at 3; Recommended Standards § 6.2.f; SR at 47.

Subsection (b). IEPA proposed that suction wells must "be watertight; have floors sloped to permit removal of water and settled solids; be covered or otherwise protected against contamination; and have two pumping compartments or other means to allow the suction well to be taken out of service for inspection, maintenance, or repair." Prop. 604 at 83 (subsections (1) – (4)); *see* Recommended Standards § 6.2.1; SR at 47-48.

Subsection (c). IEPA placed these requirements under the heading "Equipment servicing."

Subsection (c)(1). IEPA proposed that pump stations must be provided with "crane-ways, hoist beams, eyebolts, or other adequate facilities for servicing or removal of pumps, motors or other heavy equipment." Prop. 604 at 83; *see* Recommended Standards § 6.2.2.a; SR at 48.

Subsection (c)(2). IEPA proposed that the stations must be provided with "openings in floors, roofs or wherever else needed for removal of heavy or bulky equipment. Prop. 604 at 83; *see* Recommended Standards § 6.2.2.b; SR at 48.

Subsection (d). IEPA proposed that "[p]rovisions shall be made for adequate heating for the safe and efficient operation of the equipment." Prop. 604 at 83; *see* Recommended Standards § 6.2.4.b; SR at 48.

The Board asked IEPA to comment on how it intends to determine that "adequate heating" is provided. Board Questions at 15. IEPA responded that the term refers to preventing treatment plant fixtures from freezing. IEPA Resp. at 24.

Subsection (e). IEPA placed these requirements under the heading "Ventilation."

Subsection (e)(1). IEPA proposed that "[a]dequate ventilation shall be provided for all pumping stations." Prop. 604 at 83; *see* Johnson Test. at 3; Recommended Standards § 6.2.5; SR at 48.

The Board asked IEPA to comment on how it intends to determine that "adequate ventilation" is provided. Board Questions at 15. IEPA responded that the term refers to preventing condensation in the plant. IEPA Resp. at 24.

Subsection (e)(2). IEPA proposed that "[f]orced ventilation of at least six changes of air per hour shall be provided for: all rooms, compartments, pits and other enclosures below ground floor; or any area where unsafe atmosphere may develop or where excessive heat may be built up." Prop. 604 at 83; *see* Johnson Test. at 3; Recommended Standards § 6.2.5; SR at 48.

Subsection (f). IEPA proposed that "[d]ehumidification shall be provided in areas where excess moisture could cause hazards for operator safety, or damage to equipment." Prop. 604 at 84; *see* Recommended Standards § 6.2.6; SR at 48.

Section 604.1210: Pumps.

Subsection (a). IEPA proposed that "[a]t least two pumping units must be provided for all pump stations." Prop. 604 at 84; *see* Recommended Standards § 6.3; SR at 48.

Subsection (b). IEPA proposed that, "[w]ith any pump out of service, the remaining pump or pumps must be capable of providing the maximum demand of the community water supply." Prop. 604 at 84; *see* Recommended Standards § 6.3; SR at 48.

The Board asked IEPA to clarify whether, when a pump is out of service, the remaining pump or pumps must be capable of meeting the "maximum daily demand" rather than "maximum demand." Board Questions at 16. IEPA responded that, since 35 Ill. Adm. Code 601.105 defines both terms the same way, it proposes either term in this provision. IEPA Resp. at 24; *see* Prop. 601 at 5.

Subsection (c). IEPA proposed that "'[t]he pumping units must be provided with readily available spare parts and tools." Prop. 604 at 84; Recommended Standards § 6.3.c; SR at 48.

Subsection (d). IEPA placed these requirement under the heading "Suction Lifts."

Subsection (d)(1). IEPA proposed that "[s]uction lifts must be avoided if possible." Prop. 604 at 84; *see* Recommended Standards § 6.3.1.a; SR at 48.

Subsection (d)(2). IEPA proposed that "[s]uction lifts must be less than 15 feet." Prop. 604 at 84; *see* Recommended Standards § 6.3.1.b; SR at 48.

Subsection (d)(3). IEPA proposed that, "[i]f suction lift is necessary, provisions shall be made for priming the pumps." Prop. 604 at 84; Recommended Standards § 6.3.1; SR at 48. Subsection (A) proposes that "prime water must not be of lesser quality than that of the water being pumped." Prop. 604 at 84; *see* Recommended Standards § 6.3.2; SR at 48. Subsection (B) proposes that "means shall be provided to prevent either backsiphonage or back flow." Prop. 604 at 84; *see* Recommended Standards § 6.3.2; SR at 48. Subsection (C) proposes that "vacuum priming may be used." Prop. 604 at 84; *see* Recommended Standards § 6.3.2; SR at 48.

Subsection (e). IEPA proposed that "[p]umps taking suction from ground storage tanks shall be equipped with automatic shutoffs or low pressure controllers as recommended by the pump manufacturer." Prop. 604 at 84; *see* Recommended Standards § 6.4.c; SR at 48. IEPA stated that automatic shutoff intends "to prevent the pump from breaking suction should the ground storage become empty." SR at 48.

CLCJAWA commented that a reference in Section 604.135(c)(3) to water pressure "in any portion of the distribution system" should exempt "pump and delivery station yard piping." PC 8 at 1. IEPA did not believe this exemption was necessary but revised this section as follows: "Pumps taking suction from ground storage tanks shall be provided adequate net positive suction head, but the minimum distribution pressure of 20 psi is not required. The

pumps shall be equipped with automatic shutoffs or low pressure controllers as recommended by the pump manufacturer." Resp. 7-8 at 5. The Board's order reflects this revision.

Section 604.1215: Booster Pumps. Mr. Johnson testified that boosters pump water directly from water mains to other areas of the distribution system. Johnson Test. at 3. Booster stations increase water supply and water pressure to downstream customers. *Id*.

Subsection (a). IEPA proposed that "[e]ach booster pumping station must contain not less than two pumps with capacities such that demand can be satisfied with the largest pump out of service." Prop. 604 at 84; *see* Recommended Standards § 6.4.1; SR at 49.

The Board asked IEPA to clarify whether, when the largest pump is out of service, the remaining pump or pumps must be capable of meeting the "maximum daily demand" rather than "demand." Board Questions at 16. IEPA responded by proposing the following revision: "[e]ach booster pumping station must contain not less than two pumps with capacities such that maximum demand can be satisfied with the largest pump out of service." IEPA Resp. at 24. The Board's order reflects this revision.

Subsection (b). IEPA proposed that "[c]onstruction must conform to Section 604.150 [Protection of Community Water Supply Structures]." Prop. 604 at 85; *see* 35 Ill. Adm. Code 653.107(a); SR at 48; Prop. 604 at 13-14 (setbacks).

Subsection (c). IEPA proposed that "[a]utomatic control equipment must be installed to prevent the pump from causing a vacuum and/or lowering water pressure in any part of the distribution system to less than 20 psi as measured at ground surface." Prop. 604 at 84; *see* 35 Ill. Adm. Code 653.107(b); SR at 48.

Subsection (d). IEPA proposed that "[a]utomatic or remote control devices must have a range between the start and cutoff pressure which will prevent excessive cycling." Prop. 604 at 84; *see* Recommended Standards § 6.4.d; SR at 49.

Subsection (e). IEPA proposed that "[b]ooster pumps shall have the ability to be bypassed." Prop. 604 at 85; *see* Recommended Standards § 6.4.e; SR at 49.

Subsection (f). IEPA proposed that "[p]ressure for portions of a distribution system served by a booster pump station as required by Section 604.1415 [System Design] must be provided during periods when the booster station is not in operation." Prop. 604 at 85; *see* 35 Ill. Adm. Code 653.107(c); Johnson Test. at 3; SR at 48.

Subsection (g). IEPA proposed that "[o]ne of the following must be installed if adequate pressure will not be available in any part of the system: hydropneumatic storage designed in accordance with Section 604.1345 on the discharge side of the booster pump station; or elevated storage." Prop. 604 at 85 (subsections (1) and (2)); *see* 35 Ill. Adm. Code 653.107(d); SR at 48.

Subsection (h). IEPA proposed that "[a]ll booster pumping stations must be fitted with a flow rate indicating and totalizer meter." Prop. 604 at 85; *see* Recommended Standards § 6.4.2.

Section 604.1220: Automatic and Remote Controlled Stations.

Subsection (a). IEPA proposed that "[a]ll remote controlled pumping facilities shall be electrically operated and controlled and shall have signaling apparatus of proven performance." Prop. 604 at 85; *see* Recommended Standards § 6.5; SR at 49.

Subsection (b). IEPA proposed that "[a]ll automatic pumping facilities must be provided with automatic signaling apparatus which will report when the station is out of service, unless otherwise approved by the Agency pursuant to Section 604.145(b)." Prop. 604 at 85; *see* Recommended Standards § 6.5; SR at 49.

Section 604.1225: Appurtenances.

Subsection (a). IEPA proposed requirements under the heading "Valves."

Subsection (a)(1). IEPA proposed that "[e]ach pump must have an isolation valve on the inlet and discharge side of the pump to permit satisfactory operation, maintenance and repair of the equipment." Prop. 604 at 85; *see* Recommended Standards § 6.6.1; SR at 49.

Subsection (a)(2). IEPA proposed that "[e]ach pump must have a positive acting check valve on the discharge side between the pump and the shut off valve." *Id*.

Subsection (a)(3). IEPA proposed that "[s]urge relief valves or slow acting check valves must be designed to minimize hydraulic transients." *Id*.

Subsection (b). IEPA proposed requirements for piping.

Subsection (b)(1). IEPA proposed that piping must "be designed so that the friction losses will be minimized." Prop. 604 at 85; *see* Recommended Standards § 6.6.2.a; SR at 49.

Subsection (b)(2). IEPA proposed that piping must "have watertight joints." Prop. 604 at 85; *see* Recommended Standards § 6.6.2.c; SR at 49.

Subsection (b)(3). IEPA proposed that piping must "be protected against surge or water hammer and provided with suitable restraints where necessary." Prop. 604 at 86; *see* Recommended Standards § 6.6.2.d; SR at 49.

Subsection (b)(4). IEPA proposed that piping must "be designed such that each pump has an individual suction line or that the lines must be so manifolded that they will insure similar hydraulic and operating conditions." Prop. 604 at 86; *see* Recommended Standards § 6.6.2.e; SR at 49.

Subsection (c). The Board addresses gauges and meters above under "Disputed Issues." *See supra* at 27-28.

Subsection (d). IEPA placed these requirements under the heading "Water seals."

Subsection (d)(1). IEPA proposed that "[w]ater seals must not be supplied with water of a lesser quality than that of the water being pumped." Prop. 604 at 86; *see* Recommended Standards § 6.6.4; SR at 49.

Subsection (d)(2). IEPA proposed that, "[w]here pumps are sealed with potable water and are pumping water of lesser sanitary quality, the seal must: be provided with either an approved reduced pressure principle backflow preventer or a break tank open to atmospheric pressure; and where a break tank is provided, have an air gap as defined in 35 Ill. Adm. Code 601.105. Prop. 604 at 86 (subsections (A) and (B)); *see* Recommended Standards § 6.6.4; SR at 49.

Subsection (e). IEPA placed these requirements under the heading "Controls."

Subsection (e)(1). IEPA proposed that "[p]umps, their prime mover and accessories, must be controlled in such a manner that they will operate at rated capacity without dangerous overload." Prop. 604 at 86; *see* Recommended Standards § 6.6.5; SR at 49.

The Board asked IEPA to clarify the operational level above rated capacity that would be considered "dangerous overload." Board Questions at 16. The Board asked whether it would be possible to include such a level in the regulations. *Id*. IEPA responded by proposing to strike the term "dangerous" (IEPA Resp. at 24), and Board's order reflects this revision.

Subsection (e)(2). IEPA proposed that "[p]rovisions must be made to prevent energizing the motor in the event of a backspin cycle." Prop. 604 at 87; *see* Recommended Standards § 6.6.5; SR at 49.

Subsection (e)(3). IEPA proposed requirements for locating electrical controls, which the Board addresses above under "Disputed Issues." *See supra* at 28.

Subsection (e)(4). IEPA proposed that "[e]quipment must be provided or other arrangements made to prevent surge pressures from activating controls which switch on pumps or activate other equipment outside the normal design cycle of operation. *Id*.

Subsection (f). Under the heading "Lubrication," IEPA proposed in subsection (f)(1) that, "[w]hen automatic pre-lubrication of pump bearings is necessary and an auxiliary power supply is provided, design shall assure that pre-lubrication is provided when auxiliary power is in use, or the bearings can be lubricated manually before the pump is started." Prop. 604 at 87; *see* Recommended Standards § 6.6.7; SR at 49. Subsection (f)(2) proposes that "[a]ll lubricants which come in to contact with the potable water shall comply with Section 604.105(f). Prop. 604 at 87; *see* Recommended Standards § 6.6.8; SR at 49.

Subpart M: Storage

Having sufficient storage capacity allows a community water supply to accomplish important purposes: maintain water pressure; meet demand when it exceeds pumping capacity during periods of peak use; maintain supply when performing maintenance on its facilities; and ensure adequate supplies for fire protection. SR at 49-50. In Subpart M, IEPA proposes design requirements for all types of storage: ground, elevated, and hydropneumatic. SR at 50; *see* Johnson Test. at 3-4.

Section 604.1300: General Storage Requirements. IEPA proposes general requirements applicable, unless otherwise indicated, to all types of storage. SR at 50.

Subsection (a). IEPA proposed that "[s]torage facilities shall have sufficient capacity to meet domestic demands, and where fire protection is provided, fire flow demands. Prop. 604 at 87; *see* Recommended Standards § 7.0.1; SR at 50.

Subsection (b). IEPA proposed that "[e]xcessive storage capacity shall be avoided to prevent potential water quality deterioration problems and freezing." Prop. 604 at 87; *see* Recommended Standards § 7.0.1.b; SR at 50.

Subsection (c). IEPA proposed that "[t]he material used in the construction of water storage structures must be approved by the Agency, pursuant to Section 602.105 [Standards for Issuance]. Porous materials, including but not limited to wood and concrete block, are not acceptable." Prop. 604 at 87; Recommended Standards § 7.0.11; SR at 50.

Subsection (d). IEPA placed these requirements under the heading "Storage Structure Drainage."

Subsection (d)(1). IEPA proposed that "[s]torage structures must be designed so they can be isolated to prevent loss of pressure in the distribution system when maintenance or cleaning occurs." Prop. 604 at 87; *see* Recommended Standards §§ 7.0.5, 7.3.2; SR at 50.

Subsection (d)(2). IEPA proposed that "[e]ach elevated storage tank must have a hydrant or other means to drain for repair, maintenance or cleaning." Prop. 604 at 87.

Subsection (d)(3). IEPA proposed that "[t]he storage structure drain must discharge to the ground surface with no direct connection to a sewer or storm drain." Prop. 604 at 87; *see* Recommended Standards §§ 7.0.5, 7.3.2; SR at 50.

Subsection (e). IEPA proposed that "[t]he bottom of a water storage structure must be placed above the groundwater table, preferably above grade. At least 50 percent of the water depth shall be above grade." Prop. 604 at 88; *see* Recommended Standards § 7.0.2.a; SR at 50.

Subsection (f). IEPA proposed that "[f]inished water storage must be designed to facilitate turnover of water to avoid stagnation." Prop. 604 at 88; *see* Recommended Standards § 7.0.6 (Stored Water Age); SR at 50.

Subsection (g). IEPA placed these requirements under the heading "Freezing."

Subsection (g)(1). IEPA proposed that "[f]inished water storage structures and their appurtenances, including the riser pipes, overflows, and vents, must be designed to prevent freezing." Prop. 604 at 88; *see* Recommended Standards § 7.0.13; SR at 50.

Subsection (g)(2). IEPA proposed that "[e]quipment used for freeze protection that will come into contact with the potable water must comply with Section 604.105(f)." *Id*.

Subsection (h). IEPA proposed that "[t]he discharge pipes from water storage structures must be located to prevent the flow of sediment into the distribution system." Prop. 604 at 88; *see* Recommended Standards § 7.0.15; SR at 50.

Subsection (i). IEPA proposed that "[t]he area surrounding a ground level structure must be graded to prevent surface water from standing within 50 feet." Prop. 604 at 88; *see* Recommended Standards § 7.0.16; SR at 50.

Subsection (j). IEPA proposed that "[m]inimum distances from sources of contamination for below ground storage reservoirs shall be maintained as specified in Section 604.150(a)." Prop. 604 at 88; *see* Recommended Standards § 7.0.2.a; SR at 50.

Subsection (k). IEPA proposed that "[a] smooth-nosed sampling tap must be provided to facilitate collection of water samples for both bacteriological and chemical analyses." Prop. 604 at 88; *see* Recommended Standards § 7.0.19; SR at 50.

Section 604.1305: Overflow.

Subsection (a). IEPA proposed that "[a]ll water storage structures must be provided with an overflow which is brought down to an elevation between 12 and 24 inches above the ground surface, and discharges over a drainage inlet structure or a splash plate." Prop. 604 at 88; *see* Recommended Standards § 7.0.7; SR at 51.

Subsection (b). IEPA proposed that "[n]o overflow may be connected directly to a sewer or storm drain." Prop. 604 at 88; *see* Recommended Standards § 7.0.7; SR at 51.

Subsection (c). IEPA proposed that "[a]ll overflow pipes must be located so that any discharge is visible." Prop. 604 at 88; *see* Recommended Standards § 7.0.7; SR at 51.

Subsection (d). IEPA proposed that "[o]verflow for a ground level storage reservoir must meet the following requirements: open downward and be screened with twenty four mesh non-corrodible screen; [and] when a flapper or duckbill valve is used, a screen shall be provided inside the pipe." Prop. 604 at 88 (subsections (1) and (2)); *see* Recommended Standards § 7.0.7.b; SR at 51.

Subsection (e). IEPA proposed that "[o]verflow for an elevated tank must: open downward and be screened with a four mesh, non-corrodible screen or mechanical device; [and]

when a flapper or duckbill valve is used, a screen shall be provided inside the pipe." Prop. 604 at 89; *see* Recommended Standards § 7.0.7.c; SR at 51.

Subsection (f). IEPA proposed that "the overflow pipe must be of sufficient diameter to permit waste of water in excess of the filling rate." Prop. 604 at 89; *see* Recommended Standards § 7.0.7.d; SR at 51.

Section 604.1310: Access to Water Storage Structures.

Subsection (a). IEPA proposed that "[f]inished water storage structures must be designed with access to the interior for cleaning and maintenance." Prop. 604 at 89; *see* Recommended Standards § 7.0.8; SR at 51.

Subsection (b). IEPA proposed that "[a]t least two manholes must be provided above the waterline at each water compartment where space permits." Prop. 604 at 89; *see* Recommended Standards § 7.0.8; SR at 51.

The Board asked IEPA to comment on how often it expects space not to permit these manholes. Board Questions at 16. IEPA responded that it expects this "to be the exception not the rule." IEPA Resp. at 25. IEPA added that its proposal follows the Recommended Standards. *Id*., citing Recommended Standards § 7.0.8 (Access).

Subsection (c). IEPA proposed requirements for elevated storage structures.

Subsection (c)(1). IEPA proposed that "[a]t least one of the access manholes must be framed at least four inches above the surface of the roof at the opening, must be fitted with a solid water tight cover which overlaps the framed opening and extends down around the frame at least two inches, must be hinged on one side, and must have a locking device." Prop. 604 at 89; *see* Recommended Standards § 7.0.8.1.a; SR at 51.

Subsection (c)(2). IEPA proposed that "[a]ll other manholes or access ways not conforming to subsection (c)(1) must be bolted and gasketed so that they are water tight." Prop. 604 at 89; *see* Recommended Standards § 7.0.8.1.b; SR at 51.

Subsection (d). IEPA proposed requirements for ground level or flat roof structures.

Subsection (d)(1). IEPA proposed that "[e]ach manhole must be elevated at least 24 inches above the top of the tank or covering sod, whichever is higher." Prop. 604 at 89; *see* Recommended Standards § 7.0.8.2.a; SR at 51.

Subsection (d)(2). IEPA proposed that "[e]ach manhole must be fitted with a solid water tight cover which overlaps a framed opening and extends down around the frame at least two inches." Prop. 604 at 89; *see* Recommended Standards § 7.0.8.2.b; SR at 51.

Subsection (d)(3). IEPA proposed that "[t]he frame must be at least four inches high." Prop. 604 at 89; *see* Recommended Standards § 7.0.8.2.b; SR at 51.

Subsection (d)(4). IEPA proposed that "[e]ach cover must be hinged on one side, and must have a locking device." Prop. 604 at 89; *see* Recommended Standards § 7.0.8.2.b; SR at 51.

Section 604.1315: Vents. Without proper venting, the roof of a tank could collapse when water is being removed. SR at 51.

Subsection (a). IEPA proposed that "[a]ll finished water storage tanks must have vents." SR at 51; *see* Prop. 604 at 89; Recommended Standards § 7.0.9.

Subsection (a)(1). IEPA proposed that "the overflow pipe must not be considered a vent." Prop. 604 at 90; *see* Recommended Standards § 7.0.9; SR at 51.

Subsection (a)(2). IEPA proposed that "open construction between the sidewall and roof is not permissible." *Id*.

Subsection (b). IEPA proposed requirements for vents.

Subsection (b)(1). IEPA proposed that vents must "prevent the entrance of surface water and rainwater." Prop. 604 at 90; *see* Recommended Standards § 7.0.9.a; SR at 51.

Subsection (b)(2). IEPA proposed that vents must "exclude birds and animals." Prop. 604 at 90; *see* Recommended Standards § 7.0.9.b; SR at 51.

Subsection (b)(3). IEPA proposed that vents must "exclude insects and dust to the extent practicable." Prop. 604 at 90; *see* Recommended Standards § 7.0.9.c; SR at 51.

Subsection (b)(4). IEPA proposed that vents on ground level structures must "open downward with the opening at least 24 inches above the roof or sod and covered with twenty four mesh non-corrodible screen." Prop. 604 at 90; *see* Recommended Standards § 7.0.9.d; SR at 51.

Subsection (b)(5). IEPA proposed that vents on elevated tanks and standpipes must "open downward; and be fitted with either four mesh non-corrodible screen, or with finer mesh non-corrodible screen in combination with an automatically resetting pressure vacuum relief in combination with mechanism, as required by the Agency. Prop. 604 at 90 (subsections (A) – (B)); *see* Recommended Standards § 7.0.9.e; SR at 51.

The Board asked IEPA to clarify the phrase "resetting pressure-vacuum relief in combination with mechanism." Board Questions at 16. IEPA responded that this term "refers to a device that lets air into or out of the tank in case the vent is clogged for some reason. It is supposed to go back to the closed position when water is not going in or out of the tank or the clog is removed." IEPA Resp. at 25. IEPA stated that its proposed language follows the Recommended Standards. *Id*.; *see* Recommended Standards § 7.0.9.e. The Board finds that it

clarifies this subsection to strike the second phrase "in combination with," which is used only once in § 7.0.9.e of the Recommended Standards. The Board's order reflects this revision.

Section 604.1320: Level Controls. Without level controls, "a community water supply will have a difficult time tracking the water level in the storage tank." SR at 51.

Subsection (a). IEPA proposed that "[a]dequate controls, including telemetering equipment, must be provided to maintain water levels within the operating range of distribution system storage structures." Prop. 604 at 90; *see* Recommended Standards § 7.3.3; SR at 51.

Subsection (b). IEPA proposed that "[l]evel indicating devices should be provided." Prop. 604 at 90; *see* Recommended Standards § 7.3.3; SR at 51.

Subsection (c). IEPA proposed that "[o]verflow and low level warnings or alarms shall be provided." Prop. 604 at 90; *see* Recommended Standards § 7.3.3.c; SR at 51.

Section 604.1325: Roof and Sidewalls.

Subsection (a). IEPA proposed that "[t]he roof and sidewalls of all water storage structures must be watertight with no openings except properly constructed vents, manholes, overflows, risers, drains, pump mountings, control ports, or piping for inflow and outflow." Prop. 604 at 90; *see* Recommended Standards § 7.0.10; SR at 51.

Subsection (b). IEPA proposed that "[a]ny pipes running through the roof or sidewall of a metal storage structure must be welded or gasketed to prevent leaks." Prop. 604 at 90; *see* Recommended Standards § 7.0.10.a; SR at 51.

Subsection (c). IEPA proposed that "[a]ny pipes running through the roof or sidewall of a concrete tank must be connected to standard wall castings which were poured in place during the forming of the concrete." Prop. 604 at 91; *see* Recommended Standards § 7.0.10.a; SR at 51.

Subsection (d). IEPA proposed that "[o]penings in the roof of a storage structure designed to accommodate control apparatus or pump columns must be curbed and sleeved with proper additional shielding to prevent contamination from surface or floor drainage." Prop. 604 at 90; *see* Recommended Standards § 7.0.10.b; SR at 51.

Subsection (e). IEPA proposed that "[t]he roof of the storage structure must be well drained." Prop. 640 at 90; *see* Recommended Standards § 7.0.10.d; SR at 51.

Subsection (d)(1). IEPA proposed that "[d]ownspout pipes must not enter or pass through the reservoir." *Id*.

Subsection (d)(2). IEPA proposed that "[p]arapets or similar construction which would tend to hold water and snow on the roof must have adequate waterproofing and drainage." *Id*.

Subsection (f). IEPA proposed that "[t]he roof of concrete reservoirs with earthen cover must be sloped to facilitate drainage, and must have an impermeable membrane roof covering." Prop. 604 at 90; *see* Recommended Standards § 7.0.10.e; SR at 51.

Subsection (g). IEPA proposed that "[r]eservoirs with pre-cast concrete roof structures must be made watertight with the use of a waterproof membrane or similar product." Prop. 604 at 90; *see* Recommended Standards § 7.0.10.f; SR at 51.

Subsection (h). IEPA proposed that "[t]he installation of appurtenances, such as antenna, must be done in a manner that ensures no damage to the tank, coatings or water quality, or corrects any damage that occurred." Prop. 604 at 90; *see* Recommended Standards § 7.0.3; SR at 51.

Section 604.1330: Painting and Cathodic Protection. Properly protecting the metal surfaces of a storage tank with paint or other methods "will help maintain the structural integrity of the tank." SR at 52.

Subsection (a). IEPA proposed that "[p]roper protection shall be given to metal surfaces by paints or other protective coatings, by cathodic protective devices, or by both. Prop. 604 at 91; *see* Recommended Standards § 7.0.17; SR at 52.

Subsection (b). IEPA placed these requirements under the heading "Paint Systems."

Subsection (b)(1). IEPA proposed that "[p]aint systems must comply with Section 604.105(f) [compliance with NSF/ANSI standards]." Prop. 604 at 91; *see* Recommended Standards § 7.0.17.a; SR at 52.

Subsection (b)(2). IEPA proposed that "[i]nterior paint must be applied, and cured in a manner that does not transfer any substance to the water which will be toxic or cause taste or odor problems." *Id*.

Subsection (c). IEPA proposed that "[c]athodic protection shall be designed, installed and maintained by competent technical personnel and must comply with Section 604.105(f) [compliance with NSF/ANSI standards]." Prop. 604 at 91; *see* Recommended Standards § 7.0.17.c; SR at 52.

Section 604.1335: Treatment Plant Storage

Subsection (a). IEPA proposed requirements for clearwell[11] storage.

[11] "Clearwell" is "[a] tank or vessel used for storing treated water. Typical examples of storage needs include (1) finished water storage to prevent the need to vary the rate of filtration with variations in distribution system demand, and (2) backwash water for filters. Clearwells are located on-site at a water treatment plant." *The Water Dictionary* (2nd ed. 2010) at 103, incorporated by reference at 35 Ill. Adm. Code 601.115(b); *see* 35 Ill. Adm. Code 601.105(c).

Subsection (a)(1). IEPA proposed that "[c]ontact time, where required, must be provided pursuant to Section 604.715." Prop. 604 at 92; *see* Recommended Standards § 7.1.2.a; SR at 52.

Subsection (a)(2). IEPA proposed that, "[t]o ensure adequate disinfection contact time, sizing of the clearwell must include extra volume to accommodate depletion of storage during the nighttime for intermittently operated filtration plants with automatic high service pumping from the clearwell during non-treatment hours." Prop. 604 at 92; *see* Recommended Standards § 7.1.2.b; SR at 52.

Subsection (a)(3). IEPA proposed that "[c]learwell storage must be sized, in conjunction with distribution system storage, to relieve the filters from having to follow fluctuations in water use." Prop. 640 at 92; *see* Recommended Standards § 7.1.2; SR at 52.

Subsection (a)(4). IEPA proposed that "[a]n overflow and vent must be provided." Prop. 604 at 92; *see* Recommended Standards § 7.1.2.c; SR at 52.

Subsection (d)(5). IEPA proposed "[a] minimum of two clearwells or clearwell compartments must be provided." Prop. 604 at 92; *see* Recommended Standards § 7.1.2.d; SR at 52.

Subsection (b). IEPA proposed that "[s]ingle wall separation of raw and treated water is prohibited." Prop. 604 at 92; *see* Recommended Standards § 7.1.3; SR at 52.

Subsection (c). IEPA proposed that "[o]ther treatment plant storage tanks/basins including but not limited to detention basins, backwash reclaim tanks, receiving basins and pump wet wells for treated water must be designed as finished water structures, unless otherwise approved by the Agency pursuant to Section 604.145(b). Prop. 604 at 92; *see* Recommended Standards § 7.1.4; SR at 52.

Subsection (d). IEPA proposed that, "[w]hen provided, filter washwater tanks must be sized to provide adequate treated water for duration of the backwash cycle, including the sequential backwash of several filters." Prop. 604 at 92; *see* Recommended Standards § 7.1.1; SR at 52.

Section 604.1340: Elevated Storage. IEPA addressed the size of new elevated storage tanks so they are large enough to provide an adequate supply without being oversized and jeopardizing water quality. Johnson Test. at 4.

Subsection (a). IEPA proposed requirements for minimum capacity.

Subsection (a)(1). IEPA proposed that minimum storage capacity must "be equal to the average daily usage or be based on an engineering study of the distribution system hydraulic conditions, anticipated domestic water demands of the system, and where fire protection is provided, fire flow demands." Prop. 604 at 92; *see* 35 Ill. Adm. Code 653.108(c); SR at 52. Mr. Cook testified that "systems that do not have storage equivalent to average daily usage would

submit a report recommending a volume of elevated storage to satisfy their peak hourly flow and fire-fighting needs that would be less than average daily usage." Tr.1 at 66-67.

CWLP asked IEPA why it decided upon average daily usage as the minimum storage capacity. CWLP also asked whether IEPA based its proposal on 35 Ill. Adm. Code 653 or the Recommended Standards. CWLP Questions at 4 (Question 15). IEPA responded that it based this proposal on an IEPA rule. IEPA Resp. at 41, citing 35 Ill. Adm. Code 653.108(c). IEPA added "average daily usage" based on the Recommended Standards. IEPA Resp. at 41, citing Recommended Standards § 7.0.1.

CWLP asked IEPA how much the engineering studies required by this subsection cost. CWLP Questions at 4 (Question 18). IEPA responded that this proposed subsection does not require an engineering study. IEPA Resp. at 41. IEPA added that the costs of a study would be the same as those under the existing regulation. *Id.*

CWLP asked IEPA how this proposed requirement would "change the interpretation of what serves as an appropriate engineering study." CWLP Questions at 4 (Question 16). IEPA responded that this proposal is based on the existing regulation without any change. IEPA Reps. at 41. IEPA added that no engineering study is required when minimum storage is based on average daily usage. *Id.*; *see* Tr.1 at 66.

CWLP asked IEPA to reconcile its proposed storage requirement with its view that "[e]xcess storage capacity can cause deterioration of the finished water quality and must be avoided" (SR at 50). CWLP Questions at 5 (Questions 20). IEPA responded that, because an engineering study could support a different capacity, there is no uniform storage capacity. IEPA Resp. at 41. IEPA argued that its proposal balances the need for stored water with proper management of a perishable commodity. *Id.* at 41-42.

CWLP asked IEPA whether a CWS that does not have storage equivalent to average daily usage would be required by the proposal to conduct a new engineering study. CWLP Questions at 4 (Question 17). IEPA responded that it would not be required to conduct a study as a result of this proposal. IEPA Resp. at 31. IEPA stressed that it based this proposal on existing Section 653.108(c) of its rules without changing that requirement. *Id.*

CWLP also asked IEPA what costs for additional storage it had assumed when developing the proposal. CWLP Questions at 4 (Question 19). IEPA does not expect any CWS to need additional storage as a result of this proposed requirement. IEPA Resp. at 41. IEPA stated that "[t]he cost of storage under the proposal is the same as under current regulation." *Id.*

Subsection (a)(2). IEPA proposed that minimum storage must "be capable of maintaining adequate pressures as described in Section 604.1415(a) [design of distribution system]." *Id.*

Subsection (b). IEPA proposes that "[e]levated tanks with riser pipes over eight inches in diameter shall have protective bars over the riser opening inside the tank." Prop. 604 at 92; *see* Recommended Standards § 7.0.12.b; SR at 52.

Section 604.1345: Hydropneumatic Storage. Mr. Johnson testified that hydropneumatic or pressure storage, when it is the only storage provided, is limited to small water systems. Johnson Test. at 4; *see* Recommended Standards § 7.2; SR at 52.

Subsection (a). IEPA proposed that "hydropneumatic tanks, when provided as the only water storage, are not acceptable in community water supplies with over 150 service connections." Prop. 604 at 93; *see* Recommended Standards § 7.2; SR at 52.

Subsection (b). IEPA proposed that "[h]ydropneumatic tank storage is not to be permitted for fire protection purposes." Prop. 604 at 93; *see* Recommended Standards § 7.2; SR at 52.

Subsection (c). IEPA proposed that "[h]ydropneumatic tanks shall meet the ASME BPVC [Boiler and Pressure Vessel Code] – VIII [Rules for Construction of Pressure Vessels] – I - 2015, incorporated by reference in 35 Ill. Adm. Code 601.115." Prop. 604 at 93; *see* 35 Ill. Adm. Code 653.109(a); Recommended Standards § 7.2.

Subsection (d). IEPA proposed that "[t]he tank must be located above normal ground surface and be completely housed." Prop. 604 at 93; *see* Recommended Standards § 7.2.1; SR at 53.

Subsection (e). IEPA proposed that "[g]ross volume must equal or exceed 80 gallons per service connection where only hydropneumatic storage is provided." Prop. 604 at 93; *see* 35 Ill. Adm. Code 653.109(b) (35 gallons per person).

Subsection (f). IEPA proposed that "[a]n air compressor must be provided to maintain an air cushion in the hydropneumatic tanks." Prop. 604 at 93; *see* 35 Ill. Adm. Code 653.109(c); SR at 53.

Subsection (g). Because hydropneumatic storage has small volume, a community water supply must be able to deliver water at a higher rate. SR at 53. IEPA proposed that "[f]inished water must be delivered at a rate greater than the peak hourly flow as provided in Section 604.115(d) [Usage]." Prop. 604 at 93; *see* 35 Ill. Adm. Code 653.109(d).

Subsection (h). IEPA proposed that "[a]ctual capacity of the well pump or high service pump used to deliver water to the distribution system through the hydropneumatic tank must be greater than the peak hourly flow as provided in Section 604.115(d)." Prop. 604 at 93; *see* 35 Ill. Adm. Code 653.109(e); SR at 53.

Subsection (i). IEPA proposed that "[a]ctual capacities of multiple well pumps or high service pumps used to deliver water to the distribution system through the hydropneumatic tank must be greater than the peak hourly flow as provided in Section 604.115(d) with the largest well pump or high service pump out of operation." Prop. 604 at 93; *see* 35 Ill. Adm. Code 653.109(f); SR at 53.

Subsection (j). IEPA proposed that "[a]ll hydropneumatic tanks must have bypass piping to permit operation of the system while the tank is being repaired or painted." Prop. 604 at 93; *see* Recommended Standards § 7.2.3; SR at 53.

Subsection (j)(1). IEPA proposed that each tank must "have an access manhole, and where practical the access manhole should be 24 inches in diameter." Prop. 604 at 93; *see* Recommended Standards § 7.2.4; SR at 53.

Subsection (j)(2). IEPA proposed that each tank must have a drain. Prop. 604 at 93; *see* Recommended Standards § 7.2.4; SR at 53.

Subsection (j)(3). IEPA proposed that each tank must have "control equipment consisting of the following: a pressure gauge; water sight glass placed to show the water-air interface; automatic or manual air blow off; means for adding air; and pressure operated start stop controls for the pumps." Prop. 604 at 93-94 (subsections (A) – (E)); *see* Recommended Standards § 7.2.4; SR at 53.

Section 604.1350: Combination Pressure Tanks and Ground Storage. Community water supplies do not commonly have both ground storage and hydropneumatic storage, but "some small water systems may pursue this alternative to help maintain pressure or increase their storage." SR at 53; *see* Prop. 604 at 94.

Subsection (a). IEPA proposed that design of a combination system must include "a minimum ground storage volume equivalent to 1.5 times the average daily usage." Prop. 604 at 94; *see* 35 Ill. Adm. Code 653.110(a); SR at 53.

Subsection (b). IEPA proposed that the design must also include "a minimum of two pumps, each capable of meeting the peak hourly flow as provided in Section 604.115(d). If more than two pumps are proposed, the peak hourly flow must be met when any pump is out of service." Prop. 604 at 94; *see* 35 Ill. Adm. Code 653.110(b); SR at 53.

Subsection (c). IEPA proposed that the design must also include "an electric generator with automatic start capable of providing power to pump(s) which can produce the peak hourly flow as provided in Section 604.115(d), plus sufficient power to operate all chemical feeders, appurtenances and equipment essential to plant operation. Consideration should be given to sizing the generator to provide power for at least one well." Prop. 604 at 94; *see* 35 Ill. Adm. Code 653.110(c); SR at 53.

The Board asked IEPA to comment on whether it would clarify subsection (c) to require that "[c]onsideration must ~~should~~ be given to sizing the generator to provide power for at least one well." Board Questions at 16. IEPA "has no objection to this proposal" (IEPA Resp. at 25), and the Board's order reflects this revision.

Subsection (d). IEPA proposed that the design must also include "an hydropneumatic tank sized to provide service for a minimum of ten minutes under the peak hourly flow as provided in Section 604.115(d)." Prop. 604 at 94; *see* 35 Ill. Adm. Code 653.110(d); SR at 53.

Subpart N: Distribution

Distribution transfers water from a treatment facility to customers for their use. SR at 53. Distribution systems consist of water mains, hydrants, and valves. *Id.*; McMillan Test. at 4. A community water supply ends at each service connection (35 Ill. Adm. Code 601.102), so water service lines to private properties are not regulated by IEPA or Board rules, and IEPA's proposed Part 604 does not address them. SR at 53; McMillan Test. at 4.

Section 604.1400: General Distribution System Requirements.

Subsection (a). IEPA proposed that "[w]ater distribution systems must be designed to maintain finished water quality." Prop 604 at 94; *see* Recommended Standards § 8.0; SR at 53.

Subsection (b). IEPA proposed that "[t]he community water supply must have a record keeping system by which the nature and frequency of water main breaks are documented." Prop. 604 at 94; *see* SR at 53.

Subsection (c). IEPA proposed that "[t]he system must be designed to meet existing demands on the distribution system. Future distribution system demands must be taken into account." Prop. 604 at 94; *see* 35 Ill. Adm. Code 653.117(d); SR at 54.

Section 604.1405: Installation of Water Mains.

Subsection (a). IEPA proposed that, "[e]xcept as provided in 35 Ill. Adm. Code 602.200 [Construction Permit Requirement], a permit from the Agency is required for the installation of a water main." Prop. 604 at 94; *see* SR at 54.

Subsection (b). IEPA placed these requirements under the heading "Bedding."

Subsection (b)(1). IEPA proposed that "[a] continuous and uniform bedding must be provided in the trench for all buried pipe." Prop. 604 at 94; *see* Recommended Standards § 8.7.2; SR at 54.

Subsection (b)(2). IEPA proposed that "[b]ackfill material must be tamped in layers around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe." Prop. 604 at 95; *see* Recommended Standards § 8.7.2; SR at 54.

Subsection (b)(3). IEPA proposed that "[s]tones found in the trench must be removed for a depth of at least six inches below the bottom of the pipe." *Id.*

Subsection (c). IEPA proposed that "[w]ater mains must be placed at a sufficient depth, or covered with sufficient earth or other insulation to prevent freezing." Prop. 604 at 95; *see* Recommended Standards § 8.7.3; SR at 54.

Subsection (d). IEPA proposed that "[a]ll tees, bends, plugs and hydrants shall be provided with reaction blocking (thrust blocks), tie rods or joints designed to prevent pipe failure." Prop. 604 at 95; Recommended Standards § 8.7.4; SR at 54.

Subsection (e). IEPA proposed that "[i]nstalled pipe must be pressure and leak tested." Prop. 604 at 95; Recommended Standards § 8.7.6; SR at 54.

Subsection (f). IEPA proposed that "[n]ew, cleaned and repaired water mains must be disinfected in accordance with 35 Ill. Adm. Code 602.310 [Projects Requiring Disinfection] and AWWA C651 [Disinfecting Water Mains], incorporated by reference in 35 Ill. Adm. Code 601.115." Prop. 604 at 95; *see* Recommended Standards § 8.7.7; SR at 54.

Subsection (g). IEPA placed these requirements under the heading "External corrosion."

Subsection (g)(1). IEPA proposed that, "[i]n areas where aggressive soil conditions are suspect, the community water supply must perform analyses to determine the actual aggressiveness of the soil unless protections in subsection (g)(2) are provided." Prop. 604 at 95; *see* Recommended Standards § 8.7.8; SR at 54.

Subsection (g)(2). IEPA proposed that, "[i]f soils are found or known to be aggressive, the community water supply must protect the water main, such as by encasement of the water main in polyethylene, provision of cathodic protection (in very severe instances), or using corrosion resistant water main materials." *Id*.

Section 604.1410: Materials. IEPA addresses the materials used to construct water mains "because they are essential in maintaining the sanitary quality of water in the distribution system." SR at 53.

Subsection (a). IEPA proposed that "[a]ll materials including, but not limited to, ductile iron pipe, steel pipe, concrete pipe, plastic pipe, pipe liners, joints, fittings, valves and fire hydrants must conform to the AWWA, ASTM, ANSI or NSF standards incorporated by reference at 35 Ill. Adm. Code 601.115." Prop. 604 at 95; *see* 35 Ill. Adm. Code 653.117(b); Recommended Standards § 8.1.1.a; SR at 54.

Subsection (b). IEPA placed these requirements under the heading "Plastic Pipe."

Subsection (b)(1). IEPA proposed that polyvinyl chloride (PVC), chlorinated polyvinyl chloride (CPVC), Molecularly Oriented Polyvinyl Chloride (PVCO) and Polyethylene (PE) must conform to NSF Standard 14, Plastic Piping System Components and Related Materials, which is incorporated by reference in Section 601.115. Prop. 604 at 95; *see* Recommended Standards § 8.1; SR at 54.

Subsection (b)(2). IEPA proposed that "PVC, CPVC, PVCO, and PE pipe may be used for water mains in accordance with this Section." Prop. 604 at 95; *see* 35 Ill. Adm. Code 653.111; SR at 54. Subsection (A) proposes that PVC may be used for water mains according to AWWA C900, AWWA C905, ASTM D1784-11, ASTM D1785-15, and ASTM D2241, which

are incorporated by reference in Section 601.115. Prop. 604 at 96 (subsections (i) – (v)); *see* 35 Ill. Adm. Code 653.111(a); Recommended Standards § 8.1.1.a; SR at 54.

ISAWWA stated that "AWWA standard C905 has been discontinued." PC 7 at 3. ISAWWA added that "[l]arger pipes are now covered by C900." *Id*. IEPA proposed to delete subsection (b)(2)(A)(ii), which lists C905 (Resp. 7-8 at 4). The Board's order deletes subsection (ii) and re-numbers the three subsections that follow.

Subsection (B) proposes that PE pipe may be used for water mains according to AWWA C906, which is incorporated by reference in Section 601.115. Prop. 604 at 96; Recommended Standards § 8.1.1.a; SR at 54. Subsection (C) proposes that PVCO pipe may be used for water mains according to AWWA C909, which is incorporated by reference in Section 601.115. Prop. 604 at 96; *see* Recommended Standards § 8.1.1.a; SR at 54. Subsection (D) proposes that CPVC pipe may be used for water mains according to ASTM F441/F441M, ASTM F442/F442M, and ASTM D1784, which are incorporated by reference in Section 601.115. Prop. 604 at 96; *see* Recommended Standards § 8.1.1.a; SR at 54.

Subsection (b)(3). Under the heading "Jointing," IEPA in subsection (A) proposed that "[j]ointing shall be pressure slip jointed, solvent welded, heat welded, flange or threaded joint." Prop. 604 at 96; *see* 35 Ill. Adm. Code 653.111(c)(5); SR at 54. Subsection (B) proposes that "[c]lean, dry contact surfaces are required when making solvent or heat welded joints. Adequate setting time shall be allowed for maximum strength." *Id*.

Subsection (C) proposes that "[e]lastomeric seals (gaskets) used for push-on joints shall comply with ASTM F477 and shall be pressure rated in accordance with ASTM D3139," which are incorporated by reference in Section 601.115. Prop. 604 at 96; *see* 35 Ill. Adm. Code 653.111(c)(3); SR at 54. Subsection (D) proposes that "[s]olvent cement shall be specific for the piping material and shall comply with ASTM D2564 for PVC and ASTM F493 for CPVC, and comply with Section 604.105(f)." Prop. 604 at 97; *see* 35 Ill. Adm. Code 653.111(c)(2); SR at 54. Both standards listed in subsection (D) are incorporated by reference in Section 601.115.

Subsection (b)(4). Under the heading "Plastic Pipe Fittings," IEPA proposed in subsection (A) proposes that "PVC fabricated fittings 4 inch through 12 inch shall conform to AWWA C900." Prop. 604 at 97; *see* SR at 54.

ISAWWA commented that "AWWA C900 covers larger size pipe and fabricated fittings up to 60 inch." PC 7 at 3. IEPA's response proposes replacing the reference to 12-inch fitting with a reference to 60-inch fittings. Resp. 7-8 at 4. The Board's order reflects this revision.

Subsection (B) proposes that "[p]olyethylene pressure pipe fitting, 4 inch through 63 inch shall conform to AWWA C906." *Id*. Subsection (C) proposes that "[i]njection-molded PVC pressure fittings, 4 inch through 12 inch shall conform to AWWA C907." *Id*. Subsection (D) proposes that "[s]chedule 40 or 80 PVC and CPVC pipe fittings shall be of the same material as the pipe" and comply with ASTM Standards listed in subsections (i) through (vi). Prop. 604 at 97; *see* 35 Ill. Adm. Code 653.111(c)(1); SR at 54. Subsection (E) proposes that "[p]lastic fitting material must conform to ANSI/NSF Standard 14 and comply with Section 604.105(f)."

Prop. 604 at 97; *see* SR at 54. Subsection (F) proposes that "[a]ll fittings shall bear the NSF seal of approval." Prop. 604 at 97; *see* 35 Ill. Adm. Code 653.111(c)(4); SR at 54.

Subsection (c). IEPA placed these requirements under the heading "Protection from organic compounds."

Subsection (c)(1). IEPA proposed that, "[w]here distribution systems are installed in areas contaminated by organic compounds: pipe and joint materials must be protected [and] protection must extend at least 25 feet laterally from the areas contaminated by organic compounds." Prop. 604 at 97 (subsections (A) and (B)); *see* 35 Ill. Adm. Code 653.119(e); Recommended Standards § 8.1.2; SR at 54.

Subsection (c)(2). IEPA proposed that, "[w]here distribution systems are installed within 25 feet of potential sources of organic compound contamination, including, but not limited to, any unit at a facility or a site that stores or accumulates petroleum at any time above ground or below ground, pipe and joint materials must be protected from organic compounds." Prop. 604 at 98; *see* Recommended Standards § 8.1.2.a; SR at 54.

Subsection (c)(3). IEPA proposed that protection from organic compounds may include "use of ductile iron pipe with a Viton® or nitrile gaskets, unless otherwise approved by the Agency pursuant to Section 604.145(b); remediation; use of steel pipe; encasement of the pipe; and secondary containment of the source." Prop. 604 at 96 (subsections (A) – (E)).

Section 604.1415: System Design.

Subsection (a). IEPA placed these requirements under the heading "Pressure."

Subsection (a)(1). IEPA proposed that "[t]he system must be designed to maintain a minimum pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow." Prop. 604 at 98; *see* 35 Ill. Adm. Code 653.106(b); 653.117(a); Recommended Standards § 8.2.1; SR at 54.

Subsection (a)(2). IEPA proposed that "[t]he normal working pressure on all transmission mains for finished water shall be at least 20 psi. All other water mains shall have a normal working pressure of at least 35 psi." Prop. 604 at 98; *see* Recommended Standards § 8.2.1; SR at 54.

Subsection (a)(3). IEPA proposed that, "[w]hen static pressures exceed 100 psi, pressure reducing devices shall be provided on water mains or on individual service lines." Prop. 604 at 98; *see* SR at 54.

Subsection (a)(4). IEPA proposed that "[a]ll water mains, including those not designed to provide fire protection, must be sized after a hydraulic analysis based on flow demands and pressure requirements." Prop. 604 at 98; *see* SR at 54.

Subsection (b). Water main size is based on factors including the number of customers connected, whether the main provides fire flow, and whether the main is a dead end. SR at 55. If a water main is the proper size, it "should be able to maintain the minimum pressure requirements under all conditions." *Id*.

Subsection (b)(1). Under the heading "Diameter of water mains," IEPA proposed that "[t]he minimum size of water main which provides for fire protection and serving fire hydrants must be six-inch diameter. Larger size mains will be required if necessary to allow the withdrawal of the required fire flow while maintaining the minimum residual pressure specified in subsection (a)." Prop. 604 at 98; *see* Recommended Standards § 8.2.2; SR at 55.

Subsection (b)(2). IEPA proposed that "[t]he minimum size of water main must be 4-inch nominal diameter in distribution systems serving incorporated areas, subdivisions, or other closely situated housing or commercial units." Prop. 604 at 99; *see* 35 Ill. Adm. Code 653.117(d)(1); SR at 55.

Subsection (b)(3). IEPA proposed that "[t]he minimum size of water main must be 3-inch nominal diameter in distribution systems serving rural areas where service connections are widely spaced, water usage per service is low, and rates of flow are low." Prop. 604 at 99; *see* 35 Ill. Adm. Code 653.117(d)(2); SR at 55.

Subsection (c). The Board addresses dead ends above under "Disputed Issues." *See supra* at 28-29.

Section 604.1420: Valves.

Subsection (a). IEPA proposed that "[a] sufficient number of valves must be provided to isolate portions of the distribution system during repairs, maintenance, and to facilitate unidirectional flushing." Prop. 604 at 99; Recommended Standards § 8.3; SR at 55.

Subsection (b). Under the heading "Location," IEPA proposed that, "[u]nless otherwise approved by the Agency pursuant to Section 604.145(b), valves must be located: at not more than 500 foot intervals in commercial districts; [and] at not more than two blocks or 1200 foot intervals in other districts." Prop. 604 at 99 (subsections (1) and (2)); Recommended Standards § 8.3; SR at 55.

ISAWWA commented that this provision does not address "transmission mains not interconnected with the distribution system" where "the distance between valves may be as much as 4000 feet. PC 7 at 3. ISAWWA requested that IEPA clarify the applicability of this proposal to these mains. *Id*. IEPA responded that subsection (b) refers to alternate requirements under Section 604.145(b) for this purpose. Resp. 7-8 at 4.

Section 604.1425: Hydrants.

Subsection (a). IEPA proposed that "[o]nly water mains designed to carry fire flows may have fire hydrants connected to them." Prop. 604 at 99; *see* Recommended Standards §§ 8.4.1.b; SR at 55-56.

Subsection (a)(1). IEPA proposed that "'[t]he fire hydrant lead must be a minimum of six inches in diameter." Prop. 604 at 99; *see* Recommended Standards §§ 8.4.3; SR at 55-56.

Subsection (a)(2). IEPA proposed that "[a]uxiliary valves must be installed on all fire hydrant leads." Prop. 604 at 99; *see* Recommended Standards §§ 8.4.3; SR at 55-56.

Subsection (b). IEPA proposed that "[w]ater mains not designed to carry fire-flows must have flushing hydrants." Prop. 604 at 99; *see* Recommended Standards § 8.4.1.b; SR at 55.

CLCJAWA comments that this subsection "cannot apply to large transmission mains." PC 8 at 3. IEPA responds that it "does not object" to the following revision: "Unless otherwise approved by the Agency pursuant to Section 604.145(b), water ~~Water~~ mains not designed to carry fire-flows must have flushing hydrants." Resp. 7-8 at 9. The Board's order reflects this revision.

Subsection (b)(1). IEPA proposed that "[f]lushing hydrants must be sized to provide flows which will give a velocity of at least 2.5 feet per second in the water main being flushed." Prop. 605 at 99; *see* Recommended Standards § 8.4.1.b; SR at 55.

Subsection (b)(2). IEPA proposed that "[n]o flushing device shall be directly connected to any sewer." *Id*.

Subsection (c). IEPA proposed that "[e]ach community water supply must develop and maintain a systematic flushing program." Prop. 604 at 99; *see* SR at 55.

Subsection (d). "All hydrants must be capable of being drained to prevent breakage or damage from freezing." SR at 55. IEPA proposed requirements under the heading "Hydrant drainage."

Subsection (d)(1). IEPA proposed that, "[w]hen hydrant drains are plugged, the barrels must be pumped dry after use during freezing weather." Prop. 604 at 100; *see* Recommended Standards § 8.4.4.a; SR at 56.

Subsection (d)(2). IEPA proposed that, "[w]here hydrant drains are not plugged, a gravel pocket or dry well must be provided unless the natural soils will provide adequate drainage." Prop. 604 at 100; *see* Recommended Standards § 8.4.4.b; SR at 56.

Subsection (d)(3). IEPA proposed that "[h]ydrant drains must not be connected to or located within 10 feet of sanitary sewers, storm sewers, or storm drains." Pro. 604 at 100; *see* Recommended Standards § 8.4.4.c; SR at 56.

Subsection (d)(4). IEPA proposed that "[h]ydrant drains must be above the seasonal groundwater table." Prop. 604 at 100; *see* Recommended Standards § 8.4.4.d; SR at 56.

Section 604.1430: Air Relief Valves. Accumulation of air in water mains, particularly at the top of hills, can reduce water flow. SR at 56. IEPA proposes to require relief valves to dissipate air accumulations or air lock. *Id.*

Subsection (a). IEPA proposed that "[a]ir relief valves must be installed at high points in water mains where air can accumulate." Prop. 604 at 100; *see* Recommended Standards § 8.5.1; SR at 56.

Subsection (b). IEPA proposed that "[a]utomatic air relief valves must not be used in situations where flooding of the manhole or chamber may occur." Prop. 604 at 100; *see* Recommended Standards § 8.5.1; SR at 56.

Subsection (c). IEPA placed these requirements under the heading "Air relief valve piping."

Subsection (c)(1). IEPA proposed that "[t]he open end of an air relief pipe from a manually operated valve must extend to the top of the pit and be provided with a screened, downward-facing elbow if drainage is provided for the manhole." Prop. 604 at 100; *see* Recommended Standards § 8.5.2.b; SR at 56.

Subsection (c)(2). IEPA proposed that "[t]he open end of an air relief pipe from automatic valves must be extended to at least one foot above grade and provided with a screened, downward-facing elbow." Prop. 604 at 100; *see* Recommended Standards § 8.5.2.c; SR at 56.

Subsection (c)(3). IEPA proposed that "[d]ischarge piping from air relief valves must not connect directly to any storm drain, storm sewer, or sanitary sewer." Prop. 604 at 100; *see* Recommended Standards § 8.5.2.d; SR at 56.

Section 604.1435: Valve, Meter, and Blow Off Chambers. The chambers, pits, or manholes containing valves, meters, or blow-off chambers can accumulate groundwater or runoff from the surface. SR at 56. IEPA proposed to reduce accumulation of water and the risk of contaminating water in the water main or water line. *Id.*

Subsection (a). IEPA proposed that "[v]alves, blow-offs, meters, or other such appurtenances to a distribution system must be protected from standing water in the chamber, pits, or manholes." Prop. 604 at 100; *see* Recommended Standards § 8.6; SR at 56.

The Village of Wilmette questioned how existing systems protect structures from standing water. PC 21 at 1. Its system has approximately 1,250 valves, most in structures with an average age of more than 50 years. *Id.* "All of the structures take on surface and ground water from the watermain penetrations." *Id.* The Village estimated that spray lining to encapsulate the valve enclosures would cost approximately $4,000 per structure for a total of $5 million. *Id.* at 1-2. Because most of the Village's valves are situated in roadways, the work

would disrupt traffic. *Id*. at 1. Because enclosures would still receive water from pipe penetrations, the Village states that it would have to pump out standing water, which would annually require more than 1,000 hours of staff time. *Id* at 2. The Village requests clarification on how to comply with this proposed requirement and when a CWS would be expected to comply. *Id*. at 1, 2.

IEPA responded that this proposed requirement would become effective upon adoption by the Board. IEPA Reply at 2. IEPA stressed that proposed Section 604.145 provides for alternate requirements for CWSs operating before adoption of Part 604. However, IEPA stated that it may enforce the Act and regulations if standing water causes a risk to public health. *Id*.

Subsection (b). IEPA proposed that "[c]hambers, pits, or manholes containing valves, blow-offs, meters, or other appurtenances to a distribution system must be drained or be equipped with other means to remove standing water." Prop. 604 at 100; *see* Recommended Standards § 8.6; SR at 56.

CLCJAWA commented that, "[e]pecially in Lake County, the requirement to keep all valve containing manholes dry is not possible without sump pumps. With hundreds of valve vents, this is not feasible." PC 8 at 3. CLCJAWA requests that IEPA provide clarification if this requirement is not its intent. *Id*. IEPA responds that its proposal accounts for CLCJAWA's position by allowing "other means" of removing standing water. Resp. 7-8 at 9.

Subsection (c). IEPA proposed that "the chambers, pits and manholes containing valves, blow-offs, meters, or other appurtenances to a distribution system must not connect directly to any storm drain or sanitary sewer." Prop. 604 at 101; *see* Recommended Standards § 8.6; SR at 56.

Section 604.1440: Sanitary Separation for Finished Water Mains. IEPA addressed separation of water mains from sewer lines because it is "essential in maintaining the sanitary quality of water in the distribution system." SR at 53. Separation reduces the risk that contaminated water enters a distribution system. *Id*. at 56. IEPA proposed that "[w]ater mains must be protected from sanitary sewers, storm sewers, combined sewers, house sewer service connections and drains" as specified in the following subsections. Prop. 604 at 101.

Subsection (a). IEPA placed these requirements under the heading "Horizontal Separation."

Subsection (a)(1). IEPA proposed that "[w]ater mains shall be laid at least ten feet horizontally from any existing or proposed drain, storm sewer, sanitary sewer, combined sewer or sewer service connection. The distance must be measured edge to edge." Prop. 604 at 101; *see* 35 Ill. Adm. Code 653.119(a)(1); Recommended Standards § 8.8.2.a; SR at 56.

Capt. Curry requested that IEPA define the term "existing or proposed drain." Curry Test. at 37 (emphasis in original). IEPA responds that The Water Dictionary, which is incorporated by reference at 35 Ill. Adm. Code 601.115(b), defines "drain" as "[a] pipe, conduit,

or receptacle in a building that carries liquids by gravity to waste." Curry Resp. at 16, citing The Water Dictionary at 179 (2nd ed. 2010); *see* 35 Ill. Adm. Code 601.105(c).

Capt. Curry also commented on separation from culverts conveying storm water runoff, and the Board addresses this above under "Disputed Issues. *See supra* at 29.

Subsection (a)(2). IEPA proposed that "[w]ater mains may be laid closer than ten feet to a sewer line when: local conditions prevent a lateral separation of ten feet; the water main invert is at least 18 inches above the crown of the sewer; and the water main is either in a separate trench or in the same trench on an undisturbed earth shelf located to one side of the sewer." Prop. 604 at 101 (subsections (A) – (C)); *see* 35 Il. Adm. Code 653.119(a)(1)(B); Recommended Standards § 8.8.4.a; SR at 56.

Subsection (a)(3). When it is impossible to meet separation requirements in subsection (a)(1) or (a)(2), IEPA proposed the alternative of structural lining. SR at 56. Under the heading "Required Materials," subsection (A) proposes that "[b]oth the water main and drain or sewer shall be constructed of materials specified in Section 604.1410; or [t]he sewer has a structural lining meeting ASTM F1216. An alternate structural lining may be approved by the Agency pursuant to Section 604.145(b)." Prop. 604 at 101 (subsections (i) and (ii)); *see* 35 Ill. Adm. Code 653.119(a)(1)(C); SR at 56. Subsection (B) proposes that '[t]he drain or sewer shall be pressure tested to the maximum expected surcharge head before backfilling." Prop. 604 at 101; *see* 35 Ill. Adm. Code 653.119(a)(1)(C); SR at 56.

Subsection (a)(4). IEPA proposed that "[w]ater mains shall be laid at least 25 feet horizontally from any existing or proposed sanitary lift station, unless otherwise approved by the Agency pursuant to Section 604.145(b)." Prop. 604 at 101.

Subsection (b). IEPA placed these requirements under the heading "Vertical Separation."

Subsection (b)(1). IEPA proposed that, "[w]hen possible, the water mains shall be placed above the sewer." Prop. 604 at 101; *see*35 Ill. Adm. Code 653.119(a)(2)(A); Recommended Standards § 8.8.3.a.

Subsection (A) proposes that "[a] water main shall be laid so that its invert is 18 inches above the crown of the drain or sewer whenever water mains cross storm sewers, sanitary sewers or sewer service connections." Prop. 604 at 102; *see* 35 Ill. Adm. Code 653.119(a)(2)(A); Recommended Standards § 8.8.3.a; SR at 56. Subsection (B) proposes that "[t]he vertical separation shall be maintained for that portion of the water main located within ten feet horizontally of the outer edge of any sewer or drain crossed." Prop. 604 at 102; *see* 35 Ill. Adm. Code 653.119(a)(2)(A); SR at 56. Subsection (C) proposes that "[a] length of water main pipe shall be centered over the sewer to be crossed with joints equidistant from the sewer or drain." Prop. 604 at 102; *see* 35 Ill. Adm. Code 653.119(a)(2); Recommended Standards § 8.8.3.b; SR at 56.

Subsection (D) proposes that, when it is impossible to maintain the 18-inch separation required by subsection (b)(1)(A), IEPA may approve an alternate method of construction that reduces the risk of sanitary contamination. *See* 35 Ill. Adm. Code 653.119(c). IEPA proposed a list including four alternate methods. Subsection (i) proposes that "[b]oth the water main and sewer is constructed of water main materials specified in Section 604.1410, extending on each side of the crossing until at least ten feet separates the two pipes." Prop. 604 at 102; *see* SR at 56. Subsection (ii) proposes that "[t]he sewer has a structural lining meeting ASTM F1216 or an alternate structural lining approved by the Agency pursuant to Section 604.145(b)." *Id*. Subsection (iii) proposes that "[t]he water main or the sewer is encased in a carrier pipe equivalent to water main materials specified in Section 604.1410, extending on each side of the crossing until at least ten feet separates the two pipes." *Id*. Subsection (iv) proposes that, "[w]hen the water main crosses a storm sewer, the storm sewer is constructed with reinforced concrete pipe conforming to ASTM C76 with ASTM C443 flat gasket joints or ASTM C351 "O-ring" joints within ten feet of the water main." *Id*.

Subsection (b)(2). IEPA proposes that, if it is impossible to place a water main above a storm sewer, sanitary sewer, or sewer service connection, it may be placed below the sewer under specified conditions. Subsection (A) requires that "'[t]he water main is laid so that it is at least 18 inches below the invert of the drain or sewer wherever water mains cross storm sewers, sanitary sewers or sewer service connections." Prop. 604 at 102; *see* 35 Ill. Adm. Code 653.119(a)(2)(C); SR at 56.

Under the heading "Construction," subsection (B) lists four alternate methods for a water main placed below a sewer. Prop. 604 at 102; *see* 35 Ill. Adm. Code 653.119(c). Subsection (i) proposes that "[b]oth the water main and sewer is constructed of water main materials specified in Section 604.1410, extending on each side of the crossing until at least ten feet separates the two pipes." Prop. 604 at 103; *see* SR at 56. Subsection (ii) proposes that "[t]he sewer has a structural lining meeting ASTM F1216 or an alternate structural lining approved by the Agency pursuant to Section 604.145(b)." *Id*. Subsection (iii) proposes that "[t]he water main or the sewer is encased in a carrier pipe equivalent to water main materials specified in Section 604.1410, extending on each side of the crossing until at least ten feet separates the two pipes." *Id*. Subsection (iv) proposes that, "[w]hen the water main crosses a storm sewer, the storm sewer is constructed with reinforced concrete pipe conforming to ASTM C76 with ASTM C443 flat gasket joints or ASTM C351 "O-ring" joints within ten feet of the water main." *Id*.

Subsection (C) requires that, for a water main placed below a sewer, "[t]he sewer or drain lines must be supported to prevent settling and breaking the water main." Prop. 604 at 103; *see* 35 Ill. Adm. Code 653.119(a)(2)(C); Recommended Standard § 8.8.3.b; SR at 56.

Subsection (c). IEPA proposed that "[w]ater mains shall be separated from sewage disposal systems, disposal fields and seepage beds by a minimum of 25 feet." Prop. 604 at 103; *see* 35 Ill. Adm. Code 653.119(d); Recommended Standards § 8.8.7.

Subsection (d). IEPA proposed that, notwithstanding subsection (a) or (b), sanitary sewer force mains[12] must have specific minimum separation from water mains.

Subsection (d)(1). IEPA proposed that, when a sanitary sewer force main and water main are parallel, there must be a 10 foot horizontal separation from water mains. Prop. 604 at 103; *see* Recommended Standards § 8.8.5: SR at 56.

Subsection (d)(2). IEPA proposed that, when a sanitary sewer force main and water main cross, there must be an 18 inch vertical separation with the water main above the sanitary sewer force main. Prop. 604 at 103; *see* Recommended Standards § 8.8.5; SR at 56.

Section 604.1445: Sanitary Separation for Raw Water Mains. Although IEPA interprets Section 653.119 to apply to both distribution system water lines and raw water lines, it proposes this section to clarify that raw water lines require separation. SR at 57; *see* 35 Ill. Adm. Code 653.119.

Subsection (a). IEPA proposed that "[r]aw water mains from groundwater sources shall have the same sanitary separation as provided in Section 604.1440 for finished water mains." Prop. 604 at 104; *see* SR at 57. The proposed separation applies to drains, storm sewers, sanitary sewers, and combined sewers. SR at 57.

The Board asked IEPA to clarify whether "the same sanitary separation" requires separation from house sewer service connections and drains. Board Questions at 16. IEPA responded that its proposal requires separation from "sanitary sewers, storm sewers, combined sewers, house sewer service connections and drains." IEPA Resp. at 25, citing Prop. 604 at 101 (proposed Section 604.1440(a)(1)).

Subsection (b). IEPA proposed that "[r]aw water mains from surface water shall have the same sanitary separation between the sanitary sewer and combined sewer as provided in Section 604.1440 for finished water mains." Prop. 604 at 104; *see* SR at 57. IEPA stated that it did not propose to require separation from a storm water sewer "because the surface water contains storm water runoff." SR at 57.

The Board asked IEPA to comment on whether this separation should also include "house sewer service connections and drains." Board Questions at 16-17. IEPA "has no objection to this proposal" (IEPA Resp. at 26), and the Board's order reflects this revision.

Section 604.1450: Surface Water Crossings. Water mains must sometimes cross surface waters and may do so above or below a stream, river, or lake. SR at 57. IEPA proposed this section to address the specific problems that may result from these crossings. *Id.*; *see* Recommended Standards § 8.9.

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[12] A "force main" is "[a] pressure pipe joining the pump discharge at a water-pumping station with a point of gravity flow." *The Water Dictionary* (2nd ed. 2010) at 242, incorporated by reference at 35 Ill. Adm. Code 601.115(b); *see* 35 Ill. Adm. Code 601.105(c).

Subsection (a). IEPA proposed that, "[f]or above-water crossings, the pipe must be adequately supported and anchored, protected from damage and freezing, and accessible for repair or replacement." Prop. 604 at 104; *see* Recommended Standards § 8.9.1; SR at 57.

Subsection (b). IEPA placed these requirements under the heading "Underwater crossings."

Subsection (b)(1). IEPA proposed that "[a] minimum cover of five feet must be provided over the pipe." Prop. 604 at 104; *see* Recommended Standards § 8.9.1; SR at 57.

Subsection (b)(2). IEPA addressed pipes crossing water courses wider than 15 feet. Subsection (A) proposes that "the pipe must be of special construction, having flexible, restrained or welded watertight joints." Prop. 604 at 104; *see* Recommended Standards § 8.9.2.a; SR at 57. Subsection (B) proposes that "valves must be provided at both ends of water crossings so that the section can be isolated for testing or repair." Prop. 604 at 104; *see* Recommended Standards § 8.9.2.a; SR at 57. Subsection (C) proposes that "the valves must be easily accessible and not subject to flooding." *Id*. Subsection (D) proposes that "permanent taps or other provisions to allow insertion of a small meter to determine leakage and obtain water samples must be made on each side of the valve closest to the supply source." Prop. 604 at 104; *see* Recommended Standards § 8.9.2.c; SR at 57.

Section 604.1455: Water Service Line. IEPA regularly faces questions about the distinction between a water main and a water service line, particularly from rural community water supplies. SR at 58. The Board's regulations define a water main as "any pipe for the purpose of distributing potable water that serves or is accessible to more than one property, dwelling or rental unit and is exterior to buildings." *Id*. at 57-58, citing 35 Ill. Adm. Code 601.105. A "water service line" means "any pipe from the water main or source of potable water supply that serves or is accessible to not more than one property, dwelling or rental unit of the user." *Id.*

Based on these definitions, IEPA argued that a pipe serving a single property is a water main if it is accessible to another property. SR at 57-58. IEPA interprets the term "accessible" to mean that another person may gain access to the pipe. *Id*. at 58. If the pipe crosses the property of another person, then IEPA considers the pipe to be accessible to that other person. *Id*. IEPA proposed this section to make this distinction clearer to regulated community water supplies. *Id*.

IPDH testified that this proposed section addresses an issue faced "by the water supply and plumbing industry concerning regulatory overlap and perceived conflicts in the agencies rules." IPDH Test. at 3. IPDH supports this provision because "it plainly identifies the statutory demarcation and division of responsibility." *Id.*

Subsection (a). IEPA proposed that "[a] community water supply shall not supply water through a water service line to more than a single property, dwelling or rental unit." Prop. 604 at 104; *see* 35 Ill. Adm. Code 601.105 (defining "water service line"); SR at 57-58.

Subsection (b). IEPA proposed that, '[i]f a pipe from the water main or source of potable water supply is accessible to more than one property, dwelling or rental unit, the pipe will be considered a water main subject to all permitting requirements of 35 Ill. Adm. Code 602." Prop. 604 at 104; *see* 35 Ill. Adm. Code 601.105 (defining "water main"); SR at 57-58.

Subsection (c). IEPA proposed that "[a] pipe is accessible when it crosses the property boundary of another landowner to reach the property, dwelling or rental unit being served." Prop. 604 at 104; *see* SR at 57-58.

Section 604.1460: Water Loading Stations. IEPA stated that, although loading stations allow the public to purchase large quantities of water, they place finished water at risk of contaminated vessels. SR at 58. Because filling equipment can be used by more than one person, contamination can pass from one user to the next. *Id*. To protect from these risks, IEPA proposed standards for the design of water loading stations. *Id*.; *see* Prop. 604 at 104; Recommended Standards § 8.13.

Subsection (a). IEPA proposed that "a six inch or larger air gap or other Agency approved cross connection control measure shall be included for all water loading stations." Prop. 604 at 104; *see* Recommended Standards §§ 8.13.a, Figure 1 (Suggested Filling Device for Water Loading Stations); SR at 58.

Subsection (b). IEPA proposed that "the piping arrangement must prevent potential contaminants from being transferred between hauling vessels." Prop. 604 at 104; *see* Recommended Standards §§ 8.13.a, Figure 1 (Suggested Filling Device for Water Loading Stations); SR at 58.

Subsection (c). IEPA proposes that "hoses must not be allowed to contact the ground." Prop. 604 at 105; *see* Recommended Standards § 8.13.c; SR at 58.

Subpart O: Cross Connections

Part 607 of the Board's rules (35 Ill. Adm. Code Parts 607) and Part 653 of IEPA's rules (35 Ill. Adm. Code 653) include requirements for cross connections. SR at 8. Proposed Subpart O combines and replaces these rules to "reduce the risk of unsafe substances entering community water supply distribution systems." *Id*. IEPA proposed prohibitions on types of cross connections and requirements for cross connection control devices. SR at 59; McMillan Test. at 4. IEPA also proposed cross connection control surveys and inspections. SR at 59.

Both IAPHCC and the Backflow Comments noted that proposed Subpart O refers to "backflow prevention devices." PC at 1; *see*, e.g., Prop. 604 at 106 (Section 604.1505(b)). Both cited the Illinois Plumbing Code definition of "backflow preventer" as "[a] device or an assembly used to prevent contamination of the potable water supply through an actual or potential cross-connection." PC 1 at 1; PC 2 at 1; *see* 77 Ill. Adm. Code 890.120. The Backflow Comments argued that IEPA's proposed term would exclude a "backflow assembly." PC 2 at 1. Both IAPHCC and the Backflow Comments propose that Subpart O refer instead to "backflow preventers" to be consistent with the Plumbing Code. PC 1 at 1; PC 2 at 1. The Backflow

Comments state that this change "will encompass all testable and non-testable backflow devices and backflow assemblies." PC 2 at 1.

IEPA responded that it "does not object to this change" (IEPA Resp. 1-6 at 1; *see id*. at 5 (deferring to Board)), and the Board's order reflects this revision.

Section 604.1500: Cross Connections.

Subsection (a). The Board addresses comments proposing to revise subsection (a) above under "Disputed Issues." *See supra* at 29-30.

Subsection (b). The Board addresses comments proposing to revise subsection (b) above under "Disputed Issues." *See supra* at 30-32.

Subsection (c). IEPA proposed that "[n]o cross connection shall be allowed between any portion of a community water supply distribution system and any other water supply that is not a community water supply." Prop. 604 at 105; *see* 35 Ill. Adm. Code 607.104; Prop. 607 at 2 (proposing repeal of Section 607.104); SR at 59.

Section 604.1505: Cross Connection Control Program.

Subsection (a). IEPA proposed that

> [a]ll community water supplies, including those that meet the criteria in Section 17(b) of the Act [exemption from chlorination requirement] and any exempt community water supply as defined in section 9.1 of the Public Water Supply Operations Act, must have a cross connection control program to educate and inform water supply consumers regarding prevention of the entry of contaminants into the distribution system. Prop. 604 at 105; *see* 35 Ill. Adm. Code 607.104(e); Prop. 607 at 2 (proposing repeal of Section 607.104); SR at 59.

Subsection (b). IEPA addressed the elements of the required cross connection control program. *See* 35 Ill. Adm. Code 653.801.

Subsection (b)(1). IEPA proposes that, "[f]or any new service connection, the community water supply shall evaluate the risk of cross connections whereby an unsafe substance may enter a community water supply." Prop. 604 at 105.

Subsection (b)(2). IEPA's rules require that "[a] cross-connection control survey of the distribution system shall be conducted at least every two years. . . ." 35 Ill. Adm. Code 653.801(a). IEPA proposed that community water supplies conduct these surveys every three years. Prop. 604 at 105; *see* SR at 60.

The Board asked IEPA to explain the change in survey frequency. Board Questions at 17. Mr. McMillan testified that the change reduces the "burden that existing biennial cross connection control survey places on community water supplies." McMillan Test. at 5; *see* 35 Ill.

Adm. Code 611.833; Prop. 611 at 199 (proposing repeal of Section 611.833 (Cross Connection Reporting)). Water systems expect this change to generate savings in areas including evaluation of operations and administrative support. IEPA Resp. at 26. IEPA argued that its proposal would not compromise the protection provided by cross connection control programs. *Id*.

Subsection (b)(3).[13] IEPA proposed that a CWS must use the completed surveys to develop an inventory of

> all customers surveyed; the number of customers who responded to the survey; identification of service connections not required to have a backflow prevention device installed pursuant to 77 Ill. Adm. Code 890.1130; identification of service connections required to have a backflow prevention device installed pursuant to 77 Ill. Adm. Code 890.1130; backflow prevention devices installed; service connections that require further risk evaluation; and corrective actions to mitigate cross connections. Prop. 604 at 105-06 (subsections (A) – (G)); *see* 35 Ill. Adm. Code 653.801(a)(1); SR at 60.

IEPA rules require that the survey "must consist of a pencil and paper collection of information, conducted by telephone, mail or personal visit to the manager or owner of a specific property." 35 Ill. Adm. Code 653.801(a)(1). The Board asked IEPA to comment on whether it expects CWSs to continue completing surveys in this manner. Board Questions at 17. IEPA responded that it "wishes to be flexible" with the means for submitting this information, including Web surveys. IEPA Resp. at 26.

Subsection (b)(4). IEPA proposed to require adoption and enforcement of "[a]n ordinance, tariff, or required condition for service whichever is applicable which meets the Illinois Plumbing Code, 77 Ill. Adm. Code 890." Prop. 604 at 106; *see* 35 Ill. Adm. Code 653.801(b).

Subsection (b)(5). IEPA proposed that "[t]he community water supply shall maintain records of annual tests of all backflow prevention devices that require testing." Prop. 604 at 106; *see* 35 Ill. Adm. Code 653.801(c).

The Backflow Comments argue that this subsection should be revised to provide that "[t]he community water supply shall maintain records of annual testing of all testable backflow preventers." PC 2 at 2. IEPA responded by proposing to clarify this subsection as follows: "[t]he community water supply shall maintain records of ~~annual tests~~ of all backflow prevention devices that require <u>annual</u> testing <u>pursuant to 77 Ill. Adm. Code and identified in Subsections 604.1505(b)(2) and (b)(3).</u>" IEPA Resp. 1-6 at 5. After adding a reference to Part 890, the Illinois Plumbing Code of Title 77, the Board's order reflects this revision.

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[13] IEPA's proposal designated this as a second subsection (b)(2). Prop. 604 at 105. The Board re-designates it as subsection (b)(3) and re-numbers subsequent subsections to maintain numerical order.

Section 604.1510: Cross Connection Control Device Inspectors. "Above under "Disputed Issues," the Board addresses comments addressing use of the term "inspector" throughout this section. *See supra* at 32-33.

Subsection (a). The Board addresses comments about inspecting cross connection control devices above under "Disputed Issues." *See supra* at 33-35.

Subsection (a)(1). The Board addresses comments about inspection records above under "Disputed Issues." *See supra* at 35.

Subsection (a)(2). IEPA proposed that "[e]ach device inspected shall have a tag attached listing the date of most recent test, name of CCCDI, and type and date of repairs." Prop. 604 at 106; *see* 35 Ill. Adm. Code 653.802(e)(3).

Subsection (a)(3). The Board addresses comments about maintenance logs above under "Disputed Issues." *See supra* at 35-36.

Subsection (b). IEPA proposed to incorporate and update existing requirements for "obtaining cross connection control device inspector approval." Prop. 604 at 107-109; *see* SR at 60, citing at 35 Ill. Adm. Code 653.802(d).

Subsection (b)(1). IEPA proposed qualification for CCCDIs. Subsection (A) requires that an applicant "[m]ust meet the qualifications to inspect plumbing and plumbing systems as described in the Illinois Plumbing License Law, 225 ILCS 320/3(1)." Prop. 604 at 107; *see* 35 Ill. Adm. Code 653.802(d)(1)(A); SR at 60.

The Backflow Comments stated that "[m]ost currently approved CCCDIs would not meet this qualification" (PC 2 at 3), and IAPHCC argued that this proposed requirement "is not accurate for this application" (PC 1 at 3). Both proposed that the applicant must be qualified or authorized "to perform plumbing." PC 1 at 3; PC 2 at 3. The Backflow Comments stated that this alternate language "will allow licensed plumbers to meet those qualifications without having to become a certified plumbing inspector." PC 2 at 3.

IEPA concurred with this recommendation and proposed that applicants for CCCDI approval "[m]ust ~~meet the qualifications to inspect plumbing and plumbing systems~~ be a person authorized to perform plumbing as described in the Illinois Plumbing License Law, 225 ILCS 320/3(1)." IEPA Resp. 1-6 at 3, 7-8. The Board's order reflects this recommendation.

As proposed by IEPA, subsection (B) requires that an applicant "[m]ust complete a training course offered by the Environmental Resource Training Center [ERTC] on cross connection control device which includes hands on practice testing of different types of backflow devices and proper maintenance and repair." Prop. 604 at 107. IEPA stated that the General Assembly intends for "ERTC to be the training arm of the State programs involving water treatment and distribution." IEPA Resp. 1-6 at 3, 8, citing 110 ILCS 530 (Sewage and Water System Training Institute Act). IEPA has an agreement with the ERTC to administer CCCDI training and testing. IEPA Resp. at 26.

Both IAHPCC and the Backflow Comments questioned whether ERTC would necessarily have funds and staff in the future to provide training. PC 1 at 3; PC 2 at 3-4. Both proposed that this subsection allow "other training providers in the event that ERTC would no longer be able to provide services." *Id*. Both stated that alternate providers should be approved by IDPH "with the advice and consent of the Illinois Plumbing Code Advisory Council and the Board of Plumbing Examiners." *Id*.

IEPA stressed ERTC's statutory role but acknowledged the uncertainty reflected in the comments. IEPA Resp. 1-6 at 3, 8, citing 110 ILCS 530 (Sewage and Water System Training Institute Act). IEPA proposed revising this subsection to provide that an applicant "[m]ust complete a training course offered by the Environmental Resource Training Center or the Agency's delegate on cross connection control device which includes hands on practice testing of different types of backflow devices and proper maintenance and repair." *Id*. The Board's order reflects this revision.

IEPA's proposed subsection (C) requires that the applicant "[m]ust complete and submit an application for CCCDI Approval." Prop. 604 at 107; *see* 35 Ill. Adm. Code 653.802(d)(1)(B).

The Board asked IEPA whether it charges a fee to review an application for approval as a CCCDI or a renewal application. Board Questions at 17. IEPA responded that renewal of CCCDI approval "coincides with plumber renewals under the Illinois Plumbing Act." IEPA Resp. at 26. IEPA added that it has an agreement with the ERTC to administer CCCDI training and testing. *Id*.

As proposed by IEPA, subsection (D) requires that an applicant

> [m]ust successfully complete both written and performance examinations demonstrating understanding of the following: the principles of backflow and back-siphonage; the hazard presented to a potable water system; locations which require installation of cross-connection control devices; identifying, locating, inspecting, testing, maintaining, and repairing cross-connection control methods and devices in-line, as located throughout each system which connects to a community public water supply. Prop. 604 at 107; *see* 35 Ill. Adm. Code 653.802(d)(1)(D).

Both IAPHCC and the Backflow Comments proposed to replace the term "understanding" so that successful completion of the examinations demonstrates "competency." PC 1 at 3; PC 2 at 4. The Backflow Comments argued that an understanding of backflow does not necessarily mean that a person is competent to pass an examination. PC 2 at 4. IEPA concurred and proposed to replace "understanding" with "competency." IEPA Resp. 1-6 at 4, 9. The Board's order reflects this revision. Although IAHPCC's proposal struck "inspecting" from the list of examination subjects (PC 2 at 4), IEPA's revision did not strike it. IEPA Resp. 1-6 at 4, 9. The Board's order retains inspection as an element of the competence that applicants must demonstrate.

In subsection (D)(i), IEPA proposed that each applicant "[m]ust successfully complete the written examination with a score of 75% minimum." Prop. 604 at 107. In subsection (D)(ii), IEPA proposed that an applicant "[m]ust successfully complete a performance-based examination by demonstrating competency in testing device procedures on all types of devices at the examination center." *Id*.

Subsection (b)(2). IEPA proposed to require that "CCCDIs must renew the CCCDI Approval each year, between May 1 and June 30. An application for CCCDI renewal will be sent by the Agency or its designee, and must be completed and returned by June 30 of the renewal year." Prop. 604 at 107; *see* 35 Ill. Adm. Code 653.802(d)(2).

The Board asked IEPA to explain the rationale for requiring renewal of CCCDI approval every year as opposed to every two or three years. Board Questions at 17. IEPA responded that renewal "coincides with plumber renewals under the Illinois Plumbing Act." IEPA Resp. at 26. IEPA added that it has an agreement with ERTC "to administer training and testing of CCCDIs." *Id*.

Both IAPHCC and the Backflow Comments stated that the proposal does not require CCCDIs to obtain additional education or recertification after their initial approval. PC 1 at 4; PC 2 at 4. Both stated that programs throughout the U.S require recertification at least every three years, which allows CCCDIs to follow changes in the industry and protect the safety of water supplies. *Id*. IAPHCC and the Backflow Comments recommended that Section 604.1510 require recertification. *Id*. The Backflow Comments suggested the following language:

> CCCDIs are required to complete an eight hour recertification course every three years from their original issuance date of their CCCDI license. The course shall include a written and practical exam demonstrating competency in backflow prevention testing and be completed through Environmental Resources Training Center or an approved course by the agency or plumbing advisory council. PC 2 at 4; *see* Tr.2 at 43-44.

IEPA asked Mr. Marvel to "supply information on what other states specifically require for re-certification." Tr.2 at 44. On December 15, 2015, Mr. Marvel submitted to the Board standards and requirements of ABPA, ASSE, the Backflow Prevention Industry Group, the University of Southern California Foundation of Cross Connection Control and Hydraulic Research, and the New England Water Works Association (ISAWWA Cmts). Mr. Marvel stated that these programs and standards consistently recommend or require two-year or three-year recertification periods. ISAWWA Cmts. at 1. ISAWWA recommended rules based on a Backflow Industry Position Paper, which endorses a program of written and practical recertification exams. *Id*. at 2. The paper also recommends that "certification should be valid for a maximum of 3 years." *Id.*

IEPA states that it "does not object to this recommendation." IEPA Resp. 1-6 at 4, 9. The Board is persuaded that recertification helps ensure that CCCDIs maintain proficiency and includes this requirement in its order. The Board follows IEPA's recommendation that this requirement should be included in this subsection. *Id*. The Board revised the language

suggested in the Backflow Comments but to be consistent with subsection (b)(1)(B) on training for initial CCCDI approval.

Subsection (b)(3). IEPA proposed that "CCCDI Approval or admission to examination for CCCDI Approval may be suspended, revoked or not issued by the Agency" for any one or more of four reasons: "[p]ractice of any fraud or deceit in obtaining or attempting to obtain a CCCDI Approval, including misrepresentation of approval; [a]ny repeated, flagrant or willful negligence or misconduct in the inspection, testing or maintenance of cross-connection control devices; [f]alsification of reports required by these rules; [or] [w]illful violation of the Environmental Protection Act or any rules thereunder." Prop. 604 at 108 (subsections (A) – (D)); *see*35 Ill. Adm. Code 653.802(d)(3).

Subsection (b)(4). Under the heading "Suspension/Revocation Procedures," subsection (A) proposes that "[a]ny person may file with the Agency a written complaint regarding the conduct of a CCCDI approved under this Part. The complaint shall state the name and address of the complainant, the name of the CCCDI and all information that support the complaint." Prop. 604 at 108; *see* 35 Ill. Adm. Code 653.802(d)(4)(B).

Subsection (B) proposes that "[t]he Agency may initiate the suspension/revocation procedure on the basis of any written complaint or on its own motion." Prop. 604 at 108; *see* 35 Ill. Adm. Code 653.802(d)(4). IEPA proposed in subsection (C) that "[t]he decision to institute suspension or revocation shall be based upon the seriousness of the violation and its potential deleterious impact upon public health and safety." Prop. 604 at 108; *see* 35 Ill. Adm. Code 653.802(d)(4)(C).

The Board asked IEPA to comment on whether the revision below would clarify subsection (b)(4) by combining subsections (b)(4)(B) and (b)(4)(C). Board Questions at 17.

> The Agency may initiate a suspension <u>or</u> ~~/~~revocation procedure on the basis of any written complaint or on its own motion. The <u>Agency's</u> decision to initiate suspension or revocation <u>proceedings will</u> ~~shall~~ be based on the seriousness of the violation and its potential deleterious impact upon public health and safety.

IEPA "has no objection to this proposal" (IEPA Resp. at 26), and the Board's order reflects this revision.

The Board then re-designates each of the following subsections proposed by IEPA to maintain alphabetical order

Subsection (C) proposes that,

> [w]hen the suspension/revocation procedure is initiated, the Agency must notify the CCCDI by certified mail that suspension/revocation is being sought. Such notice must specify the cause upon which suspension/revocation is sought and include the procedures for requesting a hearing before the Agency. Request for hearing must be made in writing 14 days following receipt of the Agency's

certified notification. If no hearing is requested, the Agency will suspend/revoke the CCCDI approval. Prop. 604 at 108; *see* 35 Ill. Adm. Code 653.802(d)(4)(C).

The Board's order provides that the CCCDI must request hearing "in writing within 14 days" to clarify that there is an appeal period of 14 days following receipt of notification.

Subsection (D) proposes that, "[s]hould a hearing be requested, the Director must appoint one or more Agency employees to chair the proceedings. The hearing must be conducted in accordance with hearing requirements of 35 Ill. Adm. Code 168." Prop. 604 at 108; *see* 35 Ill. Adm. Code 653.802(d)(4)(D).

Subsection (E) proposes that "[t]he Director must make a decision within 30 days after receiving the hearing transcript. The Director must give written notice of that decision and reasons for the decision to the CCCDI by certified mail." Prop. 604 at 108; *see* 35 Ill. Adm. Code 653.802(d)(4)(E).

Subsection (F) proposes that "[w]ithin 30 days of receipt of a notice of suspension/revocation from the Agency, the CCCDI may appeal the suspension/revocation to the Pollution Control Board. The suspension/revocation of the CCCDI's Approval must be stayed pending a final decision on the appeal by the Pollution Control Board." Prop. 604 at 108; *see* 35 Ill. Adm. Code 653.802(d)(4)(F).

Subsection (c). "Above under "Disputed Issues," the Board addressed comments concerning use of the term "inspector" throughout this subsection. *See supra* at 30-32.

IEPA proposed that "[b]ackflow prevention devices located in the treatment plant, wellhouse or booster station of a community public water supply facility shall be inspected at least annually by either an approved cross-connection control device inspector or by a certified water supply operator who has completed the qualifications listed in Section 604.1510(b)(1)(B) and (b)(1)(D)." Prop. 604 at 109; *see* 35 Ill. Adm. Code 653.802(f); SR at 60.

Subsection (c)(1). IEPA proposed that, "[w]hen the inspection is conducted by a certified public water supply operator who has completed the necessary qualifications, records must be kept as required by Section 604.1510(a)(3) above." Prop. 604 at 109; *see* 35 Ill. Adm. Code 653.802(f).

Subsection (c)(2). IEPA proposed that "[e]ach device inspected shall have a tag attached listing the date of most recent test, name of the CCCDI, and type and date of repairs." Prop. 604 at 109.

Section 604.1515: Agency Approved Connection Control Measures. Based on its existing rules, IEPA proposes the types of cross connections that "may be used within the community water supply." SR at 61; *see* 35 Ill. Adm. Code 653.803; Prop. 604 at 109-110. IEPA clarified that its proposal "does not cover devices that are or may be used within plumbing of a private residence, commercial or industrial facility." SR at 61.

Subsection (a). IEPA proposed that, "[f]or all mains, pipes, structures through which water is obtained and distributed to the public, including wells and well structures, intakes and cribs, pumping station, treatment plans, reservoirs, storage tanks and appurtenances, collectively or severally, actually used or intended for use for the purpose of furnishing water for drinking or domestic use, cross connection devices shall be used as set forth in this section." Prop. 604 at 109; *see* SR at 61.

Subsection (b). IEPA proposed that, "[e]xcept as provided in this section, a fixed air gap shall be used." Prop. 604 at 109; *see* 35 Ill. Adm. Code 653.803(a); SR at 61.

Subsection (c). IEPA proposed that "[a]tmospheric vacuum breakers may be installed subject to the following conditions: the location is not subject to back pressure; the substance in the container receiving water is not toxic; [and] [a]n atmospheric vacuum breaker is installed at the highest point in the waterline and after the last control valve before the point of discharge and a minimum of six inches above the flood level rim of the receptacle." Prop. 604 at 109 (subsections (1) – (3)); *see* 35 Ill. Adm. Code 653.803(b); SR at 61.

Subsection (d). IEPA listed examples of acceptable installations of atmospheric vacuum breakers, which include "surface wash piping for a gravity filter, solution tanks of gravimetric dry chemical feeders, faucet with hose attachments, and receptacles with a low level inlet where the substance contained is nontoxic such as food or beverages." Prop. 604 at 110 (subsections (1) – (4)); *see* 35 Ill. Adm. Code 653.803(b)(3); SR at 61.

Subsection (e). IEPA proposed conditions under which reduced pressure principle backflow preventers may be installed. Prop. 604 at 110; *see* 35 Ill. Adm. Code 653.803(c); SR at 61.

Subsection (e)(1). Under the heading "Installation," subsection (A) proposes that "[u]nits must be accessible for maintenance and testing." Prop. 604 at 110; *see* 35 Ill. Adm. Code 653.803(c)(1)(A). Subsection (B) proposes that "[m]imimum clearances recommended by the manufacturer must be used." Prop. 604 at 110; *see* 35 Ill. Adm. Code 653.803(c)(1)(B). Subsection (C) proposes that "[u]nits must be protected against flooding and freezing." Prop. 604 at 110; *see* 35 Ill. Adm. Code 653.803(c)(1)(C). Subsection (D) proposes that "[r]elief ports must not be plugged. A drain which will remain free flowing under all conditions must be provided." Prop. 604 at 110; *see* 35 Ill. Adm. Code 653.803(c)(1)(D). Subsection (E) proposes that "[n]o reduction must be made in the size of the relief port drain." Prop. 604 at 110; *see* 35 Ill. Adm. Code 653.803(c)(1)(F).

Subsection (e)(2). IEPA proposed that "[b]ypass lines without reduced pressure principle backflow preventers must not be installed." Prop. 604 at 110; *see* 35 Ill. Adm. Code 653.803(c)(2).

Subsection (e)(3). IEPA proposed that "[r]educed pressure principle backflow preventers must be used for installations where a fixed air gap is not possible, and an atmospheric vacuum breakers is not allowed under subsection (c)." Prop. 604 at 110; *see* 35 Ill. Adm. Code 653.803(c)(3).

Section 604.Table 1. In Section 604.240(d)(2), IEPA proposed that permanent steel casing pipe must meet requirements including minimum weight and thickness as indicated in Table 1 of Part 604. Prop. 604 at 21. For steel pipe of various sizes, Table 1 provides external and internal diameter and thickness in inches. Prop. 604 at 110-11; *see* Recommended Standards at 32 (Table I: Steel Pipe). Table I also provides the weight per foot in pounds for pipe with plain ends and pipe with threads and couplings. *Id.*

Part 607: Operation and Record Keeping

The Board has repealed all but two sections of Part 607. Safe Drinking Water Act Rules, R 88-26, slip op. at 26-29 (Aug. 9, 1990). IEPA proposed to adopt the two remaining provisions of Part 607 as part of its proposed Part 604. To avoid duplication and to clarify the rules, IEPA intends to repeal the two remaining sections of Part 607 after adoption of Part 604. SR at 12-13; *see* Prop. 607 at 1-2.

Section 607.103: Emergency Operation

Subsection (a). This subsection requires a PWS to issue a boil order in cases of microbiological contamination. IEPA argued that it overlaps with 35 Ill. Adm. Code 653.303 (Emergency Operation). SR at 69-70. IEPA proposed to repeal this requirement from Part 607 (Prop. 607 at 1) and move it to Section 604.135(c)(1) (Prop. 604 at 10-11).

Subsection (b). This subsection requires a PWS to issue a boil order when distribution pressure drops below 20 pounds per square inch, unless three conditions apply. SR at 70. IEPA proposes to repeal this requirement from Part 607 (Prop 607 at 2) and move it to Section 604.135(c)(3) (Prop. 604 at 11-12).

Subsection (c). This subsection requires a water supply to notify consumers and IEPA of waterborne hazards and take action to protect the supply. IEPA proposes to repeal this requirement from Part 607 (Prop. 607 at 2) and move it to Section 604.135(c)(2) (Prop. 604 at 11).

Section 607.104: Cross Connections

In addition to this provision of the Board' rules, Part 653 of IEPA's rules addresses cross connections. SR at 70; *see* 35 Ill. Adm. Code 653.801 – 653.805. IEPA proposed to repeal these requirements from Part 607 (Prop. 607 at 2-3) and move them to Sections 604.1500 and 604.1505(a) (Prop. 604 at 105). SR at 70.

Part 611: Primary Drinking Water Standards

IEPA stated that its proposed addition of Part 604 necessitates conforming changes to Part 611. SR at 2, 10, 13.

IEPA adds that, when the Board adopted Part 611, USEPA's Safe Drinking Water Act rules generally superseded the rules the Board had adopted in Parts 604 through 607. SR at 12. However, the Board retained some more stringent additional State requirements and moved them into Part 611. *Id*. IEPA now proposes to repeal from Part 611 those additional State requirements that are now addressed in Part 601 or proposed Part 604. *Id*.

The Board addresses these proposed amendments below section-by-section.

Section 611.107: Agency Inspection of PWS Facilities

IEPA characterizes this section as "an additional State requirement." SR at 66. IEPA proposes to repeal the entire section because it restates IEPA's statutory authority to conduct inspections and investigations. SR at 66; Prop. 611 at 30; *see* 415 ILCS 5/4(c), 4(d)(1) (2016). Part 602 addresses IEPA's inspection authority under the Act. SR at 66, *see* 35 Ill. Adm. Code 602.108 (Right of Inspection).

Section 611.110: Special Exception Permits

Subsections (a)-(d) address initiating, issuing, appealing, and violating an SEP. IEPA proposes to repeal this language and adopt it in a new Section 602.600 under the general permitting requirements. SR at 12, 66; Prop. 611 at 30-31; *see* Prop. 602 at 22-23. IEPA does not propose to amend subsections (e)-(g) and re-designates them as subsections (a)-(c). Prop. 611 at 31-33.

Board Notes for re-designated subsections (a) and (c) include cross references to the original designations as subsection (e), (f), and (g). Prop. 611 at 31-32. In its order, the Board amends the cross references to reflect re-designation of those subsections.

Section 611.115: Source Water Quantity

This provision addresses the adequacy of surface water and groundwater sources to meet the demand of a CWS. IEPA proposes to repeal this entire section because it addresses surface water quantity in proposed Section 604.205 and groundwater quantity in proposed Section 604.230. SR at 12, 66; *see* Prop. 604 at 16-17, 19-20.

Section 611.121: Maximum Contaminant Levels and Finished Water Quality

Subsection (b) addresses finished water quality. IEPA proposes to repeal this language and adopt it as Section 601.101(b). SR at 12, 67; Prop. 604 at 33; *see* Prop. 601 at 1.

IEPA does not propose to amend subsection (c) and re-designates it as subsection (b). Prop. 611 at 34.

Section 611.231: Source Water Quality Conditions

Subsection (c) requires that "[e]ach CWS must take its raw water from the best available source that is economically reasonable and technically possible." 35 Ill. Adm. Code 611.231(c). IEPA proposes to repeal this language and adopt it in Section 604.200(a). SR at 67; Prop. 611 at 36; *see* Prop. 604 at 15. IEPA does not propose to amend subsection (d) and re-designates it as subsection (c). Prop. 611 at 36.

The re-designated subsection (c) provides that "[u]se of recycled sewage treatment plant effluent by a CWS on a routine basis must not be permitted." The Board asked IEPA to comment on whether this limitation applies if the effluent meets all applicable source water requirements under Part 604, Subpart B. Board Questions at 17. IEPA responded that this provision is based on an existing Board rule. IEPA Resp. at 27. IEPA states that the provision limits the use of recycled effluent regardless of whether it meets the requirements of proposed Part 604. *Id*.

The Board also asked IEPA to comment on whether this additional state limitation would be more appropriately codified in the source water requirements in Section 604.200 than in Section 611.231, which lists conditions IEPA must consider when determining whether to require filtration. Board Questions at 18. IEPA responded that, to avoid confusion, the language must remain in Part 611 because this section derives chiefly from 40 C.F.R. 141.71(a) (2003). IEPA Resp. at 27.

Section 611.240: Disinfection

Subsection (g) requires that a CWS must chlorinate groundwater that is not under the direct influence of surface water. IEPA proposes to repeal this language and move it to proposed Section 604.700. SR at 67; Prop. 611 at 37; *see* Prop. 604 at 56-60. IEPA argued that "[t]he continuous chlorination requirement for all community water supplies fits better in Part 604: Subpart G Disinfection." SR at 67; *see* Prop. 604 at 56-57. IEPA added that the original Surface Water Treatment Rule requirements were located in Part 611: Subpart B. SR at 12, 67.

Section 611.271: Protection During Repair Work

This provision requires a supplier to prevent contamination during repair, reconstruction, or alteration, and it includes a Board Note that "[t]his is an additional State requirement." IEPA proposes to repeal this language here and adopt these requirements in Section 604.135(a). SR at 12, 67; Prop. 611 at 45; *see* Prop. 604 at 10.

Section 611.272: Disinfection Following Repair

This provision requires a supplier to disinfect any portion of the system after repairing, reconstructing, or altering it and before placing it into operation. It includes a Board Note that "[t]his is an additional State requirement." IEPA proposes to repeal this language here because it proposes to adopt these requirements in Section 604.135(b). SR at 12, 67; Prop. 611 at 45; *see* Prop. 604 at 10.

Section 611.297: Corrosion Control

Under this provision, "[a] supplier may be required to install and maintain optimal corrosion control. . . ." IEPA proposes to repeal the entire section. IEPA argues that Subpart G of Part 611 includes corrosion control requirements, which make this section unnecessary. SR at 12, 67; Prop. 611 at 47; *see* 35 Ill. Adm. Code 611.350 – 611.361.

Section 611.491: Laboratory Testing Equipment

This provision requires suppliers to have specified equipment, and it includes a Board Note that "[t]his is an additional State requirement." IEPA proposes to repeal this language because it proposes equipment requirements in Section 604.130. SR at 12, 68; Prop. 611 at 129; *see* Prop. 604 at 8-10.

Section 611.831: Monthly Operating Report

This provision requires each CWS to submit a monthly report to IEPA, and it includes a Board Note that "[t]his is an additional State requirement." IEPA proposes to repeal this language because it proposes reporting requirements in Section 604.165. SR at 12, 68; Prop. 611 at 199; *see* Prop. 604 at 15.

Section 611.833: Cross Connection Reporting

This provision requires specified suppliers to report to IEPA on "activity to educate and inform its customers about preventing contamination into the distribution system," and it includes a Board Note that "[t]his is an additional State requirement." IEPA proposes to repeal this section because it proposes cross connection rules in Subpart O of Part 604. SR at 12, 68; Prop. 611 at 199; *see* Prop. 604 at 105-110 (proposed Subpart O).

Cross References. Section 611.110 now addresses initiating, issuing, appealing, and violating an SEP. Because proposed new Part 604 includes SEPs, IEPA proposes to move language authorizing SEPs from Section 611.110 to the general permitting language in Part 602. SR at 12; *see* Prop. 602 at 22-23. However, in numerous sections, Part 611 refers to an SEP issued "pursuant to Section 611.110." IEPA proposed to remove that reference from the following provisions:

> 611.101, 611.161, 611.202. 611.240, 611.241, 611.250, 611.251, 611.261, 611.280, 611.290, 611.300, 611.350, 611.351, 611.352, 611.353, 611.354, 611.355, 611.356, 611.358, 611.359, 611.360, 611.381, 611.480, 611.500, 611.521[14], 611.531, 611.532, 611.533, 611.602, 611.603, 611.604, 611.605, 611.612, 611.646, 611.648, 611.731, 611.732, 611.733, 611.800, 611.801, 611.802, 611.803, 611.804, 611.840, 611.885, 611.901, 611.902, 611.903, 611.904, 611.920, 611.922, 611.924, 611.953, 611.955, 611.970, 611.971,

[14] The Board repealed Section 611.521 on December 21, 2017 (SDWA Update, USEPA Amendments (July 1, 2016 through December 31, 2016), R17-12), and the Board's order does not include IEPA's proposed amendment of Section 611.521.

611.972, 611.973, 611.979, 611.1001, 611.1002, 611.1003, 611.1004, 611.1007, 611.1008, 611.1009, 611.1011, 611.1013, 611.1016, 611.1017, 611.1018, 611.1019, 611.1020, 611.1021, 611.1053, 611.1054, 611.1055, 611.1056, 611.1057, 611.1058, 611.1059, 611.Appendix G, and 611.Table C. SR at 68.

ECONOMIC REASONABLENESS AND TECHNICAL FEASIBILITY

Economic Impact Study

As required by Section 27(b) of the Act (415 ILCS 5/27(b) (2016)), the Board requested in a letter dated August 28, 2017, that DCEO conduct an economic impact study of IEPA's proposed rules. The Board requested that DCEO determine by October 13, 2017, whether it would conduct such a study. The Board received no response to this request. No person at either hearing testified or commented on the Board's request or the lack of a response to it from DCEO. Tr.1 at 70; Tr.2 at 48.

Affected Facilities

IEPA expects that its proposed rules would affect "all community water supplies" in the state. SR at 71. IEPA regulates 1,744 community water supplies serving a total of 11,966,511 persons. *Id*. Approximately 1,006 of these use groundwater sources, 98 use either surface water or groundwater under the direct influence of surface water, and 652 purchase water from other community water supplies. *Id*.

Technical Feasibility

IEPA states that its proposal does not require installation of any specific water treatment technology. SR at 70. Because the proposal consolidates and updates existing design, operation, and maintenance rules, IEPA argues that it clarifies implementation and compliance. *See id*. IEPA states that its proposal largely reflects the current practices employed by community water supplies in Illinois and throughout the United States. *Id*. In addition, IEPA has proposed Section 604.145(a), which allows a CWS flexibility to modify or replace components to meet the requirements of the proposed new Part 604. *See* 35 Ill. Adm. Code 653.203; SR at 18. Based on this record, the Board concludes that its first-notice proposal is technically feasible.

Economic Reasonableness

IEPA argues that the proposal simplifies compliance and reduces costs by consolidating design, operation, and maintenance requirements into a single Part of the Board's rules. SR at 70-71. IEPA characterizes this as "an economic benefit" to regulated entities and the people of Illinois. *Id*. at 71. Because the proposal does not require installation of any specific technology, IEPA states that "it is difficult to quantify the economic costs associated with compliance." *Id*. at 70. IEPA argues that, because most of the proposed requirements are already in use, "its proposal will not result in an adverse impact to the citizens of Illinois." *Id*. at 71. As noted above, proposed Section 604.145(a) provides CWSs some flexibility to modify or replace components to comply with the new Part 604. In addition, the Board has specifically addressed

IEPA's proposed Part 604.725(a) establishing minimum chlorine residuals and found that it is economically reasonable in light of its expected public health benefits. Based on this record, the Board concludes that its first-notice proposal is economically reasonable.

FILING COMMENTS ON THE BOARD'S FIRST-NOTICE PROPOSAl

First-notice publication of the Board's proposal in the Illinois Register will start a period of at least 45 days during which any person may file a public comment with the Board, regardless of whether the person has already filed a public comment. 5 ILCS 100/5-40(b) (2016).

The Board welcomes comment on any part on its proposed amendments. In its order above, the Board specifically requested comment on the following four issues:

1) For proposed Section 604.725(a), the Free Chlorine Comments address the detection limit for equipment used to report a free chlorine residual. The Comments argue that reasonably priced methods can reliably report a concentration of 0.2 mg/L. They suggest that systems using less precise methods must meet a more stringent standard. The Board seeks IEPA's comment on this proposal, and the Board welcomes comment on it from any of the other participants.

2) For proposed Section 604.725(a), CDWM questioned whether a system would be non-compliant if it has more than five percent of sites falling below the proposed limit or if it has a single site below that limit. While the Board believes that the language of IEPA's current rule and proposal address this question, the Board requests IEPA's response and welcomes comment from any of the other participants.

3) For proposed Section 604.725(a), CDWM requested that the Board amend IEPA's proposal to allow HPC measurements as evidence of disinfection when the chlorine residual is less than 0.5 ppm. The Board requests that IEPA comment with its position on CDWM's proposal, argument in support of that position, and any revision to Section 604.725 it may wish to offer. The Board also welcomes comment on this issue from any of the other participants, including any elaboration CDWM may wish to offer.

4) For proposed Section 604.725(a), CDWM commented that adding chlorine gas to meet IEPA's proposed requirement may increase pH and corrosion of metals. The Board requests IEPA's response and welcome comments from any of the other participants.

Comments must be filed electronically through the Clerk's Office On-Line (COOL) on the Board's website (www.ipcb.state.il.us). The comment should indicate the docket number for this rulemaking, R18-17. Questions about filing comments can be directed to the Clerk's Office at 312-814-3461. Public comments and all other filings with the Clerk must be served on the

hearing officer and on those persons on the Service List for this rulemaking. The current version of the Service List for R18-17 is available on COOL.

CONCLUSION

The Board proposes to revise its public water supplies rules by adding a new Part 604 and amending Parts 601, 602, 607, and 611. The proposed rules appear in the addendum; except for the new Part 604, proposed additions appear underlined, and proposed deletions appear struck trhgouh. Publishing the proposed rules in the *Illinois Register* will start a period of at least 45 days during which any person may file public comments with the Clerk of the Board.

ORDER

The Board directs the Clerk to file the first-notice proposal with the Secretary of State for publication in the *Illinois Register*.

IT IS SO ORDERED.

I, Don A. Brown, Clerk of the Illinois Pollution Control Board, certify that the Board adopted the above opinion and order on July 26, 2018, by a vote of 5-0.

Don A. Brown

Don A. Brown, Clerk
Illinois Pollution Control Board

Addendum to Board Opinion of July 26, 2018

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE F: PUBLIC WATER SUPPLIES
CHAPTER I: POLLUTION CONTROL BOARD

PART 601
INTRODUCTION

Section
601.101 General Requirements
601.102 Applicability and Organization of this Chapter
601.103 Severability
601.104 Analytical Testing
601.105 Definitions
601.115 Incorporation by Reference

601.APPENDIX A References to Former Rules

AUTHORITY: Implementing Section 17 and authorized by Section 27 of the Environmental Protection Act [415 ILCS 5/17 and 27].

SOURCE: Filed with Secretary of State January 1, 1978; amended at 2 Ill. Reg. 36, p. 72, effective August 29, 1978; amended at 3 Ill. Reg. 13, p. 236, effective March 30, 1979; amended and codified at 6 Ill. Reg. 11497, effective September 14, 1982; amended at 6 Ill. Reg. 14344, effective November 3, 1982; amended in R84-12 at 14 Ill. Reg. 1379, effective January 8, 1990; amended in R89-5 at 16 Ill. Reg. 1585, effective January 10, 1992; amended in R96-18 at 21 Ill. Reg.6537, effective May 8, 1997; amended in R15-22 at 40 Ill. Reg. 6784, effective April 15, 2016, amended in R18-17 at 42 Ill. Reg. _____, effective _____.

Section 601.101 General Requirements

a) Owners and official custodians of a public water supply in the State of Illinois mustshall provide, underpursuant to the Act, Board Rules, and the Safe Drinking Water Act (42 USC 300f et seq.), continuous operation and maintenance of public water supply facilities to assure so that the water isshall be assuredly safe in quality, clean, adequate in quantity, and of satisfactory mineral characteristics for ordinary domestic consumption.

b) Finished Water Quality

1) The finished water delivered to any user at any point in the distribution system must contain no impurity at a concentration that may be hazardous to the health of the consumer or that would be excessively corrosive or otherwise deleterious to the water supply. Drinking water delivered to any

user at any point in the distribution system must contain no impurity that could reasonably be expected to cause offense to the sense of sight, taste, or smell.

2) No substance used in treatment should remain in the water at a concentration greater than that required by good practice. A substance that may have a deleterious physiological effect, or one for which physiological effects are not known, must not be used in a manner that would permit it to reach the consumer.

3) Concentrations of constituents listed below should not be exceeded in the finished water.

Contaminant	**Secondary MCL**	**Noticeable Effects above the Secondary MCL**
Aluminum	0.2 mg/L.	colored water
Chloride	250 mg/L.	salty taste
Color	15 color units.	visible tint
Copper	1 mg/L.	metallic taste; blue-green staining
Fluoride	2.0 mg/L.	tooth discoloration
Foaming Agents	0.5 mg/L.	frothy, cloudy; bitter taste; odor
Iron	0.3 mg/L.	rusty color; sediment; metallic taste; reddish or orange staining
Manganese	0.05 mg/L.	black to brown color; black staining; bitter metallic taste
Odor	3. T.O.N. (Threshold Odor Number)	"rotten-egg", musty or chemical smell
Silver	0.1 mg/L.	skin discoloration; graying of the white part of the eye
Sulfate	250 mg/L.	salty taste

Total Dissolved Solids	500 mg/L.	hardness; deposits; colored water; staining; salty taste

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 601.105 Definitions

a) For purposes of 35 Ill. Adm. Code 601, 602, 603 and 604~~607~~, unless a different meaning of a word or term is clear from the context:

"Act" means the Environmental Protection Act [415 ILCS 5].

"Agency" means the Illinois Environmental Protection Agency.

"Air gap" means the unobstructed vertical distance through the free atmosphere between the water discharge point and the flood level rim of the receptacle.

"Atmospheric vacuum breaker" means a device designed to admit atmospheric pressure into a piping system whenever a vacuum is caused on the upstream side of the receptacle.

"Aquifer Property Data" means the porosity, hydraulic conductivity, transmissivity and storage coefficient of an aquifer, head and hydraulic gradient.

"Board" means the Illinois Pollution Control Board.

"Boil Order" means a notice to boil all drinking and culinary water for at least five minutes before use, issued by the proper authorities to the consumers of a public water supply affected, whenever the water being supplied may have become microbiologically contaminated.

"Certified Laboratory" means any laboratory certified under~~pursuant to~~ Section 4(o) of the Act, or certified by USEPA for the specific parameters to be examined.

"Chlorine"

"Chlorine Demand" means the difference between the amount of chlorine applied to a given water and the amount of total available chlorine remaining at the end of the contact period. All test

conditions (contact time, pH and temperature) must be given, expressing the chlorine demand in a given water.

"Combined Chlorine" means the reaction product formed when chlorine has reacted with ammonia to form chloramines.

"Free Chlorine" means the residual chlorine existing in water as the sum of hypochlorous acid and hypochlorite ion.

"Total Chlorine" means the sum of the free chlorine and the combined chlorine.

"Community Water Supply" or "CWS" *means a public water supply which serves or is intended to serve at least 15 service connections used by residents or regularly serves at least 25 residents*~~means a public water supply which serves or is intended to serve at least 15 service connections used by residents or regularly serves at least 25 residents~~. (Section 3.145 of the Act)

"Confined Geologic Formations" are geologic water bearing formations protected against the entrance of contamination by other geologic formations.

"Conventional filtration treatment" means a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in substantial particulate removal.

"Cross-connection""~~Cross-connection"~~ means any physical connection or arrangement between two otherwise separate piping systems where flow from one system to the other is possible~~, one of which contains potable water that contains water of unknown or questionable safety, steam, or one or more gases; chemicals or other substances when flow from one system to the other is possible~~.

~~"Direct Cross-connection" means a cross-connection formed when a piping system containing potable water is physically joined to another piping system containing water of unknown or questionable safety, steam, or one or more gases, chemicals or other substances.~~

~~"Indirect Cross-connection" means a cross-connection formed when water of unknown or questionable safety, steam or one or more gases, chemicals or other substances from one piping system can be~~

~~forced, drawn by vacuum or otherwise introduced into another piping system containing potable water.~~

"CT" or "CT_{calc}" is the product of "residual disinfectant concentration" (RDC or C) in mg/L determined before or at the first customer, and the corresponding "disinfectant contact time" (T) in minutes. If a supplier applies disinfectants at more than one point prior to the first customer, it must determine the CT of each disinfectant sequence before or at the first customer to determine the total percent inactivation or "total inactivation ratio." In determining the total inactivation ratio, the supplier must determine the RDC of each disinfection sequence and corresponding contact time before any subsequent disinfection application points.

"Disinfectant" means any agent, including but not limited to chlorine, chlorine dioxide, chloramines, and ozone, added to water in any part of the treatment or distribution process, that is intended to kill or inactivate pathogenic microorganisms.

"DPD method" means an analytical method for determining chlorine residual utilizing the reagent DPD (n-diethyl-p-phenylenylenediamine).

"Effective external linkage" is the ability of a water system to communicate and exchange information with water customers, regulators, technical and financial assistance organizations, and other entities that routinely interact with the water system.

"Groundwater" means underground water which occurs within the saturated zone and geologic materials where the fluid pressure in the pore space is equal to or greater than atmospheric pressure. (Section 3.210 of the Act)

"Head" means the sum of the elevation head, pressure head and velocity head at a given point in an aquifer.

"Hydraulic Conductivity" means the rate of flow in gallons per day (gpd) through a cross section of one square foot (ft^2) under a unit hydraulic gradient (gpd/ft^2).

"Hydraulic Gradient" means the rate of change of total head per unit distance of flow in a given direction.

"Infrastructure" means all mains, pipes and structures through which water is obtained and distributed to the public, including wells and well structures, intakes and cribs, pumping stations, treatment plants, reservoirs, storage

tanks and appurtenances, collectively or severally, actually used or intended to be used for the purpose of furnishing water for drinking or general domestic use.

"Interconnection" means a physical connection between two or more community water supply systems.

"Maximum Average Daily Demand" or "Maximum Demand" means highest average daily production over seven consecutive days ~~the maximum seven day production period~~.

"New Community Water Supply" means, beginning after October 1, 1999, all new community water supplies and those water supplies that expand their infrastructure to serve or intend to serve at least 15 service connections used by residents or regularly serves at least 25 residents. Any water supply not currently a community water supply that adds residents so that the total served is 25 residents or more without constructing additional infrastructure will become a community water supply, but will not be required to demonstrate capacity under 35 Ill. Adm. Code 602.103 unless the community water supply is on restricted status as required by 35 Ill. Adm. Code 602.106.

"Non-community Water Supply" means *a public water supply that is not a community water supply*. (Section 3.145 of the Act)

"Official Custodian" means *an individual who is an* officer of an *entity that* is the owner of a *community* water supply *and acts as the owner's agent in matters concerning the community water supply*. [415 ILCS 45/9.4]

"Porosity" means the percentage of the bulk volume of a rock or soil that is occupied by interstices, whether isolated or connected, as defined by the ratio of the pore volume to the total volume of a representative sample of the medium.

"Public Water Supply" or "PWS"~~*or "PWS"*~~ *means all mains, pipes and structures through which water is obtained and distributed to the public, including wells and well structures, intakes and cribs, pumping stations, treatment plants, reservoirs, storage tanks and appurtenances, collectively or severally, actually used or intended for use for the purpose of furnishing water for drinking or general domestic use and which serve at least 15 service connections or which regularly serve at least 25 persons at least 60 days per year.* (Section 3.365~~28~~ of the Act)

"Responsible Operator in Charge" *means an individual who is designated as a Responsible Operator in Charge of a community water supply* underpursuant to Section 1 of the Public Water Supply Operations Act [415 ILCS 45/1] and 35 Ill. Adm. Code 603. [415 ILCS 45/9.6]

"Satellite supply" means any community water supply that: purchases all finished water from another community water supply; does not provide any treatment other than chlorination or corrosion control; and distributes finished water to the consumers.

"Sell Water" means to deliver or provide potable water, obtained from a public water supply subject to these regulations, to the consumer, who is then individually or specifically billed for water service, or where any monetary assessment is levied or required and specifically used for water service. Water supply facilities owned or operated by political subdivisions, homeowners' associations, and not-for-profit associations, as well as privately owned utilities regulated by the Illinois Commerce Commission, are considered to sell water whether or not a charge is specifically made for water.
"SEP" means special exception permit.

"Service Connection" is the opening, including all fittings and appurtenances, at the water main through which water is supplied to the user through a water service line.

"Storage Coefficient" means the volume of water an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in head.

"Surface Water" means all tributary streams and drainage basins, including natural lakes and artificial reservoirs, which may affect a specific water supply above the point of water supply intake.

"Surface Water Supply Source" means any surface water used as a water source for a public water supply.

"Supply" means a community water supply.

"Transmissivity" means the rate in gallons per minute (gpm), at which water is transmitted horizontally through a unit width by the total saturated thickness of an aquifer, in feet (ft), under a unit hydraulic gradient (gpm/ft).

"Water Main" means any pipe for the purpose of distributing potable water that serves or is accessible to more than one property, dwelling or rental unit and is exterior to buildings.

"Water Service Line" means any pipe from the water main or source of potable water supply that serves or is accessible to not more than one property, dwelling or rental unit of the user.

"Well Hydraulics" means equations that are applied to understand the effect that a pumping well structure has on inducing the movement of water through permeable rock formations and certain aquifer properties to determine the rate of withdrawal of the well. This term is inclusive of equations that quantify wellbore skin effects/well loss.

"Wellhead Protection Area" or "WHPA" means the surface and subsurface recharge area surrounding a community water supply well or well field, delineated outside of any applicable setback zones (underpursuant to Section 17.1 of the Act) established underpursuant to Illinois' Wellhead Protection Program, through which contaminants are reasonably likely to move toward the well or well field.

"Wellhead Protection Measures" means management practices needed to mitigate existing and future threats to the water quality within the delineated WHPA.

"Wellhead Protection Program" means the Wellhead Protection Program for the State of Illinois, approved by USEPA under section 1428 of the SDWA (42 USC 300h-7).

b) Terms not specifically defined in subsection (a), will have the meanings ascribed in 35 Ill. Adm. Code 611.

c) Terms not specifically defined in subsections (a) or (b) will have the meanings specified in The Water Dictionary, incorporated by reference in Section 601.115.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 601.115 Incorporations by Reference

a) Abbreviations and Short-name Listing of References. The following names and abbreviated names are used in this Chapter I to refer to materials incorporated by reference:

"ANSI" means those standards published by American National Standards Institute (ANSI).

"ASME" means the American Society of Mechanical Engineers.

"ASTM" means those standards published by American Society for Testing and Materials ~~(ASTM)~~.

"AWWA" means those standards published by the American Water Works Association.

"NSF" means those standards published by the National Science Foundation International.

"Recommended Standards" means "Recommended Standards for Water Works − Policies for the Review and Approval of Plans and Specifications for Public Water Supplies".

b) The Agency incorporates the following materials by reference:

ASME. American Society of Mechanical Engineers, Two Park Avenue, New York NY 10016, (800) 843-2763, www.asme.org.

ASME BPVC-VIII-1-2015, Boiler & Pressure Vessel Code (BPVC), Section VIII—Rules for Construction of Pressure Vessels, Division 1: Rules for Construction and Pressure Vessels, 2015.

ASTM. American Society for Testing and Materials, 100 Barr Harbor Drive, PO Box C700, West Conshohocken PA 19428-2959, (610)832-9500.

ASTM C 76-16 Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe, approved November 1, 2016.

ASTM C361-16 Standard Specification for Reinforced Concrete Low-Head Pressure Pipe, approved September 1, 2016.

ASTM C443-12 Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets, approved September 1, 2012.

ASTM D 1784-11, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds, approved May 1, 2011.

ASTM D 1785-15 Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120, approved August 1, 2015.

ASTM D 2241-09, Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series), approved December 1, 2009.

ASTM D 2464-15 Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80, approved March 1, 2015.

ASTM D 2466-15 Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40, approved March 1, 2015.

ASTM D 2467-15 Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80, approved March 1, 2015.

ASTM D 2564-12 Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems, approved August 1, 2012.

ASTM D 3139-11 Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals, February 1, 2011.

ASTM F 437-15 Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80, approved March 1, 2015.

ASTM F 438-15 Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40, approved March 1, 2015.

ASTM F 439-13 Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80, approved August 2013.

ASTM F 441/F 441M–15 Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80, approved August 1, 2015.

ASTM F 442/F 442M-13 Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR–PR), approved June 1, 2013.

ASTM F 477-14 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe, approved September 15, 2014.

ASTM F 493-14 Standard Specification for Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings, approved November 1, 2014.

ASTM F 1216-16 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube, approved August 1, 2016.

AWWA. American Water Works Association et al., 6666 West Quincy Ave., Denver CO 80235, (303)794-7711.

~~ANSI/~~AWWA A100-06, Water Wells, approved February 2, 2006, effective August 1, 2006.

~~ANSI/~~AWWA B100-09, Granular Filter Material, approved January 25, 2009, effective March 1, 2010.

~~ANSI/~~AWWA C151/A21.51-09, Ductile-Iron Pipe, Centrifugally Cast, approved January 25, 2009, effective September 1, 2009.

~~ANSI/~~AWWA C200-12, Steel Water Pipe, 6 In. (150 mm) and Larger, approved June 10, 2012, effective September 1, 2012.

~~ANSI/~~AWWA C301-07, Prestressed Concrete Pressure Pipe, Steel-Cylinder Type, approved January 21, 2007, effective June 1, 2007.

~~ANSI/~~AWWA C651-05, Disinfecting Water Mains, approved January 16, 2005, effective June 1, 2005.

~~ANSI/~~AWWA C652-11, Disinfection of Water Storage Facilities, approved June 12, 2011, effective October 1, 2011.

~~ANSI/~~AWWA C653-03, Disinfection of Water Treatment Plants, approved January 19, 2003, effective June 1, 2003.

~~ANSI/~~AWWA C654-03, Disinfection of Wells, approved January 19, 2003, effective November 1, 2003.

AWWA C900-07 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution, 2007.

~~ANSI/~~AWWA C905-10, Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 48 In. (350 mm Through 1,200 mm), approved January 17, 2010, effective April 1, 2010.

AWWA C906-07 Polyethylene (PE) Pressure Pipe and Fittings, 4 In. (100 mm) Through 63 In. (1,600 mm) for Water Distribution and Transmission, 2007.

AWWA C907-12 Injection-Molded Polyvinyl Chloride (PVC) Pressure Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water, Wastewater, and Reclaimed Water Service, effective March 1, 2012.

AWWA C909 -09 Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe, 4 In. through 24 In. (100 mm through 600 mm) for Water, Wastewater, and Reclaimed Water Service, effective March 1, 2010.

~~ANSI/~~AWWA D100-11, Welded Carbon Steel Tanks for Storage, approved January 23, 2011, effective July 1, 2011.

~~ANSI/~~AWWA D103-09, Factory Coated Bolted Carbon Steel Tanks for Water Storage, approved January 25, 2009, effective November 1, 2009.

~~ANSI/~~AWWA D107-10, Composite Elevated Tanks for Water Storage, approved January 17, 2010, effective December 1, 2010.

"Improving Clearwell Design for CT Compliance" (1999).

"The Water Dictionary", 2nd Edition, 2010.

The Chlorine Institute, 1300 Wilson Boulevard, Suite 525, Arlington VA, 22209, (703) 894-4140, pubs@CL2.com.

Pamphlet 6: Piping Systems for Dry Chlorine, Edition 16, March 2013.

NSF. National Sanitation Foundation International, 3475 Plymouth Road, PO Box 130140, Ann Arbor MI 48113-0140, (734)769-8010.

NSF/ANSI 14-2012 Plastics Piping System Components and Related Materials, March 2013.

NFS/ANSI 60-2013 Drinking Water Treatment Chemicals − Health Effects, April 2014.

NSF/ANSI 61-2013 Drinking Water System Components − Health Effects, March 2014.

NSF/ANSI 372-2011 Drinking Water System Components—Lead Content, July 2013

"Recommended Standards for Water Works – Policies for the Review and Approval of Plans and Specifications for Public Water Supplies", 2012 Edition, Great Lakes − Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, Health Research Inc., Health Education Services Division, PO Box 7126, Albany NY 12224, (518)439-7286.

"Standard Specifications for Water and Sewer Main Construction in Illinois", 7th Edition, 2014, Illinois Society of Professional Engineers, 100 East Washington Street, Springfield IL 62701, (217)544-7424.

USEPA, NSCEP. United States Environmental Protection Agency, National Service Center for Environmental Publications, P.O. Box 42419, Cincinnati, OH 45242-0419 (accessible on-line and available by download from http://www.epa.gov/nscep/)

Disinfection Profiling and Benchmarking Guidance Manual, August 1999, EPA 815-R-99-013

Optimal Corrosion Control Treatment Evaluation Technical Recommendations for Primacy Agencies and Public Water Systems, March 2016, EPA 816-B-16-003

c) No later amendments to or editions of the materials listed in subsection (b) are incorporated.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE F: PUBLIC WATER SUPPLIES
CHAPTER I: POLLUTION CONTROL BOARD

PART 602
PERMITS

SUBPART A: GENERAL PERMIT PROVISIONS

SUBPART B: CONSTRUCTION PERMITS

SUBPART C: OPERATING PERMITS

SUBPART D: ALGICIDE PERMITS

SUBPART E: OTHER AQUATIC PESTICIDE PERMITS

SUBPART F: SPECIAL EXCEPTION PERMITS

AUTHORITY: Implementing Section 17 and authorized by Section 27 of the Environmental Protection Act [415 ILCS 5/17 and 27].

SOURCE: Filed with Secretary of State January 1, 1978; amended and codified at 6 Ill. Reg. 11497, effective September 14, 1982; amended at 8 Ill. Reg. 2157, effective February 7, 1984; emergency amendment at 9 Ill. Reg. 13371, effective August 16, 1985, for a maximum of 150 days; amended at 10 Ill. Reg. 7337, effective April 22, 1986~~,~~; amended in R96-18 at 21 Ill. Reg. 6562, effective May 8, 1997; amended in R03-21 at 27 Ill. Reg.18030, effective November 12, 2003; amended in R15-22 at 40 Ill. Reg. 6799, effective April 15, 2016; amended in R18-17 at 42 Ill. Reg. _____, effective _____.

SUBPART A: GENERAL PERMIT PROVISIONS

Section 602.102 Community Water Supply Permits

A community water supply may seek the following types of permits issued by the Agency:

a) Construction Permit, under~~pursuant to~~ Subpart B ~~of this Part~~;

b) Operating Permit, under~~pursuant to~~ Subpart C ~~of this Part~~;

c) Algicide Permit, under~~pursuant to~~ Subpart D ~~of this Part; or~~

d) Aquatic Pesticide Permit, under~~pursuant to~~ Subpart E; or ~~of this Part.~~

e) A special exception permit, under Subpart F.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 602.105 Standards for Issuance

a) Construction Permits and Operating Permits

1) The Agency will~~shall~~ not issue any construction or operating permit required by this Part unless the applicant submits adequate proof that the community water supply will be constructed, modified or operated so as not to cause a violation of the Act or Board rules.

2) Except as provided in subsection (a)(3), the Agency will~~shall~~ not issue any construction or operating permit required by this Part unless the applicant submits adequate proof that the community water supply facility conforms to the following design criteria. When the design criteria in the documents listed in this subsection (a)(2) conflict, the applicant must comply with the design criteria listed in subsection (a)(2)(A).

A) Criteria promulgated by the Board~~Agency~~ under 35 Ill. Adm. Code 604~~Section 39(a) of the Act or Section 602.115~~;

B) Recommended Standards for Water Works, incorporated by reference at 35 Ill. Adm. Code 601.115; and

C) AWWA, ASTM, ANSI or NSF standards incorporated by reference at 35 Ill. Adm. Code 601.115.

3) When the documents listed in subsection (a)(2) do not provide design criteria for the proposed community water supply facility, the Agency will~~must~~ not issue the construction or operating permit unless the applicant submits adequate proof that the community water supply facility conforms to other design criteria that ~~the applicant proves~~ will produce consistently satisfactory results. The Agency may require a pilot study.

4) The Agency will~~shall~~ not issue any construction permit required by this Part unless the applicant submits proof that all plan and specification documents required by this Section and Subpart B ~~of this Part~~ have been prepared by a person licensed under the Illinois Architecture Practice Act [225 ILCS 305], the Illinois Professional Engineering Practice Act [225 ILCS 325], the Illinois Structural Engineering Licensing Act [225 ILCS 340], or, for site and groundwater conditions, under the Professional Geologist Licensing Act [225 ILCS 745], or any required combination of these Acts.

5) The Agency will~~must~~ not issue a construction permit unless the community water supply has filed a notification of ownership under~~pursuant to~~ 35 Ill. Adm. Code 603.101.

6) The existence of a violation of the Act, Board regulation, or Agency regulation will not prevent the issuance of a construction permit if:

A) the applicant has been granted a variance or an adjusted standard from the regulation by the Board;

B) the permit application is for construction or installation of equipment to alleviate or correct a violation;

C) the permit application is for a water main extension to serve existing residences or commercial facilities when the permit applicant can show that those residences or commercial facilities are being served by a source of water of a quality or quantity that violates the primary drinking water standards of 35 Ill. Adm. Code 611; or

D) the Agency determines the permit application is for construction or installation of equipment necessary to produce water that is assuredly safe, as required by 35 Ill. Adm. Code 601.101.

b) Algicide or Aquatic Pesticide Permit

The Agency will~~must~~ not issue an algicide or pesticide permit required by this Part unless the applicant submits adequate proof that the application of the algicide or aquatic pesticide will not cause a violation of the Act, Board regulation, or Agency regulation.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 602.106 Restricted Status

a) Restricted status is~~shall be~~ defined as the Agency determination, under~~pursuant to~~ Section 39(a) of the Act and Section 602.105, that a community water supply facility, or portion thereof, may no longer be issued a construction permit without causing a violation of the Act or Board or Agency rules. Violations of Board rules that can result in a restricted status determination include, but are not limited to, regulations establishing maximum contaminant levels, treatment techniques, source water quantity requirements, treatment unit loading rates, storage volume requirements, and minimum pressure for a distribution system.

1) When the Agency cannot issue a construction permit to a community water supply because that issuance would extend an existing violation of the Act or Board or Agency rules, the Agency must place the community water supply on restricted status.

2) Except as specified in Section 602.105(a)(6)~~602.105(a)(5)~~, the Agency must not issue a permit for water main extension construction when the water main would extend an existing violation of the Act or Board or Agency rules.

b) The Agency must publish on its website and in the Environmental Register and update, at intervals of not more than three months, a comprehensive list of community water supplies subject to restrictive status. This list will be entitled the "Restricted Status List".

c) The Agency must~~shall~~ notify the owners or official custodian and Responsible Operator in Charge of a community water supply when the community water supply is initially placed on restricted status by the Agency.

d) The restricted status list must include a statement of the potential or existing violation of the Act or Board regulations that caused the community water supply's inclusion on the list.

e) Owners or official custodians of community water supplies that have been placed on restricted status must notify any person requesting construction of a water main extension of this status.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 602.115 Design, Operation, and Maintenance Criteria <u>(Repealed)</u>

~~a)~~ ~~The Agency may adopt criteria in rules for the design, operation, and maintenance of community water supply facilities as necessary to insure safe, adequate, and clean water. These criteria shall be revised from time to time to reflect current engineering judgment and advances in the state of the art.~~

~~b)~~ ~~Before adopting new criteria or making substantive changes to any of its rules for community water supplies, the Agency shall comply with the provisions of the Administrative Procedure Act [5 ILCS 100].~~

(Source: Repealed at 42 Ill. Reg. _____, effective _____)

SUBPART B: CONSTRUCTION PERMITS

Section 602.200 Construction Permit Requirement

a) No person <u>may</u>~~shall~~ cause or allow the construction of any new community water supply installation, or cause or allow the change of or addition to any existing community water supply, without a construction permit issued by the Agency.

b) Construction permits must be obtained by the owner or official custodian of a community water supply:

1) prior to beginning construction of any proposed community water supply;

2) prior to all alterations, changes or additions to an existing community water supply that may affect the sanitary quality, mineral quality or adequacy of the community water supply; ~~and~~

3) prior to adding new chemicals to the treatment process or changing the points of chemical application<u>; and</u>~~.~~

<u>4)</u> <u>prior to rehabilitating a water main using a liner.</u>

c) Except as required by subsection (b), a~~A~~ construction permit is not needed for normal work items such as:

1) installation of customer service connections to distribution system water mains;

2) installation or replacement of hydrants and valves in the distribution system;

3) repair of water mains, including replacement of existing water mains with mains of equivalent size pipe in the same location;

4) routine maintenance of equipment, such as painting, reconditioning or servicing;

5) replacement of chemical feeders, pumps, controls, filter media, softener resins, pipes and appurtenances that have the same rated capacity and specification as existing facilities previously permitted by the Agency; or

6) installation or replacement of meters.

d) All work performed on a community water supply must be in accordance with accepted engineering practices.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 602.210 Construction Permit Applications

All applications for construction permits required under this Part must contain, when appropriate, the following information and documents:

a) General information, including, but not limited to:

1) name of the community water supply;

2) community water supply identification number;

3) the name and mailing address of the owner or official custodian of the community water supply; and

4) name, scope and location of the project;

b) Engineer's report as specified in Section 602.225;

c) A summary of the design criteria as specified in Section 602.230;

d) Specifications as specified in Section 602.235~~602.635~~;

e) Plans as specified in Section 602.240;

f) Specific information for the type of construction, as follows:

1) For source construction, information specified in Section 602.245;

2) For the construction of treatment facilities, information specified in Section 602.250;

3) For the construction of storage facilities, information specified in Section 602.255;

4) For the construction of water mains, information specified in Section 602.260;

g) Water purchase contracts between water supplies and/or inter-municipal agreements, when applicable;

h) Evaluation of technical, managerial and financial capacity as specified in Section 602.103 for new community water supplies;

i) Certification by each person signing the application that the information in the application is complete and accurate, and that the text of the application has not been changed from the Agency's official construction permit application form; and

j) Any other information required by the Agency for proper consideration of the permit.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 602.220 Alterations

a) Before any deviations from plans and specifications approved by the Agency are made, the owner or official custodian, or an authorized delegate, must make a written request for a supplemental permit. The written request must document all of the changes made to the previously approved plans and specifications. Only those changes identified will be considered for a supplemental permit.

b) Revised plans or specifications must be submitted to and approved by the Agency with the supplemental permit request.

c) The Agency must approve supplemental permit requests if those requests comply with Section 602.105 and this Subpart.

d) A supplemental permit is not required for minor changes that will not affect the location, capacity, hydraulic conditions, water treatment processes or sanitary or mineral quality of the water to be delivered.

e) A supplemental permit will not be granted to add water main after construction has begun, except for additional water main necessary due to a change in the connection point to the existing water distribution system or due to a change in route or alignment. A new application for construction permit must be submitted for water main to serve additional users.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 602.245 Source Construction Applications

~~Construction permit applications for the construction of a new, or the modification of an existing, well or surface water intake must include the information specified by this Section.~~

a) Construction permit applications for the construction of a new or the modification of an existing well or surface water intake, or the construction of a water main to transport water purchased from another community water supply must include the following:

1) Existing and proposed finished water quality including:

A) Hardness;

B) Calcium;

C) Alkalinity:

D) pH;

E) Orthophosphate;

F) Silicate;

G) Total Dissolved Solids;

H) Oxidation-reduction potential (ORP);

I) Temperature;

J) Chloride;

K) Sulfate;

L) Iron;

M) Manganese;

N) Chlorine residual (total); and

O) Chlorine residual (free).

2) A recommendation of the treatment necessary to reduce corrosion in household plumbing.

b) Well construction permit applications must specify the following:

1) the latitude and longitude of the well location;

2) the location and nature of all potential routes, potential primary sources, and potential secondary sources of contamination within 2,500 feet of the well location;

3) for sites subject to flooding, the well casing heights and maximum flood level based upon best available information, which includes, but is not limited to, the flood of record or the 100-year or 500-year flood projections;

4) a general aquifer description;

5) the total well depth;

6) the well casing diameter, material, depth, weight, height above ground, and thickness;

7) the grout type, thickness and depth;

8) the screen diameter, material, slot size and length, if applicable;

9) temporary capping and security measures during well construction;

10) proposed pump test procedures;

11) sampling procedures, if necessary under 35 Ill. Adm. Code 611.212, for wells that may be subject to surface water influences;

12) the type, design capacity, head rating, and depth of pump setting;

13) the column pipe diameter, length, material and joint;

14) the discharge pipe diameter, depth of cover, material and valving;

15) the casing vent diameter;

16) the airline length;

17) the location of the raw water sample tap;

18) a description of how the top of the well casing is sealed;

19) a description of access to the well site; and

20) well hydraulics and aquifer property data.

c)~~b)~~ The following information must be submitted on plans for well construction permit applications:

1) the well location with the following information: ~~and~~

A) a 2,500-foot radius showing the location of potential routes, potential primary sources, and potential secondary sources of contamination;

B) cleanup sites within 2,500 feet of the proposed well site with any of the following:

i) No Further Remediation (NFR) letter;

ii) Groundwater Management Zone (GMZ);

iii) Environmental Land Use Covenant (ELUC); or

iv) an ordinance which restricts the use of ground water; and

C)~~2)~~ ~~the well location and~~ a 400-foot radius showing the location of the sources of pollution listed in ~~Table A of~~ 35 Ill. Adm. Code 604.150(a)~~653.118~~;

~~2)~~3) a cross-section of the well showing finished grade, natural ground surface, vent, casing, column pipe, screen, well depth, pump depth, grout, gravel pack and discharge piping;

~~3)~~4) all discharge piping, including pressure gauge, meter, sample tap, check valve, shut-off valve and vacuum/air release valve, if applicable;

~~4)~~5) well house construction, if provided;

~~5)~~6) the locations of all electrical junction boxes;

~~6)~~7) the locations of all observation wells; and

~~7)~~8) piping showing the ability to pump to waste.

d)~~c)~~ The following information must be submitted on plans for surface water intake construction permit applications:

1) plan and profile views of the intake structure showing the location, elevation of intake ports, fish screens, valves, piping and pumps, if applicable;

2) for sites subject to flooding, maximum flood level based upon best available information, which includes, but is not limited to, the flood or record or the 100-year or 500-year flood projections;

3) location of inspection manholes, if applicable; and

4)~~3)~~ location of chemical treatment, if applicable.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 602.250 Treatment Construction Applications

The following information must be submitted on plans for the construction of treatment facilities:

a) all appurtenances, specific structures or equipment having any connection with the planned water treatment improvements;

b) detailed hydraulic profiles of water flowing through treatment systems;

c) schematic plumbing for all structures and equipment;

d) location of feeders, piping layout and points of application;

e) locations of the sources of pollution listed in ~~Table A of~~ 35 Ill. Adm. Code 604.150(a)~~653.118~~;

f) for sites subject to flooding, the maximum flood level based upon best available information, including, but not limited to, the flood of record or the 100-year or 500-year flood projections; ~~and~~

g) security provisions; and~~.~~

h) stability and corrosion control

1) existing and proposed finished water quality including but not limited to

A) Hardness;

B) Calcium;

C) Alkalinity:

D) pH;

E) Orthophosphate;

F) Silicate;

G) Total Dissolved Solids;

H) Oxidation-reduction potential (ORP);

I) Temperature;

J) Chloride;

K) Sulfate;

L) Iron;

M) Manganese;

N) Chlorine residual (total); and

O) Chlorine residual (free).

2) a recommendation of the treatment necessary to reduce corrosion in household plumbing.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 602.255 Storage Construction Applications

The following information must be submitted on plans for the construction of storage facilities:

a) storage capacity;

b) plan and profile views showing the location, elevation, piping, access hatches, vents, overflows, safety appurtenances and sample taps;

c) for below ground or partially below ground storage tanks, locations of the sources of pollution listed in ~~Table A of~~ 35 Ill. Adm. Code 604.150(a)~~653.118~~ within a 400-foot radius of the storage structure;

d) security provisions;

e) baffling arrangement, if applicable;

f) for sites subject to flooding, the maximum flood level based upon best available information, including, but not limited to, the flood of record or the 100-year or 500-year flood projections;~~ and~~

g) for hydropneumatic tanks, the bypass piping, access manhole, drain, sight glass, pressure gauge, pressure relief valve, air compressor and housing;

h) mixing systems, if applicable; and

i) the ability to drain a storage tank without causing the pressure in the distribution system to drop below 20 psi.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 602.260 Water Main Construction Applications

a) Water main construction permit applications must specify the following:

1) the existing population served by the present supply, and the population to be served by the water main extension;

2) the average daily pumpage for the community water supply on an annual basis;

3) the maximum daily pumpage;

4) the capacity of the community water supply;

5) the capacity of the raw water source;

6) the capacity of the proposed water main;

7) the normal expected operating pressure on the proposed water main;

8) the minimum expected operating pressure on the proposed water main;

9) the pressure at the point of connection at present maximum demand;

10) the calculated pressure at the point of connection under maximum demand after installation of the water main;

11) the size of the pipe and total feet of the water main;

12) the pipe material and type of joint;

13) the proposed depth below ground surface of the water main;

14) sewer and water separation:

A) an indication of whether the minimum horizontal and vertical separation requirements in 35 Ill. Adm. Code 604.1440~~653.119~~ have been met; and

B) an explanation of other measures taken to protect the water main if the separation requirements are not met;

15) a disinfection plan that details the chemical to be used, initial disinfectant concentration, final disinfectant concentration and retention time in hours; and

16) a water sampling plan to meet the requirements of Section 602.310.

b) The following information must be submitted on plans with water main construction permit applications:

1) the border lines of the municipality, water district or area to be served;

2) the size, length and identity of proposed water mains and water system structures;

3) the elevation of water mains where necessary to show proper separation from sewers and the elevation of other water system structures;

4) the location of existing or proposed streets;

5) the location of storm, sanitary, combined and house sewers, septic tanks, disposal fields and cesspools;

6) the location of pipelines and other sources containing hydrocarbons;

7) the distance between the community water supply structures and the sources of pollution listed in ~~Table A of~~ 35 Ill. Adm. Code 604.150(a) ~~653.118~~;

8) stream crossings with elevations of the stream bed shown, including the normal, extreme high and extreme low water levels of the stream; and

9) all appurtenances, specific structures or equipment having any connection with planned water mains and water system structures.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART C: OPERATING PERMITS

Section 602.300 Operating Permit Requirement

a) No person may~~shall~~ cause or allow the use or operation of any new community water supply, or any new addition to an existing community water supply, for which a construction permit is required under this Part, without an operating permit issued by the Agency, or obtaining an operating permit-by-rule under Section 602.325.

b) When a community water supply's construction project is not eligible for an operating permit-by-rule under Section 602.325, an~~The~~ operating permit

application must be filed with the Agency when construction is complete. ~~c)~~The operating permit must be obtained before the project is placed in service.

c) Community water supplies projects identified in Section 602.325 may be placed into operation upon submission of the permit-by-rule certification to the Agency.

d) Partial operating permits may be obtained under~~pursuant to~~ Section 602.320 or Section 602.325.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 602.305 Operating Permit Applications

a) All applications for operating permits must be on forms prescribed by the Agency and must contain:

1) ~~the name, signature and identification number of the Responsible Operator in Charge (see 35 Ill. Adm. Code 603);~~

~~2)~~ the community water supply's name, address, identification number and project name;

2)~~3)~~ the construction permit number, type of construction permit, and date the construction permit was issued;

3)~~4)~~ an explanation of the status of the construction project. If the project is only partially completed, the applicant must provide the information set forth in Section 602.320; and

4)~~5)~~ any other information required by the Agency for proper consideration of the permit, including, but not limited to, the submission of the water sample results under~~pursuant to~~ Section 602.310.

b) If the operating permit application is for the operation of a well, the operating permit application must include the following information in addition to the information required by subsection (a):

1) final geologic well log;

2) aquifer property data;

3) lateral area of influence, as calculated under~~pursuant to~~ 35 Ill. Adm. Code 671.Subpart B;

4) delineated well head protection area; and

5) pump test data

A) the latitude and longitude of the observation well;

B) test pump capacity head characteristics;

C) static water level;

D) depth of pump settings; and

E) time of starting and ending each test cycle;

6) static water level in the production well and observation well(s);

7) pumping water level in the production well;

8) transmissivity in gallons per day per foot of drawdown (GPD/ft);

9) hydraulic conductivity in gallons per day per square feet (GPD/ft^2) or feet per day (ft/day)

10) saturated thickness of the aquifer (ft);

11) storage coefficient or specific yield (dimensionless); and

12) recording and graphic evaluation of the following, at one-hour intervals or less:

A) pumping rate;

B) pumping water level;

C) drawdown;

D) water recovery rate and levels; and

E) specific capacity, measured in gallons per minute per foot (GPM/ft) of draw down.

13) a determination of the regional groundwater gradient and flow direction:

A) if the groundwater gradient and flow direction was estimated, provide the data, and the source of such data;

B) if the groundwater gradient and flow direction was not estimated, provide the longitude and latitude of the wells used, well logs and the water elevations observed in the wells during the pump test;

C) provide the compass direction clockwise from north in degrees; and

D) provide the gradient.

14) Geological Data:

A) a driller's log determined from samples collected at 5-foot intervals and at each pronounced change in formation;

B) accurate geographical location such as latitude and longitude or GIS coordinates; and

C) records of drill hole diameters and depths;

D) order of size and length of casing, screens and liners;

E) grouting depths;

F) formations penetrated;

G) water levels; and

H) location of any blast charges.

15)~~5)~~ analyses of water samples for the constituents listed in 35 Ill. Adm. Code 620.410(a) and (b).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 602.310 Projects Requiring Disinfection

a) Wells, water storage tanks, water treatment plants, and water mains must be disinfected in accordance with AWWA C651, C652, C653 or C654 incorporated by reference in 35 Ill. Adm. Code 601.115.~~Satisfactory disinfection as specified in this Section must be demonstrated before the issuance of an operating permit for~~

~~completed construction projects when facilities produce, contain, treat or carry water that must be bacteriologically safe. This includes, but is not limited to, water mains, filters, finished water storage tanks and wells.~~

b) Disinfection of a filter with granular activated carbon (GAC) must be completed prior to adding the GAC. Disinfection of an ion exchange unit must be completed prior to adding a resin with a low chlorine tolerance. Disinfection of a membrane unit must be completed prior to adding membrane material with a low chlorine tolerance. Care should be taken when handling the GAC, resin or membrane to keep the material as clean as possible.

c) Except as provided in Section 602.315~~specified in subsection (d)~~, the permit applicant must verify disinfection before seeking an operating permit-by-rule under Section 602.235 or the issuance of an operating permit by the Agency for completed construction projects. Disinfection~~satisfactory disinfection~~ is verified~~demonstrated~~ when two consecutive water sample sets collected from the completed project at least 24 hours apart show the absence of coliform bacteria and the presence of a chlorine residual as required by 35 Ill. Adm. Code 604.725~~indicate no bacterial growths as measured by the membrane filter technique or no tubes testing positive as measured by the presumptive test, fermentation tube method, as set forth in 35 Ill. Adm. Code 611~~. A sample set consists of the following:

1) For water mains, representative water samples must be collected from every 1,200 feet of new main along each branch and from the end of the line. The Agency may approve a different sampling plan on a site-specific basis.

2) For water treatment plants, representative water samples must be collected from each aerator, detention tank, filter, ion exchange unit and clearwell, from all other treatment components other than those not requiring disinfection under Section 602.315, and from the entry point to the distribution system.

d) ~~For water main construction projects at existing community water supplies practicing chlorination in accordance with 35 Ill. Adm. Code 611.240, satisfactory disinfection is demonstrated when:~~

~~1)~~ ~~one water sample set from the completed project collected in accordance with subsection (c)(1) indicates no bacterial growths as measured by the membrane filter technique or no tubes testing positive as measured by the presumptive test, fermentation tube method as set forth in 35 Ill. Adm. Code 611; and~~

~~2)~~ ~~Adequate chlorine residual is present at the point of connection. Adequate chlorine residuals exist in a distribution system when there is a minimum of 0.2 mg/l free chlorine residual for water supplies practicing free chlorination or 0.5 mg/l combined chlorine residual for water supplies practicing combined chlorination.~~

~~e)~~ ~~If the analyses performed pursuant to subsection (d) indicate the presence of bacterial growth, the community water supply must do the following to demonstrate satisfactory disinfection:~~

~~1)~~ ~~resample at the sampling point indicating contamination and at every sampling point downstream of the point indicating contamination;~~

~~2)~~ ~~submit a general layout sheet of the project indicating the location of all water mains to be operating; and~~

~~3)~~ ~~submit evidence to the Agency that two consecutive water sample sets collected as specified in subsection (e)(1) indicated no bacterial growths as measured by the membrane filter technique or no tubes testing positive as measured by the presumptive test, fermentation tube method as set forth in 35 Ill. Adm. Code 611.~~

~~f)~~ Analyses conducted under~~pursuant to~~ this Section must be performed by a certified laboratory.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 602.325 Operating Permit-by-Rule

a) The purpose of this Section is to implement the permit-by-rule program provided for in Section 39.12 of the Act for classes of community water supply operating permits. By fulfilling all of the requirements of this section, a community water supply is considered to have met the requirements for obtaining an operating permit under Section 18(a)(3) of the Act and Section 602.300.

b) A community water supply is eligible to obtain an operating permit-by-rule if the construction project for which the Agency granted a construction permit is for any of the following projects;

1) Water main extensions; or

2) Projects not requiring disinfection specified in Section 602.315.

c) A community water supply is not eligible to obtain an operating permit-by-rule if the construction project involves a water main that connects two or more community water supplies.

d) Upon issuance of a construction permit, the Agency may notify an eligible community water supply that it may not seek a permit-by-rule if the community water supply has failed to submit information required by Agency or Board rules in the two years preceding the Agency's notification.

e) For construction projects that contain both permit-by-rule eligible and non-eligible components, a community water supply may obtain a partial operating permit-by-rule for the eligible portions of the project.

f) A community water supply eligible for a permit-by-rule under subsection (b), who does not elect to obtain a permit-by-rule, must obtain an operating permit issued by Agency before commencing operations.

g) Permit-by-Rule Certification. Any community water supply seeking to obtain an operating permit-by-rule must submit a certification on forms prescribed by the Agency specifying the following:

1) the community water supply's name, address, identification number and project name;

2) the construction permit number, type of construction permit, and date the construction permit was issued;

3) an explanation of the status of the construction project, and if the project is only partially completed, the information set forth in Section 602.320;

4) a statement attesting to compliance with Section 602.310, if disinfection is required; and

5) the submission of the water sample results required by Section 602.310.

h) The community water supply may begin operation of a permit-by-rule eligible construction project immediately after it files the certification required by subsection (g).

(Source: Added at 42 Ill. Reg. _____, effective _____)

SUBPART F: SPECIAL EXCEPTION PERMITS

Section 602.600 Special Exception Permits

a) Unless contained in a construction or operating permit, each Agency determination in Part 604 and Part 611 is to be made by way of a written special exception permit ("SEP") pursuant to Section 39(a) of the Act [415 ILCS 5/39(a)].

b) No person may cause or allow the violation of any condition of a SEP.

c) The community water supply may appeal the denial of or the conditions of a SEP to the Board pursuant to Section 40 of the Act [415 ILCS 5/40].

d) A SEP may be initiated in either of the following ways:

1) By a written request from the community water supply; or

2) By the Agency, when authorized by Board regulations.

BOARD NOTE: The Board does not intend by any provision of this Part to require that the Agency exercise its discretion and initiate a SEP under subsection (d)(2). Rather, the Board intends to clarify by subsection (d)(2) that the Agency may initiate a SEP without receiving a request from the supplier.

(Source: Added at 42 Ill. Reg. _____, effective _____)

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE F: PUBLIC WATER SUPPLIES
CHAPTER I: POLLUTION CONTROL BOARD

PART 604
DESIGN, OPERATION AND MAINTENANCE CRITERIA

SUBPART A: GENERAL PROVISIONS

SUBPART B: SOURCE DEVELOPMENT

SUBPART C: SOURCE WATER PROTECTION PLAN

SUBPART D: AERATION

SUBPART E: CLARIFICATION

SUBPART F: FILTRATION

SUBPART G: DISINFECTION

SUBPART H: SOFTENING

SUBPART I: STABILIZATION

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SUBPART K: CHEMICAL APPLICATION

SUBPART L: PUMPING FACILITIES

SUBPART M: STORAGE

SUBPART N: DISTRIBUTION

SUBPART O: CROSS CONNECTIONS

Section
604.1500 Cross Connections
604.1505 Cross Connection Control Program
604.1510 Cross Connection Control Device Inspectors
604.1515 Agency Approved Connection Control Measures

604.TABLE A Steel Pipe

AUTHORITY: Implementing Sections 14-19 and authorized by Section 27 of the Illinois Environmental Protection Act [415 ILCS 5/14-19 and 27].

SOURCE: Adopted in R18-17 at 42 Ill. Reg. _____, effective _____.

SUBPART A: GENERAL PROVISIONS

Section 604.100 Purpose

This Part includes the design, operational, and maintenance criteria for owners, operators and official custodians of community water supplies.

Section 604.105 General Requirements

a) The community water supply must be designed to produce at least 20 percent greater than the maximum average daily demand, as defined in 35 Ill. Adm. Code 601.105.

b) The criteria for design of community water supply facilities must be the standards under this Part or other criteria under 35 Ill. Adm. Code 602 which the applicant demonstrates will produce a finished water which meets requirements of 35 Ill. Adm. Code 611 under all operating conditions.

c) Water must be treated to meet the national primary drinking water standards in 35 Ill. Adm. Code 611.

d) Duplicate units for water treatment facilities must be provided in the following situations:

1) The treatment is installed to comply with any microbial requirements in 35 Ill. Adm. Code Part 611;

2) The treatment unit is installed to comply with the maximum contaminant level for nitrite or nitrate in 35 Ill. Adm. Code 611.301; and

3) The treatment unit is installed to comply with Section 17.10 of the Act regarding the removal of carcinogenic volatile organic compounds.

e) Duplicate units must not be required as described in subsection (d) if an adequate supply of finished water can be provided to meet the maximum daily demand to the community water supply and comply with the requirements of 35 Ill. Adm. Code 611 with the water treatment facility out of service for any period of time.

f) Unless otherwise approved by the Agency under Section 604.145(b), products that come in contact with water, including protective barrier materials, joining and sealing materials, mechanical devices, pipes and related products, plumbing devices, process media and non-metallic potable water materials, or components which comprise chemical feed systems in a community water supply, must be certified to comply with NSF/ANSI Standard 61 and NSF/ANSI Standard 372, incorporated by reference in 35 Ill. Adm. Code 601.115.

g) Water treatment chemicals must be certified to comply with NSF/ANSI Standard 60, incorporated by reference in 35 Ill. Adm. Code 601.115.

Section 604.110 Location

a) All community water supplies must select construction sites after completing an evaluation of risk from earthquakes, land subsidence, floods, fires or other disasters which could result in breakdown of any part of the system. If a site is subject to an identified risk, the community water supply must submit a complete statement describing reasons for site selection and identify construction measures which will be taken to protect the community water supply.

b) All community water supply facilities must be located outside the flood plain or must be at least two feet above the 100-year flood elevation or maximum flood of record, whichever is higher.

c) All access roads, except roads to wells, must be protected to at least the 100-year flood elevation or maximum flood of record.

Section 604.115 Usage

a) Average daily usage must be based on finished water pumpage records. When records are not available or when a new supply is proposed, average daily usage

must be based on at least 75 gallons per person per day based on the current or projected population to be served.

b) The average daily usage estimate must be increased where large uses such as irrigation, filling swimming pools and service to commercial or industrial establishments are known or anticipated.

c) When records are not available, maximum demand must be calculated as 1.5 times the average daily usage.

d) For Sections 604.1345 and 604.1350, peak hourly flow must be calculated using six times the average daily usage and converted into units of gallons per minute.

Section 604.120 Piping Identification

a) Piping in a community water supply treatment facility must be identified clearly by legends or the use of nametag labels identifying the contents of individual pipes, spaced at intervals to allow convenient identification of individual pipes. A consistent standard must be used throughout the system.

b) The following color scheme or a similar consistent scheme must be used to identify piping in plants and pumping stations:

1) Water Lines
   A) Raw or Recycle: Olive Green
   B) Settled or Clarified: Aqua
   C) Finished or Potable: Dark Blue

2) Chemical Lines
   A) Alum or Primary Coagulant: Orange
   B) Ammonia: White
   C) Carbon Slurry: Black
   D) Caustic: Yellow with Green Band
   E) Chlorine (Gas and Solution): Yellow
   F) Chlorine Dioxide: Yellow with Violet Band

G) Fluoride: Light Blue with Red Band

H) Lime Slurry: Light Green

I) Ozone: Yellow with Orange Band

J) Phosphate Compounds: Light Green with Red Band

K) Polymers or Coagulant Aids: Orange with Green Band

L) Potassium Permanganate: Violet

M) Soda Ash: Light Green with Orange Band

N) Sulfuric Acid: Yellow with Red Band

O) Sulfur Dioxide: Light Green with Yellow Band

3) Waste Lines

A) Backwash waste: Light Brown

B) Sludge: Dark Brown

C) Sewer (sanitary or other): Dark Grey

4) Other Lines

A) Compressed Air: Dark Green

B) Gas: Red

C) Other line: Light Grey

c) Potable water lines must be clearly and permanently identified where dual water lines or pressure sewer systems exist.

Section 604.125 Automatic Equipment

a) Equipment which will automatically shut down a water treatment process is acceptable, provided restart procedures are manual.

b) Automatic startup must be allowed for treatment plants which treat only groundwater and have only unit processes not exposed to contamination. Examples include iron removal by protected aeration, enclosed retention and pressure sand filtration or ion exchange softening in a pressure vessel operated in a downflow mode.

Section 604.130 Operational Testing Equipment

a) Monitoring Equipment. Community water supplies must have equipment to monitor the water as follows:

1) Plants treating surface water and groundwater under the direct influence of surface water must have the capability to monitor and record the following:

A) chlorine residual, water temperature and pH at locations necessary to evaluate adequate CT disinfection; and

B) turbidity.

2) Plants treating groundwater using iron removal or ion exchange softening must have the capability to monitor and record chlorine residual.

3) Ion exchange plants for nitrate removal must continuously monitor and record the finished water nitrate level.

b) Sampling taps

1) Smooth-nosed sampling taps must be provided for collecting representative samples of treated and untreated water.

2) When fluoride is added, the sample tap for the finished water must be located after the fluoride solution is added and has thoroughly mixed with the water being fluoridated.

3) Smooth-nosed sample taps for untreated water must be provided at each well or source.

c) For measuring chlorine residual, DPD test equipment or other means as approved in "Standard Methods for the Examination of Water and Wastewater", incorporated by reference in 35 Ill. Adm. Code 611.102, must be used.

d) Testing equipment must be available to plants with specific treatment processes which include:

1) fluoride adjustment - test equipment for measuring levels of fluoride ion;

2) iron removal - test equipment for measuring ferrous and total iron levels;

3) cation exchange softening - equipment for measuring hardness and chloride concentration;

4) coagulation and filtration - jar testing equipment for determining chemical dosages and equipment for measuring pH, hardness, total and phenolphthalein ("P") alkalinity, nitrate, and nitrite;

5) lime softening - equipment for measuring pH, hardness and total and phenolphthalein alkalinity forms;

6) reverse osmosis - equipment for measuring total dissolved solids, chlorides and monitoring sulfates;

7) phosphate addition - equipment for measuring both orthophosphates and total phosphates;

8) anion exchange - equipment for continuous monitoring of nitrate concentration must be provided for treated water and finished water after blending;

9) stabilization - equipment for determining the effectiveness of stabilization treatment for parameters which may include temperature, pH, alkalinity, total dissolved solids, chloride, sulfate, calcium hardness and total harness, expressed as calcium carbonate;

10) chloramination - equipment to measure free chlorine residual, total chlorine residual, monochloramine residual, and free Ammonia-N;

11) coagulation using coagulants that contain aluminum – in addition to the equipment described in subsection (d)(4), equipment to measure total and insoluble aluminum;

12) manganese removal - equipment for measuring the concentration of total manganese and soluble manganese; and

13) chlorine dioxide treatment - equipment for measuring chlorine dioxide residual and chlorite ion concentration.

Section 604.135 Repair Work and Emergency Operation

a) The community water supply must be protected from contamination when any part of the system is out of service for repair, construction, alteration or replacement.

b) Disinfection Following Repair

1) Any part of a community water system which has direct contact with finished water and has been out of service for repair, alteration or replacement must be disinfected and sampled as required by 35 Ill. Adm. Code 602.310 before being returned to service.

2) Equipment which does not come in contact with finished water such as raw surface water pumps, raw surface water transmission lines, chemical mixing tanks and clarifiers need only be flushed before being returned to service.

3) Filters must be disinfected.

4) Wells, water storage tanks, water treatment plants, and water mains must be disinfected in accordance with AWWA C651, C652, C653 or C654 incorporated by reference in 35 Ill. Adm. Code 601.115.

c) Emergency Operation

1) Boil Order

A) Whenever microbiological contamination is determined to persist in a community water supply, as demonstrated by microbiological analysis results, the owners or official custodians of the supply must notify all consumers as required by subsection (c)(2) to boil for five minutes all water used for consumption or culinary purposes.

B) This boil order will remain in effect until appropriate corrective action approved by the Agency is taken and microbiological samples demonstrate that the water is safe for domestic use.

C) If the owner or official custodian of the supply fails to take such action, the Agency may issue a boil order directly to the consumers affected.

D) Issuance of a boil order does not relieve the water supply from making public notification in accordance with 35 Ill. Adm. Code 611.Subpart V.

2) Required Notification

A) Owners and operators of community water supplies must immediately notify the Agency at the appropriate Regional Office in accordance with 35 Ill. Adm. Code 602.104(f) when there is knowledge or suspicion that a water supply has become contaminated or the community water supply's finished water quality is negatively impacted due to water treatment equipment malfunction.

B) Whenever the safety of a supply is endangered for any reason, including spillage of hazardous substances, the community water supply owner, official custodian, or Responsible Operator in Charge must take appropriate action to protect the community water supply, and immediately notify the Agency.

C) The Agency will require the community water supply to notify all consumers of appropriate actions to protect themselves if the water supply has become contaminated or the consumers' safety may be endangered. If the community water supply fails to make such notifications, the Agency must notify directly the consumers affected.

D) On weekends, holidays and after office hours, the Agency must be notified through the Illinois Emergency Management Agency at 1-800-782-7860.

3) When the water pressure falls below twenty pounds per square inch on any portion of the distribution system for any amount of time, the owner or official custodian of the community water supply must issue a boil order as required by subsection (c)(2) to those consumers affected unless the Agency has issued a SEP and:

A) There is a historical record of adequate chlorine residual as required by Section 604.725(a) and approved turbidity levels in the general area affected covering at least twelve monthly readings;

B) Samples for bacteriological examination are taken in the affected area immediately and approximately twelve hours later; and

C) Tests for residual chlorine and turbidity taken at not more than hourly intervals in the affected area for several hours do not vary significantly from the historical record. If significant decrease in chlorine residual or increase in turbidity occurs, a boil order as required by subsection (c)(2) must be issued.

d) Emergency Operations Plan

1) Each community water supply must develop an emergency operations plan for the provision of water under emergency circumstances including earthquakes, floods, tornados, and other disasters. The emergency operations plan must include a review of the methods and means by which alternative supplies of drinking water could be provided in the event of destruction, impairment or contamination of community water supply.

2) The community water supply must review its emergency operations plan at least every three years and revise the plan as necessary. The community water supply must maintain the emergency operations plan on site and make it available to the Agency, upon request.

Section 604.140 Nitrification Action Plan

Any community water supply distributing water without a free chlorine residual must create a Nitrification Action Plan (NAP). The NAP must:

a) contain a plan for monitoring total Ammonia-N, free Ammonia-N, Nitrite-N, Nitrate-N, monochloramine residual, dichloramine residual, and total chlorine residual;

b) contain system specific levels of the chemicals in subsection (a) where action must be taken;

c) contain specific corrective actions to be taken if the levels in subsection (b) are exceeded; and

d) be maintained on site and made available to the Agency, upon request.

Section 604.145 Exceptions for Community Water Supplies

a) A community water supply operating before the effective date of this Part must not be required to modify or replace components to meet the requirements of this Part if:

1) the requirements of 35 Ill. Adm. Code 611 are met;

2) the requirements of Sections 604.205, 604.230, 604.1210 are met;

3) water pressure meets the standards of Section 604.1415(a)(1); and

4) the components were permitted or no permits were required at the time of construction.

b) Alternate Design, Maintenance and Operation Requirements

1) As specified in this Part, the Agency may approve design, maintenance, or operation requirements different from those contained in this Part so long as the alternative produces water meeting 35 Ill. Adm. Code 601.101 and 35 Ill. Adm. Code Part 611.

2) When approving alternate design, maintenance or operation requirements, the Agency must issue a construction permit, operating permit or a special exception permit.

3) The Agency must approve alternate design, maintenance or operation requirements, when the community water supply demonstrates that compliance with this Part is economically unreasonable or technically impossible.

Section 604.150 Protection of Community Water Supply Structures

a) Each community water supply must protect its wells, clear water reservoirs, suction lines, gravity filters, iron removal, chlorine reaction and wet salt storage basins from sources of contamination by maintaining the following minimum distances:

Source of Contamination	**Distance for clay or loam soils**	**Distances for soils with higher permeability than clay or loam**
Cesspools, leaching sewage disposal pits	150'	300'

Privies	150'	300'
Septic tanks and subsurface septic tanks effluent disposal tile	75'	150'
Livestock, grazing areas or feedlots	50'	100'
Sewers (non-watertight)	50'	50'
Sewers (cast iron pipe, with leaded or mechanical joints)	25'	25'
Sewers (extra-heavy cast iron pipe, asbestos-cement pressure pipe prestressed concrete pipe, or PVC pipe meeting water main standards, with pressure tested, leaded, mechanical or slip-on joints	10'	10'
Washwater sumps of reinforced concrete construction.	10'	10'
Flood waters – A horizontal distance must be maintained by natural earth or fill. In addition, wells must meet the requirements of Section 604.240(k).	15'*	15'*
Flood waters – A vertical distance must be maintained to which structure and earth protection must be carried above maximum high water elevation. In addition, wells must meet the requirements of Section 604.240(k).	2'	2'
Fuel storage tanks above ground	25'**	25'**

*The Agency must consider special structural arrangements equivalent to earthen construction for protection of the well when horizontal earth protection is impractical.
** unless otherwise approved by the Agency under Section 604.145(b)

b) Wells must meet the setback requirements of the Act.

c) Fuel storage tanks located at a community water supply facility must be above ground and must have secondary containment.

Section 604.155 Electrical Controls and Standby Power

a) Electrical controls must be located above grade, in areas not subject to flooding.

b) Each community water supply must provide on-site, dedicated standby power capable of maintaining continued operation of its water system during power outages to meet the average daily usage determined under Section 604.115.

Section 604.160 Safety

a) All community water supplies whose treatment involves chemical application must have and maintain a chemical safety plan.

b) All community water supply personnel involved in the use and maintenance of chemicals must have periodic safety training.

Section 604.165 Monthly Operating Report

a) The community water supply must prepare an operating report on a form approved by the Agency as specified in a construction, operating or special exception permit.

b) An individual set of operating reports must be maintained for each installation when more than one source of water with separate chemical addition equipment is used.

c) The operating report must be signed by the Responsible Operator in Charge, and submitted to the Agency within 30 days after the last day of the month.

d) A copy of the operating report records must be maintained by the official custodian of the community water supply.

Section 604.170 Security

a) Each community water supply well, well house, raw water intake structure, pumping stations, treatment plant buildings, and treated water storage reservoirs must be protected to prevent vandalism and entrance by animals or unauthorized persons.

b) Fencing, locks on tank access hatches, or other necessary precautions must be provided to prevent trespassing, vandalism, and sabotage.

SUBPART B: SOURCE DEVELOPMENT

Section 604.200 General Requirements

a) Each water supply must take its raw water from the best available source, which is economically reasonable and technically possible.

b) In selecting the source of water to be developed, the community water supply must prove the following:

1) an adequate quantity of water will be available; and

2) the water which is to be delivered to the consumers will meet the current requirements of the Board and Act with respect to microbiological, physical, chemical and radiological qualities.

c) A surface water source includes tributary streams and drainage basins, natural lakes and artificial reservoirs or impoundments above the point of water supply intake.

d) A groundwater source includes all water obtained from wells.

e) The Agency will approve surface water, groundwater under the direct influence of surface water, or groundwater as a community water supply source only if treatment produces water which meets the primary drinking water standards of 35 Ill. Adm. Code 611 and the following conditions are met:

1) The design of the water treatment plant must consider the worst conditions that may exist during the life of the system.

2) Sampling must be performed to determine treatment requirements. The Agency may require samples be taken for at least once a month over a 12-consecutive month period. Representative samples must be submitted to the Agency to determine raw water quality.

3) More frequent sampling must be required to obtain a true representation of raw water quality. Raw water characteristics must be determined after heavy rainfall and runoff, low stream flow and at other times when unusual factors pertaining to physical and chemical quality, treatability, tastes, and odors exist.

4) Auxiliary treatment must be provided for waters where the geometric mean of fecal coliform exceeds 2000 per 100 ml. Examples of auxiliary treatment are presedimentation, prechlorination and storage of raw water for 30 days or more.

Section 604.205 Surface Water Quantity

The quantity of surface water at the source must:

a) be adequate to meet the maximum projected water demand of the service area as shown by calculations based on a one in fifty-year drought or the extreme drought of record, and should include consideration of multiple year droughts;

b) provide a 20% surplus unless otherwise approved by the Agency under Section 604.145(b); and

c) be adequate to compensate for all losses, including silting, evaporation, seepage and required water releases.

Section 604.210 Surface Water Quality

a) For all surface water, community water supplies must provide conventional filtration treatment or filtration treatment using technologies approved by the Agency under 35 Ill. Adm. Code 611.250(d) and disinfection.

b) For all groundwater under the direct influence of surface water, community water supplies must provide filtration treatment using technologies approved by the Agency under 35 Ill. Adm. Code 611.250 and disinfection.

c) A source water assessment under Section 604.315 must be completed considering factors, both natural and manmade, which may affect water quality in the water supply stream, river, lake, or reservoir or groundwater under direct influence of surface water.

Section 604.215 Surface Water Structures

a) Design of intake structures must provide for:

1) withdrawal of water from more than one level if quality varies with depth;

2) separate facilities for release of less desirable water held in storage;

3) where frazil ice may be a problem, holding the velocity of flow into the intake structure to a minimum, generally not to exceed 0.5 feet per second;

4) inspection manholes every 1000 feet for pipe sizes large enough to permit visual inspection;

5) cleaning of the inlet line;

6) protection against rupture by dragging anchors, ice and other factors;

7) ports located above the bottom of the stream, lake or impoundment, but at sufficient depth to be kept submerged at low water levels;

8) where shore wells are not provided, a diversion device capable of keeping large quantities of fish or debris from entering an intake structure; and

9) when buried surface water collectors are used, sufficient intake opening area must be provided to minimize inlet head loss. Particular attention should be given to the selection of backfill material in relation to the collector pipe slot size and gradation of the native material over the collector system;

b) Raw water pumping station must:

1) be protected from flooding and, when feasible, located above grade;

2) be accessible;

3) be designed against flotation;
4) be equipped with a screen before the pump suction well;

5) provide for introduction of chlorine or other chemicals in the raw water transmission line if necessary for quality control;

6) have intake valves and provisions for backflushing or cleaning by a mechanical device and testing for leaks, where practical;

7) have provisions for withstanding surges where necessary; and

8) be constructed to prevent intrusion of contaminants.

c) Side channel raw water storage reservoir

1) A side channel water storage reservoir is a facility into which water is pumped during periods of good quality and high stream flow for future release to treatment facilities.

2) Side channel raw water storage reservoirs must be constructed to assure that:

A) water quality is protected by controlling runoff into the reservoir;

B) dikes are structurally sound and protected against wave action and erosion;

C) intake structures and devices meet requirements of subsection (a);

D) point of influent flow is separated from the point of withdrawal;

E) separate pipes are provided for influent to and effluent from the reservoir; and

F) a bypass line is provided around the reservoir to allow direct pumping to the treatment facilities.

Section 604.220 Invasive Mussel Control

a) When chemical treatment for the control of invasive mussels is permitted by the Agency:

1) Chemical treatment must be in accordance with Subpart K;

2) Plant safety items, including ventilation, operator protective equipment, eyewashes/showers, and cross connection control, must be provided;

3) Solution piping and diffusers must be installed within the intake pipe or in a suitable carrier pipe. Provisions must be made to prevent dispersal of chemical into the water environment outside the intake. Diffusers must be located and designed to protect all intake structure components; and

4) The chemical feeder must be interlocked with plant system controls to shut down automatically when the raw water flow stops.

b) When alternative control methods are proposed for the control of invasive mussels, appropriate piloting or demonstration studies must be provided to the Agency for approval.

Section 604.225 Reservoirs

Reservoirs must provide where applicable for:

a) removal of brush and trees to high water elevation;

b) protection from floods during construction; and

c) abandonment of all wells, which will be inundated.

Section 604.230 Groundwater Quantity

a) A community water supply must determine groundwater source adequacy by the amount of water produced by each well pumping within its calculated safe yield.

b) Multiple well systems: Where multiple wells are used the combined delivery must equal or exceed the maximum average daily demand under Section 604.105(a) with the largest producing well out of service.

c) Single well systems: No community water supply, the construction or modification of which commences after the effective date of this section may rely only on a single well for its water source. A community water supply, the construction of which commenced before and which is not modified after the effective date of this section may rely on a single well for its water source, but must be placed on the critical review list under 35 Ill. Adm. Code 602.107. For the purposes of this subsection, "modified" means where the fixed capital costs of the new components constructed within a 2-year period exceed 50% of the fixed capital cost of a comparable entirely new facility.

d) The well location must be selected to minimize the impact on other wells and other water resources.

Section 604.235 Groundwater Quality

a) Each community water supply using groundwater must collect and analyze one sample per well per month for total coliform bacteria. The analysis must be performed by a certified laboratory.

1) If a routine sample result is total coliform-positive, the community water supply must collect and analyze another sample within 24 hours of being notified of the positive result. The sample must be submitted to a certified laboratory for analysis.

2) Results which show the presence of coliform and have been confirmed by a sample taken under subsection (a)(1) must be reported to the Agency within 24 hours of being notified of the positive result of the sample taken under subsection (a)(1).

b) The Agency must require multiple barrier treatment to achieve at least 99.99 percent (4-log) removal or inactivation of viruses for all groundwater sources subject to bacteriological contamination.

c) When maintenance or equipment replacement on a well occurs that does not require a construction or operating permit under 35 Ill. Adm. Code 602, one sample from the well must be submitted to a certified laboratory for analysis for total coliform bacteria.

1) If the sample result is satisfactory, the well may be placed into service.

2) If the sample result is unsatisfactory, the well may not be placed into service until samples collected from the well on two consecutive days and tested by a certified laboratory have satisfactory results.

d) A source water assessment under Section 604.315 must be completed considering factors, both natural and manmade, which may affect water quality in the groundwater.

Section 604.240 General Well Construction

a) Drilling fluids and additives must not impart any toxic substance to the water or promote bacterial contamination.

b) Minimum protected depths of drilled wells must provide watertight construction to exclude contamination and seal off formations that are, or may be, contaminated or yield undesirable water.

c) Surface or temporary steel casing used for construction must be capable of withstanding the structural load imposed during its installation and removal. Surface or temporary casing must be removed during or prior to grouting or it must be grouted in place when set according to subsection (i).

d) The well casing material must be steel. Permanent steel casing pipe must:

1) be new single steel casing pipe meeting AWWA A100, incorporated by reference in 35 Ill. Adm. Code 601.115, for water well construction;

2) have a minimum weight and thickness indicated in Table 1 of this Part;

3) be equipped with a drive shoe when driven; and

4) have full circumferential welds or threaded coupling joints.

e) All wells during construction must be protected against the entrance of water, contaminants and tampering. Methods for capping a well include a welded metal plate and a threaded cap.

f) Packers must be of material that will not impart taste, odor, toxic substances or bacterial contamination to the well water. Lead packers must not be used.

g) Screens must:

1) be constructed of materials resistant to damage by chemical action of groundwater or cleaning operations;
2) have size of openings based on sieve analysis of formation and/or gravel pack materials;

3) have sufficient length and diameter to provide adequate specific capacity and low aperture entrance velocity;

4) be installed so that pumping water level remains above the screen under all operating conditions; and

5) be provided with a bottom plate or washdown bottom fitting of the same material as the screen.

h) Grouting Requirements. The annulus of all permanent well casings must be grouted from the original ground surface or pitless unit to a minimum depth of 10 feet utilizing a minimum thickness of 1 ½ inches of grout.

1) Neat Cement Grout. Cement conforming to AWWA A100, and water, with not more than six gallons of water per 94 pounds of cement, must be used for 1½ inch openings.

2) Concrete Grout. Equal parts of cement conforming to AWWA A100, and sand, with not more than six gallons of water per 94 pounds of cement may be used for annular openings larger than 1 ½ inches. For annular openings greater than four inches, gravel added to the concrete must not exceed one-half inch.

3) Application

A) A minimum thickness of 1½ inches of grout around permanent casings, including couplings, must be provided.

B) Prior to grouting through creviced or fractured formations, bentonite or similar materials may be added to the annular opening, in the manner indicated for grouting.

C) When the annular opening is less than four inches, grout must be installed under pressure by means of a grout pump from the bottom of the annular opening upward in one continuous operation until the annular opening is filled.

D) When the annular opening is four inches or greater and extends less than 100 feet, and concrete grout is used, it may be placed by gravity through a grout pipe installed to the bottom of the annular opening in one continuous operation until the annular opening is filled.

E) Grout must be allowed to overflow from the annular opening until the proper density or percent solids have been achieved.

F) Standby grouting equipment for grouting annular openings, including a backup grout pump and tremie pipe, must be on-site during the grouting of all wells.

G) The conductor pipe must be completely withdrawn from the well prior to flushing excess grout from the conductor pipe when grouting down the annular space or must be disconnected from the grout shoe or street elbow prior to flushing excess grout when grouting within the casing.

H) After cement grouting is applied, work on the well must be discontinued until the cement or concrete grout has properly set.

I) Grout placement must be sufficient to achieve proper density or percent solids throughout the annular space.

4) Guides. The casing must be provided with sufficient guides welded to the casing to center the casing in the drill hole, prevent displacement of the casing and still permit unobstructed flow and uniform thickness of grout.

i) Upper terminal well construction

1) Permanent casing for all groundwater sources must project at least 12 inches above the pumphouse, well platform floor or concrete apron surface and at least 18 inches above final ground surface.

2) Where a well house is constructed, the floor surface must be at least six inches above the final ground elevation.

3) Protection from physical damage must be provided.

4) The upper terminal must be constructed to prevent contamination from entering the well.

5) Where well appurtenances protrude through the upper terminal, the connections to the upper terminus must be mechanical or welded connections that are water tight.

j) Upper terminal well construction in the flood plain of a 100-year flood or flood of record

1) Sites subject to flooding must be provided with an earth mound to raise the well house floor to an elevation at least two feet above the highest known flood elevation, or other suitable protection as determined by the Agency. A 15-foot horizontal distance must be maintained.

2) The top of the well casing at sites subject to flooding must terminate at least three feet above the 100-year flood level or the highest known flood elevation, whichever is higher, or as otherwise approved by the Agency under Section 604.145(b).

3) Wells must have a six-inch concrete envelope completely surrounding the regular casing and extending at least 10 feet below original ground surface.

k) Development

1) Every well must be developed to remove the native silts and clays, drilling mud or finer fraction of the gravel pack.

2) Development must continue until the maximum specific capacity is obtained from the completed well.

3) Where chemical conditioning is required, specifications submitted to the Agency under 35 Ill. Adm. Code 602 must include provisions for the method, equipment, chemicals, testing for residual chemicals, and disposal of waste.

4) Where blasting procedures are used, specifications submitted to the Agency under 35 Ill. Adm. Code 602 must include the provisions for blasting and cleaning. The grouting and casing must not be damaged by the blasting.

l) When an operating permit is not required under 35 Ill. Adm. Code 602, disinfection of modified or reconditioned wells must be provided, and a record of microbiological sample results must be maintained for five years.

m) Test wells and groundwater sources which are not in use must be sealed in accordance with 77 Ill. Adm. Code 920.120. The sealing form specified in 77 Ill. Adm. Code 920.120(e)(2) must be submitted to the Agency not more than 30 days after the well is sealed.

Section 604.245 Well Testing and Records

a) The specific capacity of the production well must be determined by a drawdown test before the well is placed in service.

b) Aquifer property data must be determined by using

1) published values of transmissivity and hydraulic conductivity;

2) estimated by using specific capacity; or

3) a pump test with an observation well.

c) Pump Test

1) A pump test must be performed on every production well after construction and prior to placement of the permanent pump.

2) A pump test must have a capacity of at least 1.5 times the flow anticipated at the maximum anticipated drawdown.

3) The test must provide, as a minimum, for continuous pumping for at least 24 hours at the design pumping rate or until stabilized drawdown has continued for at least six hours when test pumped at 1.5 times the design pumping rate.

d) The following information must be submitted to the Agency before the Agency will issue an operating permit:

1) pump test data:

A) the latitude and longitude of the observation well;

B) test pump capacity head characteristics;

C) static water level;

D) depth of test pump settings; and

E) time of starting and ending each test cycle;

2) static water level in the production well and observation well(s);

3) pumping water level in the production well;

4) transmissivity in gallons per day per foot of drawdown (GPD/ft);

5) hydraulic conductivity in gallons per day per square feet (GPD/ft^2) or feet per day (ft/day);

6) saturated thickness of the aquifer;

7) storage coefficient or specific yield (dimensionless); and

8) lateral area of influence calculated under 35 Ill. Adm. Code 671.

9) recording and graphic evaluation of the following, at one-hour intervals or less:

A) pumping rate;

B) pumping water level;

C) drawdown;

D) water recovery rate and levels; and

E) specific capacity, measured in gallons per minute per foot(GPM/ft) of draw down.

10) a determination of the regional groundwater gradient and flow direction:

A) if the groundwater gradient and flow direction was estimated, provide the data, and the source of such data;

B) if the groundwater gradient and flow direction was not estimated, provide the longitude and latitude of the wells used, well logs and the water elevations observed in the wells during the pump test;

C) provide the compass direction clockwise from north in degrees; and

D) provide the gradient.

11) Geological Data:

A) a driller's log determined from samples collected at 5-foot intervals and at each pronounced change in formation;

B) accurate geographical location such as latitude and longitude or GIS coordinates;

C) records of drill hole diameters and depths;

D) order of size and length of casing, screens and liners;

E) grouting depths;

F) formations penetrated;

G) water levels; and

H) location of any blast charges.

e) Every well must be tested in accordance with AWWA A100, incorporated by reference in 35 Ill. Adm. Code 601.115, for plumbness and alignment. The test

method and allowable tolerance must be clearly stated in the specifications submitted to the Agency.

f) The owner of each well must retain all records pertaining to each well's construction, maintenance and operation.

Section 604.250 Aquifer Types and Construction Methods

a) Sand or Gravel Wells

1) Unless otherwise approved by the Agency under Section 604.145(b), the permanent casing and grout must extend at least 25 feet below the original ground elevation.

2) If a temporary or a surface casing is used, it must be completely withdrawn.

b) Gravel Pack Material

1) Gravel pack materials must:

A) be sized based on sieve analysis of the formation; and

B) be well-rounded particles, 95 percent siliceous material, that are smooth and uniform, free of foreign material, properly sized, washed and then disinfected immediately prior to or during placement.

2) Gravel pack

A) Gravel pack must be placed in one continuous operation.

B) Gravel pack must be placed in a manner that prevents segregation and gradation during placement.

C) The annular space between the well screen and the hole must allow for proper placement of gravel pack.

D) Gravel pack must extend above the highest well screen with an allowance for settling.

E) Protection from leakage of grout into the gravel pack or screen must be provided.

F) Permanent inner casing and outer casings must meet requirements of Section 604.240(d).

3) Unless otherwise approved by the Agency under Section 604.145(b), minimum permanent casing and grouted depth must be at least 25 feet below the original ground elevation.

c) Radial Water Collector

1) Locations of all caisson construction joints and porthole assemblies must be indicated on plans submitted to the Agency.

2) Provisions must be made to assure that radial collectors are essentially horizontal.

3) Caisson Construction

A) The caisson wall must be reinforced to withstand the forces to which it will be subjected.

B) The top of the caisson must be extended at least above the flood plain of a 100-year flood or flood of record and covered with a watertight floor.

C) All openings in the floor must be curbed and protected from entrance of foreign material.

D) The pump discharge piping must not be placed through the caisson walls.

d) Fractured or Highly Permeable Bedrock Aquifer Wells

1) Where the depth of unconsolidated formations is more than 50 feet over fractured or highly permeable bedrock, the permanent casing must be firmly seated in rock.

2) Where the depth of unconsolidated formations is less than 50 feet, the depth of casing and grout must be at least 50 feet.

Section 604.255 Well Pumps, Discharge Piping and Appurtenances

a) Where line shaft pumps are used:

1) the casing must be firmly connected to the pump structure or have the casing inserted into a recess extending at least one-half inch into the pump base;

2) the pump foundation and base must be at least six inches above the finished floor elevation; and

3) lubricants must comply with Section 604.105(f).

b) Where a submersible pump is used:

1) the top of the casing must be effectively sealed to prohibit the entrance of water under all conditions of vibration or movement of conductors or cables;

2) the electrical cable must be firmly attached to the riser pipe at 20-foot intervals or less; and

3) mercury seals must not be used when an existing submersible pump is replaced or a new submersible pump is installed.

c) Discharge piping

1) The discharge piping for each well must:

A) be designed to minimize friction loss;

B) be equipped with a check valve in or at the well, a shutoff valve, a pressure gauge, and a means of measuring flow;

C) be protected from the entrance of contamination;

D) have control valves and appurtenances located above the pumphouse floor when an above-ground discharge is provided;

E) be equipped with a smooth nosed sampling tap at least 18-inches above the floor to facilitate sample collection, located at a point where positive pressure is maintained, but before any treatment chemicals are applied;

F) when necessary to remove entrapped air from the well, be equipped with an air release-vacuum relief valve located upstream from the check valve, with exhaust/relief piping terminating in a

down-turned position at least 18 inches above the floor and covered with a 24 mesh, corrosion resistant screen;

G) be valved to permit test pumping and control of each well;

H) have all exposed piping, valves and appurtenances protected against physical damage and freezing;

I) be anchored to prevent movement, and be supported to prevent excessive bending forces;

J) be protected against surge or water hammer; and

K) be constructed so that it can be disconnected from the well or well pump to allow the well pump to be pulled.

2) Well must have a means of pumping to waste that is not directly connected to a sewer.

3) The discharge, drop or column piping inside the well for submersible, submersible jet and submersible line shaft pumps must:

A) be capable of supporting the weight of the submersible pump, piping, water and appurtenances and of withstanding the thrust, torque, torque fatigue and other reaction loads created during pumping; and

B) use lubricants, fittings, brackets, tape or other appurtenances that comply with Section 604.105(f).

d) Pitless well units

1) Pitless units must:

A) be shop-fabricated from the point of connection with the well casing to the unit cap or cover;

B) be threaded or welded to the well casing;

C) be of watertight construction throughout;

D) be of materials and weight at least equivalent and compatible to the casing;

E) have field connection to the lateral discharge from the pitless unit of threaded, flanged or mechanical joint connection; and

F) terminate at least 18 inches above final ground elevation or three feet above the 100-year flood level or the highest known flood elevation, whichever is higher.

2) The design of the pitless unit must make provision for:

A) access to disinfect the well;

B) a properly constructed casing vent meeting the requirements of subsection (e);

C) facilities to measure water levels in the well, under subsection (f);

D) a cover at the upper terminal of the well that will prevent the entrance of contamination;

E) a contamination-proof entrance connection for electrical cable;

F) an inside diameter as great as that of the well casing to facilitate work and repair on the well, pump, or well screen; and

G) at least one check valve within the well casing.

3) If the connection to the casing is by field weld, the shop-assembled unit must be designed specifically for field welding to the casing. The only field welding permitted will be that needed to connect a pitless unit to the casing.

e) Casing vent

1) Well casing must be vented to the atmosphere.

2) The vent must terminate in a downturned position, at or above the top of the casing or pitless unit, no less than 12 inches above grade or floor, in a minimum 1½ inch diameter opening covered with a 24 mesh, corrosion resistant screen.

3) The pipe connecting the casing to the vent must be of adequate size to provide rapid venting of the casing.

4) Where vertical turbine pumps are used, vents may be placed into the side of the casing.

f) Water level measurement

1) Each well must be equipped with a means for taking water level measurements.

2) Where pneumatic water level measuring equipment is used it must be made using corrosion-resistant materials attached firmly to the drop pipe or pump column to prevent entrance of foreign materials.

g) Observation wells must meet the requirements in 77 Ill. Adm. Code 920.170.

SUBPART C: SOURCE WATER PROTECTION PLAN

Section 604.300 Purpose

The purpose of the following requirements is to facilitate protection of source water quality and quantity.

Section 604.305 Source Water Protection Plan Requirement and Contents

Each community water supply that treats surface or groundwater as a primary or emergency supply of water must develop a source water protection plan that contains the following minimum elements:

a) a vision statement as set forth in Section 604.310;

b) a source water assessment as set forth in Section 604.315;

c) the objectives as set forth in Section 604.320; and

d) an action plan as set forth in Section 604.325.

Section 604.310 Vision Statement

The vision statement must include the following:

a) the community water supply's policy and commitment to protecting source water;

b) an explanation of the community water supply's resources to protect source water;

c) an explanation of the barriers to protecting source water; and

d) the names of the individuals who developed the vision statement.

Section 604.315 Source Water Assessment

a) The source water assessment must contain the following information:

1) statement of the importance of the source water;

2) a list of water supplies that obtain water from this community water supply;

3) delineation of all sources of water used by the community water supply:

A) For surface water, description of the watershed, map of the watershed, and intake locations must be included;

B) For groundwater, the well identification number, well description, well status, well depth, a description of setback zones and a description of the aquifer for each well must be included;

4) a report on the quality of the source water for all sources of water delineated in subsection (a)(3);

A) The report must indicate when and where samples used to determine the quality of the source water were taken. These samples must be tested by a certified laboratory; and

B) The report must include the certified laboratory's results.

5) a report on the quality of the finished water;

6) identification of potential sources of contamination to the source water;

7) analysis of the source water's susceptibility to contamination; and

8) explanation of the community water supply's efforts to protect its source water;

b) Upon request, the Agency will provide technical assistance to a community water supply in conducting the source water assessment.

c) A community water supply may use a Source Water Assessment Program Fact Sheet prepared by the Agency to fulfill the requirements of this section.

Section 604.320 Source Water Protection Plan Objectives

The source water protection plan must contain a list of the community water supply's objectives to protecting source water. These objectives can include meeting the requirements of any of the Sections in this Subpart, including developing a vision statement or performing a source water assessment. Objectives may also address the specific problems or issues identified in the source water assessment, and should consider current and potential future issues.

Section 604.325 Action Plan

In the action plan, the community water supply must identify the actions needed to achieve the community water supply's objectives determined under Section 604.320. The action plan must include the following:

a) descriptions of all projects, programs, and activities developed by the community water supply to meet the objectives listed in Section 604.320;

b) the community water supply's schedule for implementing projects, programs and activities;

c) an identification of the necessary resources to implement the plan; and

d) an identification of the potential problems with and obstacles to implementing the plan.

Section 604.330 Submission

a) A community water supply that first commenced construction after the effective date must develop and submit a source water protection plan simultaneously with the construction permit application.

b) A community water supply in existence as of the effective date must develop and submit to the Agency for approval a source water protection plan within the following time frame after the effective date:

1) Within 3 years for a community water supply serving a population greater than 50,000 persons.

2) Within 4 years for a community water supply serving a population of greater than 3,000, but less than or equal to 49,999 persons.

3) Within 5 years for a community water supply serving a population of less than or equal to 2,999 persons.

c) An existing community water supply which anticipates using a new source of water for its supply must develop and submit a revised source water protection plan simultaneously with the construction permit application.

Section 604.335 Agency Approval

The Agency, not later than 45 days after the receipt of the source water protection plan, will either approve or disapprove the plan. If the Agency takes no action within 45 days after receipt of the source water protection plan, the community water supply may deem the plan approved. A community water supply may waive the requirement that the Agency take an action within 45 days after the receipt of the plan by advising the Agency in writing.

Section 604.340 Evaluation and Revision

The community water supply must review and revise as necessary its source water protection plan no less than every five years. If the community water supply revises its source water protection plan, it must submit the plan to the Agency for approval under Section 604.335.

SUBPART D: AERATION

Section 604.400 General Requirements for Aeration

a) All aerators except those discharging to lime softening or clarification plants must be protected from contamination by birds, insects, wind borne debris, rainfall and water draining off the exterior of the aerator. Screens must be 24 mesh.

b) A bypass must be provided when a single aeration unit is installed.

c) The stability of the water after aeration must be evaluated to determine the need for additional treatment under Subpart I.

Section 604.405 Forced or Induced Draft Aeration

Forced or induced draft aeration devices must be designed to:

a) include a blower with a weatherproof motor in a tight housing and screened enclosure;

b) insure adequate counter current of air through the enclosed aerator column;

c) exhaust air directly to the outside atmosphere;

d) include a down turned and 24 mesh screened air outlet and inlet;

e) be such that air introduced in the column must be as free from obnoxious fumes, dust, and dirt as possible;

f) be such that sections of the aerator can be reached or removed for maintenance of the interior or installed in a separate aerator room;

g) provide loading at a rate of 1 to 5 gallons per minute for each square foot of total tray area (2.5 - 12.5 m/hr);

h) ensure that the water outlet is sealed;

i) discharge through a series of five or more trays with separation of trays not less than six inches;

j) provide distribution of water uniformly over the top tray; and

k) be of durable material resistant to the aggressiveness of the water and dissolved gases.

Section 604.410 Spray Aeration

Spray aeration design must provide:

a) a hydraulic head of between 5 - 25 feet;

b) nozzles, with the size, number, and spacing of the nozzles being dependent on the flow rate, space, and the amount of head available;

c) nozzle diameters in the range of 1 to 1.5 inches to minimize clogging; and

d) an enclosed basin to contain the spray, with any openings protected by a 24-mesh screen.

Section 604.415 Pressure Aeration

a) Pressure aeration may be used for oxidation purposes only. This process is not acceptable for the removal of dissolved gases.

b) Filters following pressure aeration must allow for the release of air.

c) Pressure aeration must be designed to

1) give thorough mixing of compressed air with water being treated; and

2) provide air free of obnoxious fumes, dust, dirt and other contaminants.

Section 604.420 Packed Tower Aeration

a) Packed tower aeration (PTA) may be used for removing compounds with a Henry's Constant greater than 100 atm mol/mol at 120C. Compounds with a Henry's Constant less than 10 may not be removed by PTA. For Henry Constant values between 10 and 100, PTA may be used upon completion of a pilot study and approval by the Agency.

b) Process Design

1) Construction permit applications and pilot study

A) Before installing PTA, the community water supply must submit a construction permit application which includes Henry's Constant for the contaminant, the mass transfer coefficient, air pressure drop and stripping factor, height and diameter of unit, air to water ratio, packing depth, and surface loading rate.

B) Pilot testing is required for PTA used for compounds with Henry's Constant greater than 100 unless there is considerable past performance data on the contaminant to be treated, there is a concentration level similar to previous projects, and the Agency has approved the process design based on use of appropriate calculations without pilot testing. Proposals of this type must be discussed with the Agency prior to submission of any construction permit applications.

C) When a pilot test is required, the pilot test must:

i) evaluate a variety of loading rates and air to water ratios at the peak contaminant concentration; and

ii) give special consideration to removal efficiencies when multiple contaminations occur.

2) The tower must be designed to reduce contaminants to below the maximum contaminant level (MCL) and to the lowest practical level.

3) The water loading rates are typically in the range from 15 gpm/ft^2 to 30 gpm/ft^2.

4) The ratio of the column diameter to packing diameter must be at least 10:1 for the full-scale tower. The pilot test can have a ratio of 7:1. The type and size of the packing used in the full-scale unit must be the same as that used in the pilot unit.

5) The minimum volumetric air to water ratio at peak water flow must be in the range of 25:1 and to 80:1, unless otherwise demonstrated by a pilot study and approved by the Agency under Section 604.145(b).

6) The design must consider providing pretreatment if potential fouling problems are likely to occur. Fouling problems can occur from calcium carbonate and iron precipitation and from bacterial growth.

7) Disinfection capability must be provided prior to and after PTA.

8) The effects of temperature must be considered since a drop in water temperature can result in a drop in contaminant removal efficiency.

c) Materials of construction

1) The tower may be constructed of stainless steel, concrete, aluminum, fiberglass, or plastic, but the tower must not be constructed of uncoated carbon steel;

2) Towers must be protected against damage from wind; and

3) Towers must have adequate structural support.

d) Water flow system

1) Water must be distributed uniformly at the top of the tower when using spray nozzles or orifice type distributor trays that prevent short circuiting;

2) A mist eliminator must be provided above the water distributor system;

3) A side wiper redistribution ring must be provided at least every 10 feet to prevent water channeling along the tower wall and short-circuiting;

4) Sample taps must be provided in the influent and effluent piping;

5) If an effluent sump is provided, it must be accessible to allow for cleaning and must be equipped with a drain valve in compliance with Section 604.1500;

6) The effluent piping must have a means to discharge to waste;

7) The design must prevent freezing of the influent riser and effluent piping when the unit is not operating;

8) If piping is buried, it must be maintained under positive pressure; and

9) An overflow line must be provided which discharges 12 to 24 inches above the ground surface.

e) Air flow system

1) The air inlet to the blower and the tower discharge vent must be down turned and protected with a noncorrodible 24 mesh screen to prevent contamination from extraneous matter.

2) A positive airflow sensing device and a pressure gauge must be installed on the air influent line. The positive airflow-sensing device must be a part of an automatic control system, which will turn off the influent water if positive airflow is not detected. The pressure gauge will serve as an indicator of fouling buildup.

f) Other required features

1) Access ports with a minimum diameter of 24 inches to facilitate inspection, media replacement, media cleaning and maintenance of the interior must be provided.

2) Disinfection application points ahead of the tower must be provided.

3) Adequate packing support to allow free flow of water and to prevent deformation of the media with deep packing heights must be provided.

4) An access ladder must be provided.

5) The blower, disinfectant feeder and well pump must have an electrical interconnection.

Section 604.425 Other Methods of Aeration

Other methods of aeration may be used if applicable to the treatment needs. The treatment processes must be designed to meet the particular needs of the water to be treated and must be approved by the Agency. Such methods include:

a) spraying;

b) diffused air;

c) cascades;

d) mechanical aeration; or

e) natural draft aeration.

SUBPART E: CLARIFICATION

Section 604.500 General Clarification Requirements

a) All community water supplies designed to treat surface water must have a minimum of two clarification units. The clarifiers must be capable of meeting the plant design capacity with one clarifier removed from service.

b) For community water supplies treating groundwater under the direct influence of surface water, the community water supply must have a minimum of two clarification units if clarification is provided.

c) Community water supplies designed to treat groundwater will be required to have a minimum of two clarification units if clarification is provided.

d) Design of the clarification process must:

1) be constructed to allow units to be taken out of service without disrupting operation;

2) be designed to star manually following shutdown;

3) be designed to minimize hydraulic head losses between units to allow future changes in processes without the need for repumping; and

4) if flow is split, provide a means of measuring and modifying the flow to each train or unit unless flow paths are equivalent and hydraulic controls are provided.

Section 604.505 Coagulation

a) For purposes of this section, coagulation is a process using coagulant chemicals and mixing by which colloidal and suspended material are destabilized and agglomerated into settleable or filterable flocs, or both.

b) For community water supplies treating surface water using direct or conventional filtration, the use of a primary coagulant is required at all times.

c) The community water supply must submit with the construction permit application the design basis for the velocity gradient (G value) selected, considering the chemicals to be added and water temperature, color and other related water quality parameters.

d) Mixing – Mixing must be adequate to disperse chemicals in the basin. The detention period should be instantaneous, but not longer than thirty seconds with mixing equipment capable of imparting a minimum velocity gradient (G) of at least 750 fps/ft.

e) Equipment - Basins must be designed or equipped to produce adequate mixing for all treatment flow rates. Static mixing may be considered where the flow is relatively constant and will be high enough to maintain the necessary turbulence for complete chemical reactions.

f) Location - the coagulation and flocculation basin must be as close together as possible.

Section 604.510 Flocculation

a) For purposes of this section, flocculation is a process to enhance agglomeration or collection of smaller floc particles into larger, more easily settleable or filterable particles through gentle stirring by hydraulic or mechanical means.

b) Basin Design - Inlet and outlet design must minimize short-circuiting and destruction of floc. Series compartments are recommended to further minimize short-circuiting and to provide decreasing mixing energy with time. Basins must be designed so that individual basins may be isolated without disrupting plant operation. A drain and/or pumps must be provided to handle dewatering and sludge removal.

c) Detention – The detention time must be adequate for floc formation. A detention time of at least 30 minutes with consideration to using tapered (*i.e.*, diminishing

velocity gradient) flocculation is recommended. The flow-through velocity should be not less than 0.5 nor greater than 1.5 feet per minute.

d) Equipment - Agitators must be driven by variable speed drives with the peripheral speed of paddles ranging from 0.5 to 3.0 feet per second. External, non-submerged motors are preferred.

e) Other designs - Baffling may be used to provide for flocculation in small plants only after Agency approval. The design should be such that the velocities and flows as provided in subsection (c) will be maintained.

f) Superstructure - A superstructure over the flocculation basins may be required.

g) Piping - Flocculation and sedimentation basins must be as close together as possible. The velocity of flocculated water through pipes or conduits to settling basins must be no less than 0.5 nor greater than 1.5 feet per second. Allowances must be made to minimize turbulence at bends and changes in direction.

h) Consideration should be given to the need for additional chemical feed in the future.

Section 604.515 Sedimentation

For purpose of this section, sedimentation is a process that allows particles to settle by gravity and typically precedes filtration. The detention time for effective clarification is dependent upon a number of factors related to basin design and the nature of the raw water. The following criteria apply to conventional sedimentation units:

a) A minimum of four hours of settling time must be provided. This may be reduced to two hours for lime-soda softening facilities treating only groundwater. The Agency may approve reduced detention time when equivalent effective settling is demonstrated or when the overflow rate is not more than 0.5 gpm per square foot.

b) Inlet devices - Inlets must be designed to distribute the water equally and at uniform velocities by using open ports, submerged ports, and similar entrance arrangements. A baffle should be constructed across the basin close to the inlet end and should project several feet below the water surface to dissipate inlet velocities and provide uniform flows across the basin.

c) Velocity - The velocity through a sedimentation basin must not exceed 0.5 feet per minute. The basins must be designed to minimize short-circuiting. Fixed or adjustable baffles must be provided as necessary to achieve the maximum potential for clarification.

d) Outlet devices - Outlet weirs or submerged orifices must maintain velocities suitable for settling in the basin and minimize short-circuiting. Submerged orifices must be used if necessary to provide a volume above the orifices for storage when there are fluctuations in flow. Outlet weirs and submerged orifices must be designed as follows:

1) The rate of flow over the outlet weirs or through the submerged orifices must not exceed 20,000 gallons per day per foot of the outlet launder or orifice circumference;

2) Submerged orifices should not be located lower than three (3) feet below the flow line; and

3) The entrance velocity through the submerged orifices must not exceed 0.5 feet per second.

e) Overflow - An overflow weir or pipe designed to establish the maximum water level desired on top of the filters should be provided. The overflow must discharge by gravity with a free fall at a location where the discharge can be observed.

f) Drainage – Sedimentation basins must be provided with a means for dewatering. Basin bottoms should slope toward the drain not less than one foot in twelve feet where mechanical sludge collection equipment is not required.

g) Flushing lines - Flushing lines or hydrants must be provided and must be equipped with backflow prevention devices approved by the Agency.

h) Mechanical sludge removal equipment must be provided in the sedimentation basin.

i) Sludge removal design must provide that:

1) sludge pipes must be not less than three inches in diameter and so arranged as to facilitate cleaning;

2) entrance to sludge withdrawal piping must prevent clogging;

3) valves must be located outside the tank for accessibility; and

4) the operator may observe and sample sludge being withdrawn from the unit.

Section 604.520 Solids Contact Unit

a) Adequate piping with sampling taps must be provided to allow for the collection of samples from various depths of the units.

b) Chemical feed. Chemicals must be satisfactorily mixed in accordance with Section 604.1100(b).

c) The Agency may require a rapid mix device or chamber ahead of solids contact units to assure proper mixing of the chemicals applied. If required by the Agency, the mixing devices must be constructed to:

1) provide good mixing of the raw water with previously formed sludge particles; and

2) prevent deposition of solids in the mixing zone.

d) Flocculation equipment:

1) must be adjustable (speed and/or pitch);

2) must provide for coagulation in a separate chamber or baffled zone within the unit; and

3) should provide that the flocculation and mixing period to be not less than 30 minutes.

e) Sludge removal design must:

1) Require sludge pipes not less than three inches in diameter and arranged to facilitate cleaning;

2) Prevent clogging at the entrance to sludge withdrawal piping;

3) Locate valves outside the tank for accessibility; and

4) Allow the operator to observe and sample sludge being withdrawn from the unit.

f) Cross Connections

1) Blow-off outlets and drains must terminate in a location with an air gap of six inches for backflow protection.

2) Cross connection control must be included for the potable water lines used to back flush sludge lines.

g) Detention Period. Detention period must be established on the basis of the raw water characteristics and other local conditions that affect the operation of the unit.

1) When treating surface water with upflow clarifiers using mechanical mixing, detention times must be based on design flow rates and should be two to four hours;

2) When softening groundwater with upflow clarifiers using mechanical mixing, detention times must be based on design flow rates and should be one to two hours;

3) When treating surface water using cone shaped, helical upflow, solids contact clarifiers or softeners, the detention time must a minimum of 60 minutes; and

4) When treating groundwater using cone shaped, helical upflow, solids contact softeners, the detention time must a minimum of 45 minutes.

h) Water Losses

1) Solids contact units must be provided with controls to allow adjusting the rate or frequency of sludge withdrawal.

2) Total water losses must not exceed:

A) five percent for clarifiers; and

B) three percent for softening units.

3) Solids concentration of wasted sludge to waste must be:

A) three percent by weight for clarifiers; and

B) five percent by weight for softeners.

i) Weirs or Orifices

1) Upflow clarifiers using mechanical mixing

A) The units must be equipped with either overflow weirs or orifices constructed so that water at the surface of the unit does not travel over 10 feet horizontally to the collection trough.

B) Weirs must be adjustable, at least equivalent in length to the perimeter of the tank.

C) Weir loading must not exceed:

i) 10 gpm per foot of weir length for units used as clarifiers; and

ii) 20 gpm per foot of weir length for units used as softeners.

D) Where orifices are used the loading rates per foot of launder rates should be equivalent to weir loadings. Either must produce uniform rising rates over the entire area of the tank.

2) Cone shaped, helical upflow, solids contact clarifiers or softeners

A) Weir loadings on cone shaped, helical upflow solids contact units that utilize reversing flow weirs must not exceed

i) 100 gpm per lineal foot of weir length for cone shaped helical upflow solids contact units; or

ii) 200 gpm per foot of weir length for units used as softeners

B) Where orifices are used the loading rates per foot of launder rates should be equivalent to weir loadings. Either must produce uniform rising rates over the entire area of the tank.

j) Upflow Rates. Unless otherwise approved by the Agency under Section 604.145(b), the upflow rates must not exceed:

1) 1.0 gpm per square foot of area at the sludge separation line for units used as clarifiers; and

2) 1.75 gpm per square foot of area at the slurry separation line, for units used as softeners.

k) Cone shaped, helical upflow, solids contact units must be equipped with one or more tangentially oriented inlets that introduce flow into the bottom cylindrical section of the unit. The inlets must be equipped with a means for controlling the velocity of the water flowing into the unit.

Section 604.525 Tube or Plate Settlers

a) Settler units consisting of variously shaped tubes or plates which are installed in multiple layers and at an angle to the flow may be used for sedimentation, following flocculation.

b) Tube or Plate Settlers must meet the following requirements:

1) Inlet and outlet design must maintain velocities suitable for settling in the basin and to minimize short circuiting;

2) Plate units must be designed to minimize maldistribution across the units;

3) Drain piping from settler units must be sized to facilitate a quick flush of the settlers units and to prevent flooding of other portions of the plant;

4) Outdoor installations must be protected against freezing, including sufficient freeboard above the top of the settlers;

5) Tubes must have a maximum application rate of 2 gpm per square foot of cross-sectional area, unless higher rates are shown through pilot plant or in-plant demonstration studies;

6) Plates must have a maximum application rate of 0.5 gpm per square foot, based on 80 percent of the projected horizontal plate area;

7) Flushing lines must be provided to facilitate maintenance and must be properly protected against backflow or back siphonage;

8) Inlets and outlets must conform with Section 604.515(b) and (d);

9) The units' support system must be able to carry the weight of the settler units when the basin is drained plus any additional weight to support maintenance; and

10) Provisions must be made to allow the water level to be dropped, and water or air jet system for cleaning the settler units.

Section 604.530 Other High Rate Clarification Processes

The Agency may approve high rate clarification processes upon a demonstration of satisfactory performance under on-site pilot plant conditions or documentation of full-scale plant operation with similar raw water quality conditions. The demonstration of documentation must include justification for any reductions in detention times and/or increases in weir loading rates. High rate clarification processes may include dissolved air flotation, ballasted flocculation, and contact flocculation/clarification.

SUBPART F: FILTRATION

Section 604.600 Filtration

a) Application of any one type of filter must be supported by water quality data representing a reasonable period of time to characterize the variations in water quality. The Agency may require pilot treatment studies to demonstrate the applicability of the method of filtration proposed.

b) Acceptable filters include the following types:

1) rapid rate gravity filters;

2) rapid rate pressure filters;

3) deep bed rapid rate gravity filters; and

4) biologically active filters;

Section 604.605 Rapid Rate Gravity Filters

a) The use of rapid rate gravity filters must require pretreatment.

b) For community water supplies treating surface water, groundwater under the direct influence of surface water, or using lime soda softening treatment, unless otherwise approved by the Agency under Section 604.145(b), the nominal filtration rates must not exceed 3 gal/min/ft^2 of filter area for single media filters and 5 gal/min/ft^2 for multi-media filters. Filtration rates must be reduced when treated water turbidity exceeds the standards in 35 Ill. Adm. Code 611.

c) For community water supplies treating groundwater and not using lime soda softening treatment, unless otherwise approved by the Agency under Section 604.145(b), the rate of filtration must not exceed 4 gal/min/ft^2 of filter area.

d) Number of filter units.

1) A minimum of two units must be provided. Each unit must be capable of meeting the plant design capacity or the projected maximum daily demand at the approved filtration rate.

2) Where more than two filter units are provided, the filters must be capable of meeting the plant design capacity at the approved filtration rate with one filter removed from service.

3) Where declining rate filtration is provided, the variable aspect of filtration rates, and the number of filters must be considered when determining the design capacity for the filters.

e) Structural details and hydraulics. The filter structure must be designed to provide for the following:

1) vertical walls within the filter;

2) no protrusion of the filter walls into the filter media;

3) cover by superstructure;

4) head and walking room to permit normal inspection and operation;

5) minimum depth of filter box of 8.5 feet;

6) minimum water depth over the surface of the filter media of 3 feet;

7) trapped effluent to prevent backflow of air to the bottom of the filters;

8) prevention of floor drainage to the filter with a minimum 4-inch curb around the filters;

9) prevention of flooding by providing overflow;

10) maximum velocity of treated water in pipe and conduits to filters of 2 ft/sec;

11) cleanouts and straight alignment for influent pipes or conduits where solids loading is heavy, or following lime soda softening;

12) construction to prevent cross connections, short circuiting, or common walls between potable and non-potable water; and

13) wash water drain capacity to carry maximum flow.

f) Wash water troughs must be constructed such that:

1) the bottom elevation is above the maximum level of expanded media during washing;

2) a 2-inch freeboard is provided at the maximum rate of wash;

3) the top edge is level and is all at the same elevation;

4) spaced so that each trough serves the same number of square feet of filter area; and

5) the maximum horizontal travel of suspended particles to reach the trough does not exceed 3 feet.

g) The filter media must be composed of clean silica sand or other natural or synthetic media free from detrimental chemical or bacterial contaminants and must meet the following requirements:

1) a total depth of not less than 24 inches;

2) a uniformity coefficient of the smallest material not greater than 1.65;

3) a minimum of 12 inches of media with an effective size range of 0.45 mm to 0.55 mm.

4) filter media specifications:

A) Filter anthracite must consist of hard, durable anthracite coal particles of various sizes. Blending of non-anthracite material is not acceptable. Anthracite must have:

i) an effective size of 0.45 mm - 0.55 mm with uniformity coefficient not greater than 1.65 when used alone;

ii) an effective size of 0.8 mm - 1.2 mm with a uniformity coefficient not greater than 1.7 when used as a cap;

iii) an effective size less than 0.8 mm for anthracite used as a single media on potable groundwater for iron and manganese removal only (effective sizes greater than 0.8

mm may be approved based upon onsite pilot plant studies);

iv) a specific gravity greater than 1.4;

v) an acid solubility less than 5 percent; and

vi) a Mho's scale of hardness greater than 2.7.

B) Sand must have:

i) an effective size of 0.45 mm to 0.55 mm;

ii) a uniformity coefficient of not greater than 1.65;

iii) a specific gravity greater than 2.5; and

iv) an acid solubility less than 5 percent.

C) High density sand must consist of hard durable, and dense grain garnet, ilmenite, hematite, magnetite, or associated minerals of those ores that will resist degradation during handling and use, and must:

i) contain at least 95 percent of the associated material with a specific gravity of 3.8 or higher;

ii) have an effective size of 0.2 to 0.3 mm;

iii) have a uniformity coefficient of not greater than 1.65; and

iv) have an acid solubility less than 5 percent.

D) Granular activated carbon as a single media may be considered for filtration only after pilot or full-scale testing and with prior approval of the Agency. The design must include the following:

i) The media must meet the basic specifications for filter media as given in subsection (g)(1) through (g)(3).

ii) There must be provisions for a free chlorine residual and adequate contact time in the water following the filters and prior to distribution.

iii) Provisions must be made for frequent replacement or regeneration.

E) Other media types or characteristics must be approved by the Agency.

5) Supporting media must be designed as follows based on the type of filter material.

A) A three-inch layer of torpedo sand must be used as a supporting media for filter sand where supporting gravel is used, and must have:

i) an effective size of 0.8 mm to 2.0 mm; and

ii) a uniformity coefficient not greater than 1.7.

B) Gravel

i) When gravel is used as the supporting media it must consist of cleaned and washed, hard, durable, rounded silica particles and must not include flat or elongated particles.

ii) The coarsest gravel must be 2.5 inches in size when the gravel rests directly on a lateral system, and must extend above the top of the perforated laterals.

iii) Not less than four layers of gravel must be provided in accordance with the following size and depth distribution:

Size	**Depth**
2½ to 1½ inches	5 to 8 inches
1½ to 3/4 inches	3 to 5 inches
3/4 to 1/2 inches	3 to 5 inches
1/2 to 3/16 inches	2 to 3 inches
3/16 to 3/32 inches	2 to 3 inches

iv) Reduction of gravel depths and other size gradations may be approved by the Agency upon justification for slow sand filtration or when proprietary filter bottoms are specified.

h) Filter bottoms and strainer systems

1) Water quality must be reviewed prior to the use of porous plate bottoms to prevent clogging and failure of the underdrain system.

2) The design of manifold type collection systems must:

A) minimize loss of head in the manifold and laterals;

B) ensure even distribution of washwater and even rate of filtration over the entire area of the filter;

C) provide the ratio of the area of the final openings of the strainer systems to the area of the filter at about 0.003;

D) provide the total cross-sectional area of the laterals at about twice the total area of the final openings;

E) provide the cross-sectional area of the manifold at 1.5 to 2 times the total area of the laterals; and

F) lateral perforations without strainers must be directed downward.

3) The Agency may approve departures from these standards for high rate filters and for propriety bottoms.

i) The following appurtenances must be provided for every filter:

1) influent and effluent sampling taps;

2) a gauge indicating loss of head;

3) a meter indicating the instantaneous rate of flow;

4) a pipe for filtering to waste that has a six inch or larger air gap, or other Agency approved cross connection control measure;

5) a continuously recording Nephelometer capable of measuring and recording filter effluent turbidity at maximum 15-minute intervals, and with alarm capability to notify the Operator if filtered water turbidity exceeds 0.3 NTU (Nephelometric Units);

6) an adjustable rate valve to allow the Operator to gradually control the flow rate increase when placing the filters back into operation;

7) a hose and storage rack for washing filter walls.

j) Backwash. Provisions must be made for washing filters as follows:

1) The community water supply must use filtered water provided at the required rate by washwater tanks or a dedicated washwater pump to wash the filters.

2) Backwash rate

A) a minimum rate of 15 gal/min/ft^2, consistent with water temperatures and specific gravity of the filter media.

B) a rate sufficient to provide for a 50 percent expansion of the filter bed is required.

C) a reduced rate of 10 gal/min/ft^2 for full depth anthracite or granular activated carbon filters upon approval by the Agency.

3) Washwater pumps in duplicate must be provided unless an alternate means of obtaining washwater is available.

4) The main washwater line must have a regulator or valve to obtain the desired rate of filter wash with the washwater valves on the individual filters open wide.

5) The main washwater line or backwash waste line must have a rate of flow indicator, preferably with a totalizer, located so that it can be easily read by the operator during the washing process.

6) Rapid changes in backwash water flow must be prevented.

7) Backwash must be completed with an operator in attendance to initiate the backwash cycle and to control the return-to-service procedure to assure that the effluent turbidity is less than 0.3 NTU when the filter is placed back into operation for discharge to the clearwell.

8) Appropriate measures for cross-connection control must be provided.

k) Surface or subsurface wash facilities are required except for filters used exclusively for iron, radionuclides, arsenic or manganese removal, and wash facilities may include a system of fixed nozzles or a revolving-type apparatus. All devices must be designed:

1) to provide water pressures of at least 45 psi;

2) if connected to the treated water system, to prevent back siphonage by properly installing a vacuum breaker or other approved device; and

3) to provide a rate of flow of 2.0 gpm/ft^2 of filter area with fixed nozzles or 0.5 gpm/ft^2 with revolving arms.

l) Air scouring can be used in place of surface wash if the air scouring meets the following requirements:

1) Air flow for air scouring the filter must be 3 – 5 f^3/min/ft^2 of filter area when the air is introduced in the underdrain; a lower air rate must be used when the air scour distribution system is placed above the underdrains;

2) A method to avoid filter media loss during backwashing must be provided;

3) Air scouring must be followed by a fluidization wash sufficient to restratify the media;

4) Air must be free from contamination;

5) If air scour distribution systems are placed at the media and supporting bed interface, the air scour nozzles must be designed to prevent media from clogging the nozzles or the air entering the air distribution system;

6) Piping for the air distribution system must not be flexible hose or other soft material;

7) Air delivery piping must not

A) pass down through the filter media; and

B) have any arrangement in the filter design which would allow short circuiting between the applied unfiltered water and the filtered water;

8) When air scouring is being utilized, the backwash rate must be variable and must not exceed 8 gal/min, unless a higher rate is necessary to remove scoured particles from filter media surfaces; and

9) Air scouring piping must not be installed in the underdrain unless the underdrain was designed to accommodate the piping.

Section 604.610 Rapid Rate Pressure Filters

a) Pressure filters must not be used in the filtration of surface water, groundwater under the direct influence of surface water, or water treated by lime soda softening.

b) The rate of filtration must not exceed 4 gal/min/ft^2 of filter area unless otherwise approved by the Agency under Section 604.145(b).

c) Minimum criteria at Section 605.605(e) and (g) relative to structural details, hydraulics, and filter media provided for rapid rate gravity filters also apply to pressure filters where appropriate.

d) Number

1) A minimum of two units must be provided. Each unit must be capable of meeting the plant design capacity or the projected maximum daily demand at the approved filtration rate.

2) Where more than two filter units are provided, the filters must be capable of meeting the plant design capacity at the approved filtration rate with one filter removed from service.

e) Rapid rate pressure filters must be designed to provide for the following:

1) loss of head gauges on the inlet and outlet pipes of each battery of filters;

2) an easily readable meter or flow indicator on each battery of filters;

3) filtration and backwashing of each filter individually;

4) minimum sidewall shell height of 5 feet, unless otherwise approved by the Agency under Section 604.145(b);

5) the top of the washwater collectors to be at least 18 inches above the surface of the media;

6) an underdrain system to collect the filtered water and to uniformly distribute the backwash water at a rate not less than 15 gal/min/ft^2 of filter area;

7) backwash flow indicators and controls that are readable while operating the control valves;

8) an air release valve on the highest point of each filter;

9) when the filter exceeds 36 inches in diameter, a manhole at least 24 inches in diameter;

10) means of observing backwash discharge water; and

11) a six inch or larger air gap, or other Agency approved cross connection control measure.

f) Rapid rate pressure filters should have a flow indicator on each filtering unit.

Section 604.615 Deep Bed Rapid Rate Gravity Filters

Deep bed rapid rate gravity filters refers to rapid rate gravity filters with filter material depths equal to or greater than 48 inches, and filter media sizes are typically larger than those listed in Section 604.605(f)(4).

a) Before a community water supply may use deep bed rapid rate filters, a pilot study must be completed and approved by the Agency.

b) The final filter design must be based on the pilot plant studies and must comply with all applicable portions of Section 604.605.

Section 604.620 Biologically Active Filtration

Biologically active filtration refers to the filtration of surface water or a groundwater with iron, manganese or significant natural organic material, which includes the establishment, and maintenance of biological activity within the filtration media. The objectives of biologically active filtration may include control of disinfection byproduct precursors; increased disinfectant stability; reduction of substrates for microbial regrowth; breakdown of small quantities of synthetic organic chemicals; and oxidation of ammonia-nitrogen, iron and manganese. Biological activity can have an adverse impact on turbidity, particle and microbial pathogen removal, disinfection practices, head loss development and filter run times and distribution system corrosion.

a) Before use of biologically active filters, the community water supply must conduct a pilot study and obtain Agency approval. Pilot study objectives must be clearly defined and must ensure the microbial quality of the filtered water under all anticipated conditions of operation.

1) The pilot study must be of sufficient duration to ensure establishment of full biological activity; often greater than three months is required.

2) The pilot study must establish empty bed contact time, surface filtration hydraulic loading rate, substrate loading rate per unit filter media volume, and treatment efficiency for removal or reduction of concentration of parameters targeted for the pilot study.

b) The final filter design must be based on the pilot plant studies and must comply with Section 604.605.

SUBPART G: DISINFECTION

Section 604.700 Disinfection Requirement

a) Disinfection, in addition to continuous chlorination, is required for all sources utilizing surface water, groundwater under the direct influence of surface water, groundwater obtained from unconfined fractured bedrock, groundwater with a total coliform presence, and groundwater treated in basins open to the atmosphere to meet the inactivation of pathogens treatment objectives as provided in Section 604.720 and 35 Ill. Adm. Code Part 611.

b) Disinfection may be accomplished with chlorine, chloramines, chlorine dioxide, ozone, or ultraviolet light. Chloramines must not be used as a primary disinfectant, unless otherwise approved by the Agency under Section 604.145(b).

c) Continuous chlorination is required for all community water supplies unless the chlorine residual requirements of Section 604.725 are met or the community water supply is exempt under Section 17(b) of the Act.

d) Notification of a change in disinfection practices and the schedule for the changes must be made known to the public; particularly to hospitals, kidney dialysis facilities and fish breeders, as chlorine dioxide and its byproducts may have similar effects as chloramines.

Section 604.705 Chlorination Equipment

a) Procedure for Submitting Plans and Specifications - Design documents for chlorination must be prepared and submitted in accordance with 35 Ill. Adm. Code 602.

b) Chlorination equipment must:

1) be large enough to satisfy the immediate chlorine demand and give a measurable residual of at least 2.0 mg/L of total chlorine under all operating conditions after contact;

2) be capable of feeding chlorine to the water being treated at a dosage rate of at least 5.0 mg/L except when the water has a high chlorine demand. Factors in determining chlorine demand are:

A) pH;

B) water temperature;

C) contact time;

D) presence in the water of substances having chlorine demand such as hydrogen sulfide, iron, manganese and nitrogenous compounds including ammonia; and

E) supplemental treatment such as aeration which reduces chlorine demand;

3) be provided in duplicate when operating conditions do not allow repair of the chlorinator during off-pumping periods;

4) be provided in duplicate, installed and operational, at community water supplies treating surface water, groundwater under the direct influence of surface water, and groundwater with a history of total coliform positive results; and

5) include spare parts for emergency repairs consisting of at least the commonly expendable parts such as glassware, fittings, hose clamps, and gaskets.

Section 604.710 Points of Application

Provisions must be made for the capability to add a disinfectant into or prior to any aeration, settling, or filtration process, unless the process involves biological treatment in which case the disinfectant must be added after the biological treatment.

Section 604.715 Contact Time

a) Unless otherwise approved by the Agency under Section 604.145(b), a minimum chlorine contact time of 60 minutes must be provided at all plants treating surface water, groundwater under the direct influence of surface water, groundwater with basins open to the atmosphere, and groundwater obtained from unconfined, fractured bedrock. The equivalent baffling factor must be greater than or equal to

0.3 to prevent short circuiting. The 60-minute contact time must be calculated based on the following formula:

$$\frac{\text{maximum pumping rate out of basin, gpm}}{\text{actual basin operating water volume, gallons}} = \text{minimum 60 minutes}$$

b) For the purposes of this section, contact time is measured as follows:

1) When the treatment process includes filtration, contact time is measured as the time following filtration of the water until the water reaches the first user.

2) When the treatment process does not include filtration, contact time is measured as the time following chlorination of water until the water reaches the first user.

Section 604.720 Inactivation of Pathogens

a) At plants treating surface water or groundwater under the direct influence of surface water, a disinfectant must be added to provide:

1) a minimum 0.5-log inactivation of Giardia lamblia cysts; and

2) a minimum 2-log inactivation of viruses.

b) At plants treating groundwater obtained from unconfined fractured bedrock, groundwater with a total coliform presence, and groundwater treated in basins open to the atmosphere:

1) A 4-log virus inactivation is required; and

2) A second method of inactivation is required in addition to continuous chlorination. Additional methods of inactivation must be approved by the Agency, and may include chlorine dioxide, ozone, ultraviolet light, gravity filtration and membrane filtration.

c) The methodology to determine inactivation of pathogens must be done in accordance with the Disinfection Profiling and Benchmark Guidance Manual, August 1999 USEPA Reference for methodology and C x T tables, incorporated by reference in 35 Ill. Adm. Code 601.115.

d) Factors to be considered in determining inactivation include: pH, temperature, form of disinfectant residual, disinfectant residual concentration, flow rate,

volume of basins/piping and baffling factors. Baffling factor must be determined according to "Improving Clearwell Design for CT Compliance," incorporated by reference in 35 Ill. Adm. Code 601.115, or a tracer study approved by the Agency.

Section 604.725 Residual Chlorine

a) A minimum free chlorine residual of 0.5 mg/L or a minimum combined residual of 1.0 mg/l must be maintained in all active parts of the distribution system at all times.

b) Community water supplies must monitor chlorine residual to determine the amount and type of residuals existing at different points in the distribution system.

c) Community water supplies must not mix water sources with free chlorine and combined chlorine residual.

Section 604.730 Continuous Chlorine Analyzers

Community water supplies that rely on chlorination for disinfection under Section 604.700(a) must have continuous chlorine residual analyzers with alarm capability that alerts the community water supply if chlorine residuals at the entry point to the distribution system are below the limits established in Section 604.725.

Section 604.735 Chlorinator Piping

a) Cross-Connection Protection.

1) The chlorinator piping must be designed to prevent contamination of the treated water.

2) For all systems required to disinfect under Section 604.700, piping must be arranged to prevent back flow or back siphonage between multiple points of chlorine application.

3) The water supply to each eductor must have a separate shut off valve.

b) Pipe Material.

1) The pipes carrying elemental liquid or dry gaseous chlorine under pressure must be Schedule 80 seamless steel tubing or other materials recommended by The Chlorine Institute in Pamphlet 6, Piping Systems for

Dry Chlorine, incorporated by reference in 35 Ill. Adm. Code 601.115. These pipes must not be PVC.

2) Rubber, PVC, polyethylene, or other materials recommended by the Chlorine Institute must be used for chlorine solution piping and fittings.

3) Nylon products are not acceptable for any part of the chlorine solution piping system.

SUBPART H: SOFTENING

Section 604.800 Lime or Lime-soda Process

a) Design standards for rapid mix, flocculation and sedimentation are in Subpart E.

b) When split treatment is used an accurate means of measuring and splitting the flow must be provided.

c) Before installation of lime or lime-soda processes, the community water supply must determine the carbon dioxide content of the raw water to evaluate the efficacy of installing aeration treatment.

d) Lime must be fed directly into the rapid mix basin or mixing chamber.

e) Rapid mix detention time must be no longer than 30 seconds with adequate velocity gradients to keep the lime particles dispersed.

f) The softening process must include equipment for stabilization of water softened by the lime or lime soda.

g) The use of excess lime is not an acceptable substitute for disinfection.

h) The plant processes must be manually started following shut down.

Section 604.805 Cation Exchange Process

a) Pre-treatment under Section 604.1010(b) or (c) is required when the content of iron, manganese, or a combination of the two is 1 mg/L or more.

b) Design Requirements must provide:

1) Automatic regeneration based on volume of water softened.

2) A manual override on all automatic controls.

c) The design capacity for hardness removal must not exceed 20,000 grains per cubic foot when resin is regenerated with 0.3 pounds of salt per 1000 grains of hardness removed.

d) The depth of the exchange resin must not be less than 3 feet.

e) Flow Rates

1) The rate of softening must not exceed seven gallons per minute per square foot of bed area.

2) The backwash rate must be 6 to 8 gallons per minute per square foot of bed area.

3) Rate of flow controllers or the equivalent must be installed.

f) The freeboard must be calculated based on the size and specific gravity of the resin and the direction of water flow. Unless otherwise approved by the Agency under Section 604.145(b), the washwater collector must be 24 inches above the top of the resin on down flow units.

g) The bottoms, strainer systems and support for the exchange resin must conform to criteria provided for rapid rate gravity filters in Sections 604.605(f) and 604.605(g).

h) Brine must be evenly distributed over the entire surface of both upflow and downflow units.

i) Backwash, rinse and air relief discharge pipes must be installed to prevent any possibility of back siphonage.

j) Bypass piping and equipment

1) Bypass must be provided around softening units to produce a blended water of desirable hardness.

2) Totalizing meters must be installed on the bypass line and on each softener unit.

3) The bypass line must have a shutoff valve. An automatic proportioning or regulating device is recommended.

k) When the applied water contains a chlorine residual, the cation exchange resin must be a type that is not damaged by residual chlorine.

l) Sampling Taps

1) Smooth-nosed sampling taps must be provided for the collection of representative samples.

2) The taps must be located to provide for sampling of the softener influent, effluent and blended water.

3) The sampling taps for the blended water must be at least 20 feet downstream from the point of blending.

4) Petcocks are not acceptable as sampling taps.

m) Brine and salt storage tanks:

1) Salt dissolving or brine tanks and wet salt storage tanks must be covered and must be corrosion resistant.

2) The make-up water inlet must be protected from back siphonage. Water for filling the tank must be distributed over the entire surface by pipes above the maximum brine level in the tank. An automatic declining level control system on the make-up water line is recommended.

3) Wet salt storage basins must be equipped with manholes or hatchways for access and for direct dumping of salt from truck or railcar. Openings must be provided with raised curbs and watertight covers having overlapping edges similar to those required for finished water reservoirs.

4) Overflows, where provided, must be protected with corrosion resistant screens and must terminate with either a turned downed bend having a proper free fall discharge or a self-closing flap valve.

5) The salt must be supported on graduated layers of gravel placed over a brine collection system.

6) Alternative designs which are conducive to frequent cleaning of the wet salt storage tank may be approved by the Agency.

7) Total salt storage must provide for at least 30 days of operation.

n) Corrosion control must be provided under Subpart I.

o) Suitable disposal must be provided for brine waste.

p) Pipes and contact materials must be resistant to the aggressiveness of salt. Plastic and red brass are acceptable piping materials. Steel and concrete must be coated with a non-leaching protective coating which is compatible with salt and brine.

q) Dry bulk salt storage must be enclosed and separated from other operating areas to prevent damage to equipment.

SUBPART I: STABILIZATION

Section 604.900 General Stabilization Requirements

a) Water distributed by community water supplies must be stable so as to not cause a violation of 35 Ill. Adm. Code 601.101(a).

b) The following water quality parameters of finished water must be evaluated to ensure that water quality parameters minimize corrosion and minimize deposition of excess calcium carbonate ($CaCO_3$) scale throughout the distribution system of the community water supply:

1) alkalinity (as $CaCO_3$);

2) total hardness (as $CaCO_3$);

3) calcium hardness (as $CaCO_3$);

4) temperature;

5) pH;

6) chloride;

7) sulfate;

8) total dissolved solids;

9) oxidation reduction potential;

10) conductivity;

11) iron;

12) manganese.

13) orthophosphate, if applicable; and

14) silica, if applicable.

c) The following may be used to determine the corrosivity of water distributed by a community water supply:

1) Lead and Copper

A) Optimal Corrosion Control Treatment Evaluation Technical Recommendations for Primacy Agencies and Public Water Systems, USEPA (March 2016); Office of Water (4606M); EPA 816-B-16-003, incorporated by reference at 35 Ill. Adm. Code 601.115;

B) Chloride Sulfate Mass Ratio (CSMR), calculated as follows:

$$CMSR = \frac{Cl^-, \text{ expressed as mg/L}}{SO_4^-, \text{ expressed as mg/L}};$$

C) Coupon and pipe loop studies.

2) Iron and Steel

Larson-Skold Index (L-SI), calculated as follows:

$L\text{-}SI = (Cl + SO_4) / Alkalinity$

(All parameters expressed as mg/L of equivalent $CaCO_3$)

BOARD NOTE: The following equation provides a simplified procedure for calculating L-SI:

$$LS\text{-}I = \frac{(1.41)(\text{mg/L } Cl^-) + (1.04)(\text{mg/L } SO_4^{-2})}{\text{mg/L alkalinity (as } CaCO_3)}$$

Cl^- expressed as mg/L Chloride
SO_4^{-2} expressed as mg/L Sulfate.

3) Iron Steel and Concrete

A) Calcium Carbonate Precipitation Potential (CCPP) as referenced in Method 2330 C Standard Methods for Examination of Water and Wastewater, 22nd edition, incorporated by reference in 35 Ill. Adm. Code 611.102;

B) For water containing phosphates

1) The Alkalinity Difference Technique, as described in Method 2330 B.3.b and 2330 C.2.b Standard Methods for Examination of Water and Wastewater, 22nd edition, incorporated by reference in 35 Ill. Adm. Code 611.102. The Calcium Carbonate Precipitation Potential (CCPP) is the difference between the initial and equilibrated water's alkalinity (or calcium) values, when expressed as $CaCO_3$.

2) The Marble Test as described in Method 2330 C.2.c Standard Methods for Examination of Water and Wastewater, 22nd edition, incorporated by reference in 35 Ill. Adm. Code 611.102. The Marble Test is similar to the Alkalinity Difference Technique. The Calcium Carbonate Precipitation Potential (CCPP) equals the change in alkalinity (or calcium) values during equilibration, when expressed as $CaCO_3$.

d) The following may be used to determine deposition of excess calcium carbonate ($CaCO_3$) scale:

1) Calcium Carbonate Precipitation Potential (CCPP) as referenced in Method 2330 B Standard Methods for Examination of Water and Wastewater, 22nd edition, incorporated by reference in 35 Ill. Adm. Code 611.102

2) For water containing phosphates

A) The Alkalinity Difference Technique, as described in Method 2330 B.3.b and 2330 C.2.b Standard Methods for Examination of Water and Wastewater, 22nd edition, incorporated by reference in Section 611.102. The Calcium Carbonate Precipitation Potential (CCPP) is the difference between the initial and equilibrated water's alkalinity (or calcium) values, when expressed as $CaCO_3$.

B) The Marble Test as described in Method 2330 C.2.c Standard Methods for Examination of Water and Wastewater, 22nd edition,

incorporated by reference in Section 611.102. The Marble Test is similar to the Alkalinity Difference Technique. The Calcium Carbonate Precipitation Potential (CCPP) equals the change in alkalinity (or calcium) values during equilibration, when expressed as $CaCO_3$.

BOARD NOTE: Calcium Carbonate Precipitation Potential (CCPP) can be calculated using Trussell Technologies software: www.trusselltech,com/downloads?category=6 . CCPP does not apply to protection or corrosion of lead and copper plumbing materials or to water containing phosphates. *See* "Internal Corrosion and Deposition Control", Water Quality & Treatment, A Handbook on Drinking Water, 6th ed. (2011), American Water Works Association.

BOARD NOTE: Estimating Calcium Carbonate Precipitation Potential (CCPP) using the Alkalinity Difference Technique or the Marble Test, both referenced in Standard Methods for Examination of Water and Wastewater, 22nd edition, incorporated by reference at 35 Ill. Adm. Code 611.102, is described as "Calcium Carbonate Saturation." Simplified Procedures for Water Examination, Manual of Water Supply Practices M12 (5th ed. 2002) American Water Works Association.

Based on results of the "Calcium Carbonate Saturation" test, CCPP can be calculated as:

CCPP = Final mg/L alkalinity (as $CaCO_3$) – Initial mg/L alkalinity (as $CaCO_3$)

Water is unsaturated with respect to calcium carbonate and may be corrosive if final alkalinity is greater than initial alkalinity, a positive value in the equation above. If there is alkalinity gain in the final alkalinity test, it indicates tendency to dissolve calcium carbonate scale.

Water is oversaturated with calcium carbonate scale and may deposit calcium carbonate coating in the water mains if final alkalinity is less than initial alkalinity, a negative value in the equation above. If there is alkalinity loss in the final alkalinity test, it indicates tendency to precipitate calcium carbonate scale.
If final and initial alkalinity are the same, the water is stable and in equilibrium with calcium carbonate.

CCPP is not applicable to protection or corrosion of lead and copper plumbing materials.

Verifying the alkalinity titration endpoint by using a pH meter to verify the pH of the titrated alkalinity sample is recommended, since titration endpoint visual color change may be individually variable. If pH of the sample is not certain, consider using pH of4.50 to represent the endpoint. *See* "Alkalinity Test", Standard Methods for

Examination of Water and Wastewater, 22nd edition, incorporated by reference in 35 Ill. Adm. Code 611.102.

e) Acceptable stability treatments include:

1) carbon dioxide addition;

2) acid addition;

3) phosphate addition;

4) split treatment;

5) alkali chemical;

A) hydrated lime

B) sodium carbonate

C) sodium bicarbonate

D) sodium hydroxide

6) carbon dioxide reduced by aeration;

7) calcium hydroxide; and

8) sodium silicate addition.

f) When chemical addition is used for stabilization, the community water supply must comply with requirements of Subpart K.

Section 604.905 Carbon Dioxide Addition

a) Unless carbon dioxide addition is provided in the form of a carbonic acid and water solution under pressure, recarbonation basin design must provide:

1) a total detention time of 20 minutes; and

2) a depth that will provide a diffuser submergence of not less than 7.5 feet nor greater submergence than recommended by the manufacturer.

b) Where liquid carbon dioxide is used, carbon dioxide must be prevented from entering the atmosphere within the plant from the recarbonation process.

c) Recarbonation tanks must be located outside or be sealed and vented to the outside with adequate seals and adequate purge flow of air.

d) The recarbonation basin must be designed to allow for draining and sludge removal.

Section 604.910 Phosphates

Phosphate solution must be kept covered and disinfected by carrying approximately 10 mg/L free chlorine residual unless the phosphate is not able to support bacterial growth and the phosphate is being fed from the covered shipping container. Phosphate solutions having a pH of 2.0 or less may also be exempted from this requirement by the Agency.

Section 604.915 Split Treatment

A lime softening water treatment plant can be designed using "split treatment" in which raw water is blended with lime softened water to partially stabilize the water prior to secondary clarification and filtration. Treatment plants designed to utilize "split treatment" should also contain facilities for further stabilization by other methods.

SUBPART J: OTHER TREATMENT

Section 604.1000 Presedimentation

a) Basin design: presedimentation basins must have the capability for dewatering. These basins may include hopper bottoms or a continuous mechanical sludge removal apparatus;

b) Inlet: short circuiting must be prevented;

c) Bypass: provisions for bypassing presedimentation basins must be included; and

d) Detention time must be adequate. Unless otherwise approved by the Agency under Section 604.145(b), three hours detention is the minimum period.

Section 604.1005 Anion Exchange

a) Pre-treatment Requirements. Pre-treatment under Section 604.1010 is required when a combination of iron and manganese exceeds 0.5 mg/L.

b) Anion Exchange Treatment Design.

1) Automatic regeneration based on volume of water treated must be used unless manual regeneration is justified and is approved by the Agency.

2) If a portion of the water is bypassed around the units and blended with treated water, the following requirements must be met:

   A) the maximum blend ratio allowable must be determined based on the highest anticipated raw water nitrate level; and

   B) a totalizing meter and a proportioning or regulating device or flow regulating valves must be provided on the bypass line.

3) A manual override must be provided on all automatic controls.

4) Adequate freeboard must be provided to accommodate the backwash flow rate of the unit, ensuring the resin will not overflow. The freeboard must be calculated based on the size and specific gravity of the resin.

5) The system must be designed to include an adequate under drain and supporting gravel system and brine distribution equipment.

6) Sampling Taps

   A) Smooth-nosed sampling taps must be provided for the collection of representative samples.

   B) The taps must be located to provide for sampling of the softener influent, effluent and blended water.

   C) The sampling taps for the blended water must be at least 20 feet downstream from the point of blending.

   D) Petcocks are not acceptable as sampling taps.

7) Brine and salt storage tanks:

   A) Salt dissolving or brine tanks and wet salt storage tanks must be covered and must be corrosion resistant.

   B) The make-up water inlet must be protected from back siphonage. Water for filling the tank must be distributed over the entire surface by pipes above the maximum brine level in the tank. An

automatic declining level control system on the make-up water line is recommended.

C) Wet salt storage basins must be equipped with manholes or hatchways for access and for direct dumping of salt from truck or railcar. Openings must be provided with raised curbs and watertight covers having overlapping edges similar to those required for finished water reservoirs.

D) Overflows, where provided, must be protected with corrosion resistant screens and must terminate with either a turned downed bend having a proper free fall discharge or a self-closing flap valve.

E) The salt must be supported on graduated layers of gravel placed over a brine collection system.

F) Alternative designs which are conducive to frequent cleaning of the wet salt storage tank may be approved by the Agency.

G) Total salt storage must provide for at least 30 days of operation.

c) Exchange Capacity. The design capacity for nitrate removal must not exceed 10,000 grains per cubic foot when the resin is regenerated at 15 pounds of salt per cubic foot of resin.

d) Number of Units. At least two units must be provided. The treatment capacity must be capable of producing the maximum average daily demand at a level below the nitrate/nitrite MCL, with one exchange unit out of service.

e) Type of Media. The anion exchange media must be of the nitrate selective type.

f) Flow Rates. Unless otherwise approved by the Agency under Section 604.145(b), the following flow rates apply:

1) The treatment flow rate must not exceed 5 gallons per minute per square foot of bed area.

2) The backwash flow rate must be between 4.0 and 6.0 gallons per minute per square foot of bed area.

3) The regeneration rate must be approximately 1.0 gallon per minute per square foot of bed area with a fast rinse approximately equal to the service flow rate.

g) Cross Connection Control**.** Backwash, rinse and air relief discharge pipes must be installed to prevent any possibility of back-siphonage.

h) Construction Materials. Pipes and contact materials must be resistant to the aggressiveness of salt. Plastic and red brass are acceptable materials. Steel and concrete must be coated with a non-leaching protective coating which is compatible with salt and brine.

i) Housing**.** Dry bulk salt storage must be enclosed and separated from other operating areas to prevent damage to equipment.

j) Preconditioning of the Media. Prior to startup of the equipment, the media must be regenerated with no less than two bed volumes of water containing sodium chloride followed by an adequate rinse.

Section 604.1010 Iron and Manganese Control

a) Except as provided in 35 Ill. Adm. Code 611.300(e), treatment is required to meet the iron and manganese MCL as stated in Section 611.300(b).

b) Removal of iron and manganese by oxidation, detention and filtration

1) Oxidation must be by aeration, as indicated in Subpart D, unless the community water supply demonstrates chemical oxidation provides equivalent results to aeration. Chemicals that may be used for oxidation include chlorine, sodium permanganate, potassium permanganate, ozone or chlorine dioxide.

2) Detention

A) A minimum detention time of 30 minutes must be provided following aeration to ensure that the oxidation reactions are complete prior to filtration. This minimum detention time may be modified only where a pilot plant study indicates completion of oxidation reactions in less time.

B) The reaction tank/detention basin must be provided with an overflow, vent and access hatch in accordance with Subpart M.

3) Filtration. Filters must conform to Subpart F.

c) Removal by manganese greensand or manganese coated media filtration.

1) Permanganate or chlorine must be added to the water upstream of the filter per manufacturer's recommendation.

2) An anthracite media cap of at least six inches must be provided over manganese greensand.

3) Normal backwash rate is 8 gallons per minute per square foot with filters containing manganese greensand and 15 gallons per minute with manganese coated media.

4) Sample taps must be provided:

A) prior to application of permanganate;

B) immediately ahead of filtration;

C) at points between the anthracite media and the manganese greensand;

D) halfway down the manganese greensand; and

E) at the filter effluent.

d) Sequestration of iron and/or manganese by polyphosphates

1) Sequestration by polyphosphates must not be used when the combination of iron and manganese exceeds 1 mg/L.

2) Phosphate solution must be kept covered and disinfected by carrying approximately 10 mg/L free chlorine residual unless the phosphate is not able to support bacterial growth and the phosphate is being fed from the covered shipping container. Phosphate solutions having a pH of 2.0 or less may also be exempted from this requirement by the Agency.

3) Polyphosphates must not be applied ahead of iron and manganese removal treatment. The point of application must be prior to aeration, oxidation or disinfection.

4) The phosphate feed point must be located as far ahead of the oxidant feed point as possible.

e) Sequestration of iron and/or manganese by sodium silicates:

1) Sequestration by sodium silicate must not be used when iron, manganese or combination of iron and manganese exceeds 2 mg/L.

2) A full-scale demonstration will be required to determine the suitability of sodium silicate for the particular water and the minimum feed needed.

3) Chlorine or chlorine dioxide addition must accompany the sodium silicate addition.

4) Sodium silicate must not be applied ahead of iron or manganese removal treatment.

Section 604.1015 Taste and Odor Control

a) Control of taste and odor is required when necessary to meet the requirements of 35 Ill. Adm. Code 601.101(b).

b) Acceptable taste and odor control treatments include:

1) chlorination;

2) chlorine dioxide;

3) powdered activated carbon;

4) granular activated carbon;

5) copper sulfate or other copper compounds;

6) aeration;

7) potassium permanganate;

8) ozonation; or

9) ultraviolet with hydrogen peroxide.

Section 604.1020 Powdered Activated Carbon

a) Powdered activated carbon must be added as early as possible in the treatment process to provide maximum contact time to allow the effective and economical use of the chemical.

b) Activated carbon must not be applied near the point of chlorine or other oxidant application.

c) The carbon may be added as a pre-mixed slurry or by means of a dry feed machine as long as the carbon is properly wetted.

d) Continuous agitation or resuspension equipment must be provided to keep the carbon from depositing in the slurry storage tank.

e) Provisions must be made for adequate dust control.

f) When feeding powdered activated carbon for taste and odor control provisions must be made for adding at least 40 mg/L.

g) Powdered activated carbon must be handled as a potentially combustible material.

1) A separate room must be provided for carbon feed equipment, including a door to allow isolation of the room.

2) The separate room must be as nearly fireproof as possible.

3) Other chemicals must not be stored in the same room as powdered activated carbon.

4) Carbon feeder rooms must be equipped with explosion-proof electrical outlets, lights, and motors.

SUBPART K: CHEMICAL APPLICATION

Section 604.1100 General Chemical Application Requirements

a) Permit requirement. No chemicals may be applied to treat drinking water unless specifically permitted by the Agency.

b) Chemical must be applied to the water at such points and by such means as to:

1) assure maximum efficiency of treatment;

2) assure maximum safety to consumers;

3) provide maximum safety to operators;

4) assure satisfactory mixing of the chemicals with the water;

5) provide maximum flexibility of operation through various points of application, when appropriate; and

6) prevent backflow or back siphonage between multiple points of feed through common manifolds.

c) General equipment design must be such that:

1) feeders will be able to supply, at all times, the necessary amounts of chemicals at an accurate rate, throughout the range of feed;

2) chemical contact materials and surfaces are resistant to the aggressiveness of the chemical solution;

3) corrosive chemicals are introduced to minimize potential for corrosion;

4) chemicals that are incompatible are not stored or handled together;

5) all chemicals are delivered from the feeder to the point of application in separate conduits; and

6) chemical feeders and pumps must operate at no lower than 20 percent of the feed range unless two fully independent adjustment mechanisms such as pump pulse rate and stroke length are fitted when the pump must operate at no lower than 10 percent of the rated maximum.

d) All chemical containers must bear the name, address and telephone number of the supplier, along with a functional name or identification and strength of the chemical.

e) Storage containers must be reserved for use of one chemical only.

f) Chemicals must not be fed in excess of the maximum dosage as stated in the NSF/ANSI Standard 60, incorporated by reference in Section 601.115.

Section 604.1105 Feed Equipment and Chemical Storage

a) Solution feed equipment.

1) Corrosion resistant containers must be provided for solution feeders.

2) Containers must have non-corrodible covers with overhanging edges. Openings must be constructed to prevent contamination.

3) Scales or a volumetric measuring device must be provided for determining the amount of solution fed.

b) Feeder redundancy

1) Where chemical feed is necessary for the protection of the supply, such as chlorination, coagulation or other essential processes:

A) a minimum of two feeders must be provided with each having adequate capacity to provide the maximum dosage necessary; and

B) the standby unit or a combination of units of sufficient size to meet capacity must be provided to replace the largest unit when out of service.

2) A separate feeder must be used for each chemical applied.

3) Each chemical feeder and day tank must be identified with their content.

4) Spare parts must be available on site for all feeders and chemical booster pumps to replace parts which are subject to wear and damage.

c) Control.

1) At automatically operated facilities:

A) The automatic controls must be designed to allow override by manual controls.

B) Chemical feeders must be electrically interconnected with the well or service pump so that they will not operate if the well or service pump is not operating.

2) Chemical feed rates must be proportional to the flow stream to achieve the appropriate dose of chemical application.

3) A means to measure water flow stream being dosed must be provided to determine chemical feed rates.

4) Provisions must be made for measuring the quantities of chemicals used.

5) Weighing scales.

A) Weighing scales must be capable of providing reasonable precision in relation to average daily dose.

B) Unless otherwise approved by the Agency under Section 604.145(b), treatment chemicals in gaseous state must be weighed;

C) Fluoride solution fed from supply drums or carboys must be weighed; and

D) Volumetric dry chemical feeders must be weighed unless otherwise approved by the Agency under Section 604.145(b).

d) Dry chemical feeders must:

1) measure chemicals volumetrically or gravimetrically;

2) provide adequate water and agitation of the chemical within the slurry tank; and

3) completely enclose chemicals to prevent emission of dust to the operating room.

e) Positive displacement solution pumps

1) Positive displacement type solution feed pumps may be used to feed liquid chemicals, but must not be used to feed chemical slurries.

2) Pumps must be capable of operating at the required maximum rate against the maximum head conditions found at the point of injection.

3) Calibration tubes or mass flow monitors which allow for direct physical measurement of actual feed rates must be provided.

f) To ensure that chemical solutions cannot be siphoned or overfed into the water supply, liquid chemical feeders must:

1) assure discharge at a point of positive pressure;

2) provide vacuum relief; or

3) provide a suitable air gap or anti-siphon device.

g) Cross-connection control must be provided to assure that:

1) the make-up water lines discharging to liquid storage tanks must be properly protected from backflow;

2) no direct connection exists between any sewer and a drain or overflow from a chemical feed system; and

3) all overflows and drains from a chemical field system must have an airgap above the sewer or overflow rim of a receiving sump.

h) Chemical feed equipment location must be readily accessible for servicing, repair, and observation of operation.

i) Make-up-water supply must be:

1) obtained from the finished water supply, or from a location sufficiently downstream of any chemical feed point to assure adequate mixing; and

2) ample in quantity and adequate in pressure.

j) Storage of chemicals

1) Space must be provided for:

A) at least 30 days of chemical supply;

B) convenient and efficient handling of chemicals;

C) dry storage conditions; and

D) a minimum storage volume of 1.5 times the gross shipping volume.

2) Offloading areas must be clearly labeled to prevent accidental cross-contamination.

3) Chemicals must not be stored in confined spaces.

4) Chemicals must be stored in covered or unopened shipping containers, unless the chemical is transferred into an approved storage unit.

5) Feed equipment and storage chemicals must be stored inside a building unless otherwise approved by the Agency under Section 604.145(b).

6) Liquid chemical storage tanks must have a liquid level indicator.

7) Secondary Containment

A) Liquid chemical storage tanks must have secondary containment consisting of an overflow and a receiving basin capable of receiving accidental spills or overflows without uncontrolled discharge.

B) A common receiving basin may be provided for each group of compatible chemicals that provides sufficient containment volume to prevent accidental discharge in the event of failure of the largest tank. Groups of compatible chemicals are as follows: acids, bases, salts and polymers, absorption powders, oxidizing powders and compressed gases.

8) Vents from storage tanks must have a corrosion resistant 24 mesh screen.

k) Bulk Liquid Storage Tanks

1) A uniform strength of chemical solution must be maintained. Continuous agitation must be provided to maintain slurries in suspension.

2) A means to assure continuity of chemical supply must be provided.

3) Means must be provided to measure the liquid level in the tank.

4) Liquid storage tanks including any access openings must be kept securely covered.

5) Overflow pipes, when provided, must:

A) be turned downward, with the end screened;

B) have a free fall discharge; and

C) be located where noticeable.

6) Liquid storage tanks must be vented, but not through vents in common with other chemicals or day tanks.

7) Each liquid storage tank must be provided with a valved drain in accordance with subsection (g).

8) Solution tanks must be located and protective curbings provided so that chemicals from equipment failure, spillage or accidental drainage must not enter the water in conduits, treatment or storage basins. Chemicals must be stored as required by subsection (j)(5).

l) Day tanks

1) Day tanks must be provided where bulk storage of liquid chemical is provided.

2) Day tanks must meet all the requirements of subsection (k), except that shipping containers do not require overflow pipes and subsection drains.

3) Day tanks must be scale-mounted, or have a calibrated gauge painted or mounted on the side if liquid level can be observed in a gauge tube or through translucent sidewalls of the tank. In opaque tanks, a gauge rod may be used. The ratio of the area of the tank to its height must be such that unit readings are meaningful in relation to the total amount of chemical fed during a day.

4) Except for fluosilicic acid, hand pumps may be provided for transfer from a shipping container. Where motor-driven transfer pumps are provided, a liquid level limit switch must be provided.

5) Tanks and tank refilling line entry points must be clearly labeled with the name of the chemical contained.

6) Filling of day tanks must not be automated.

m) Feed lines must be:

1) of durable, corrosion-resistant material;

2) protected against freezing;

3) designed to prevent clogging; and

4) color coded and labeled in accordance with Section 604.120.

n) Handling. Provision must be made for the proper transfer of dry chemicals from shipping containers to storage bins or hoppers, in such a way as to minimize the quantity of dust which may enter the room.

o) Housing.

1) Floor surfaces must be smooth and impervious, slip-proof and well drained.

2) Vents from feeders, storage facilities and equipment exhaust must discharge to the outside atmosphere above grade and remote from air intakes.

Section 604.1110 Protective Equipment

a) Personal protective equipment must be provided consistent with the requirements of the CWS safety plan developed under Section 604.160.

b) A deluge shower and eyewashing device must be installed where strong acids and alkalis are used or stored. The deluge shower and eye washing device and water supply to these devices shall comply with applicable provisions of 77 Ill. Adm. Code 890, the Illinois Plumbing Code.

Section 604.1115 Chlorine Gas

a) Chlorinators that are housed separately from the chlorine storage must be in an adjacent room.

b) Chlorinator rooms must be heated to 60^{o}F, and be protected from excessive heat. Cylinders and gas lines must be protected from excessive temperatures.

c) Chlorine gas feed and storage must be enclosed and separated from other operating areas. Both the feed and storage rooms must be constructed so as to meet the following requirements:

1) a shatter resistant inspection window must be installed in an interior wall;

2) all openings between the rooms and the remainder of the plant must be sealed;

3) doors must be equipped with panic hardware, assuring ready means of exit and opening outward only to the building exterior;

4) a ventilating fan with a capacity to complete one air change per minute when the room is occupied, unless otherwise approved by the Agency under Section 604.145(b);

5) the ventilating fan must take suction near the floor and at as great a distance as is practical from the door and air inlet, with the point of discharge located so as not to contaminate air inlets to any rooms or structures;

6) air inlets with corrosion resistant louvers must be installed near the ceiling;

7) air intake and exhaust louvers must facilitate airtight closure;

8) separate switches for the ventilating fan and for the lights must be located outside and at the inspection window.

A) Outside switches must be protected from vandalism.

B) A signal light indicating ventilating fan operation must be provided at each entrance when the fan can be controlled from more than one point;

9) vents from chlorinator and storage areas must be screened and discharge to the outside atmosphere, above grade;

10) where floor drains are provided, the floor drains must discharge to the outside of the building and not be connected to other internal or external drainage systems; and

11) provisions must be made to chemically neutralize chlorine gas in the event of any measured chlorine release. The equipment must be sized to treat the entire contents of the largest storage container on site.

d) Chlorine gas feed systems must be of the vacuum type and include the following:

1) vacuum regulators on all individual cylinders in service;

2) service water to eductors must be of adequate supply and pressure to operate feed equipment within the needed chlorine dosage range for the proposed system.

e) All chlorine gas feed lines located outside the chlorinator or storage rooms must be installed in air tight conduit pipe.

f) Full and empty cylinders of chlorine gas must meet the following requirements:

1) housed only in the chlorine storage room;

2) isolated from operating areas; and

3) restrained in position;

g) Continuous chlorine leak detection equipment equipped with both an audible alarm and a warning light is required.

Section 604.1120 Acids and Caustics

a) Acids and caustics must be kept in closed corrosion-resistant shipping containers or bulk liquid storage tanks.

b) Acids and caustics must not be handled in open vessels.

c) Acids storage tanks must be vented to the outside atmosphere.

Section 604.1125 Chlorine Dioxide

a) Chlorine dioxide generation equipment must be factory assembled pre-engineered units with a minimum efficiency of 95 percent. The excess free chlorine must not exceed three percent of the theoretical stoichiometric concentration required.

b) Chlorine gas and sodium chlorite feed and storage facilities must comply with Sections 604.1115 and 604.1130, respectively. Sodium hypochlorite feed and storage facilities must comply with Section 604.1135.

c) The design must comply with all applicable portions of Sections 604.130(c), 604.705, 604.710, 604.715, 604.720 and 604.735.

Section 604.1130 Sodium Chlorite

a) Storage

1) Sodium chlorite must be stored by itself in a separate room and preferably must be stored in an outside building detached from the water treatment facility.

2) The storage structures must be constructed of noncombustible materials.

3) The storage room must be available to keep the sodium chlorite area cool enough to prevent heat induced explosive decomposition of the chlorite.

b) Provisions for the clean-up of any sodium chlorite release must be included in the facility's emergency operation plan specified in Section 604.150.

c) Feeders.

1) Positive displacement feeders must be provided.

2) Tubing for conveying sodium chlorite or chlorine dioxide solutions must be Type 1 PVC, polyethylene or materials recommended by the manufacturer.

3) Check valves must be provided to prevent the backflow of chlorine into the sodium chlorite line.

Section 604.1135 Sodium Hypochlorite

Storage of sodium hypochlorite must be:

a) protected from excess temperatures.

b) sited out of the sunlight in a cool area; and

c) vented to the outside of the building

Section 604.1140 Ammonia

a) Ammonia for chloramine formation may be added to water either as a water solution of ammonium sulfate, or as aqua ammonia (ammonia gas in water solution), or as anhydrous ammonia (purified 100% ammonia in liquid or gaseous form). Special provisions required for each form of ammonia are listed in subsection (b) through (d) below.

b) Ammonium sulfate.

1) The water solution made by addition of ammonium sulfate solid to water must include agitation.

2) The tank and dosing equipment contact surfaces must be made of corrosion resistant non-metallic materials.

3) The submerged portion of the mixer shaft and propeller must be made of 304 or 316 stainless steel that is resistant to corrosion by ammonium sulfate solution.

c) Aqua ammonia (ammonium hydroxide).

1) Aqua ammonia feed pumps and storage must be enclosed and separated from other operating areas.

2) The aqua ammonia room must be equipped as in Section 604.1115 with the following changes:

A) A corrosion resistant, closed, unpressurized tank must be used for bulk storage, vented through an inert liquid trap to a high point outside.

B) The bulk liquid storage tank must be protected from excessive heat to prevent ammonia vaporization.

C) An exhaust fan must be installed to withdraw air from high points in the room and makeup air must be allowed to enter at a low point.

D) The aqua ammonia feed pump, regulators, and lines must be fitted with pressure relief vents discharging outside the building away from any air intake and with water purge lines leading back to the headspace of the bulk storage tank.

E) The aqua ammonia must be conveyed directly from storage to the treated water stream injector without the use of a carrier water stream unless the carrier stream is softened.

d) Anhydrous ammonia.

1) Anhydrous ammonia and storage feed systems (including heaters where provided) must be enclosed and separated from other work areas and constructed of corrosion resistant materials.

2) Any pressurized ammonia feed lines outside the ammonia room must be installed in air tight conduit.

3) An exhaust fan must be installed to withdraw air from high points in the room and makeup air must be allowed to enter at a low point.

4) Leak detection systems must be installed, operated and maintained in each area through which ammonia is piped.

5) Special vacuum breaker/regulator provisions must be installed to prevent backflow of water into cylinders or storage tanks.

6) Carrier water systems where provided to convey anhydrous ammonia to the injection point must use softened water.

7) Provisions must be made to chemically neutralize anhydrous ammonia where feed and/or storage is located near residential or developed areas in the event of any anhydrous ammonia release.

Section 604.1145 Potassium Permanganate

Potassium permanganate may be fed with gravimetric feeders or from batched solution fed from day tanks. For batched solutions:

a) the potassium permanganate added cannot exceed the solubility limits based on temperature; and

b) mechanical mixers must be provided.

Section 604.1150 Fluoride

a) Basis of Design - Equipment must have the capacity to maintain the fluoride content in the finished water at 0.7 mg/L.

b) Chemical feed equipment

1) A free chlorine residual of 10 mg/L must be maintained in solutions prepared from dry chemicals. This chlorine residual must not replace the chlorination requirement of Section 604.725.

2) Chlorine must not be added to hydrofluosilicic or fluorosilicic acid solutions.

3) Diaphragm operated anti-siphon devices must be provided on all fluoride saturator or fluorosilicic acid feed systems as follows:

A) one diaphragm operated anti-siphon device must be located on the discharge side of the feed pump; and

B) a second diaphragm operated anti-siphon device must be located at the point of application unless a suitable air gap is provided.

c) Chemical feed methods

1) Fluoride compound must not be added prior to filters at plants that lime soften or coagulate for turbidity removal, and must not be added prior to ion exchange softeners.

2) The point of application if into a horizontal pipe must be in the lower half of the pipe, preferably at a 45-degree angle from the bottom of the pipe, and protrude into the pipe one third of the pipe diameter.

3) Water used for sodium fluoride dissolution must be softened if hardness exceeds 75 mg/L as calcium carbonate.

4) Saturators must be provided with a meter and backflow protection on the makeup water line.

d) Secondary controls. Secondary control systems for fluoride chemical feed devices must be provided as a means of reducing the possibility for overfeed. These may include flow or pressure switches, break boxes, or other devices.

e) Samples must be submitted monthly to a certified laboratory to determine compliance with 35 Ill. Adm. Code 611.125.

SUBPART L: PUMPING FACILITIES

Section 604.1200 General

Pumping facilities must be designed to maintain the quality of pumped water.

Section 604.1205 Pumping Stations

a) Both raw and finished water-pumping stations must:

1) have adequate space for the installation of additional units if needed, and for the safe servicing of all equipment;

2) be of durable construction, fire and weather resistant and with outward opening doors;

3) not create a confined space;

4) have floors that slope to a suitable drain; and

5) provide a suitable outlet for drainage from pump glands without discharging onto the floor.

b) Suction wells must:

1) be watertight;

2) have floors sloped to permit removal of water and settled solids;

3) be covered or otherwise protected against contamination; and

4) have two pumping compartments or other means to allow the suction well to be taken out of service for inspection maintenance or repair.

c) Equipment servicing. Pump stations must be provided with:

1) crane-ways, hoist beams, eyebolts, or other adequate facilities for servicing or removal of pumps, motors or other heavy equipment; and

2) openings in floors, roofs or wherever else needed for removal of heavy or bulky equipment.

d) Provisions must be made for adequate heating for the safe and efficient operation of the equipment.

e) Ventilation.

1) Adequate ventilation must be provided for all pumping stations.

2) Forced ventilation of at least six changes of air per hour must be provided for:

A) all rooms, compartments, pits and other enclosures below ground floor; or

B) any area where unsafe atmosphere may develop or where excessive heat may be built up.

f) Dehumidification must be provided in areas where excess moisture could cause hazards for operator safety, or damage to equipment.

Section 604.1210 Pumps

a) At least two pumping units must be provided for all pump stations.

b) With any pump out of service, the remaining pump or pumps must be capable of providing the maximum demand of the community water supply.

c) The pumping units must be provided with readily available spare parts and tools.

d) Suction Lifts.

1) Suction lifts must be avoided if possible;

2) Suction lifts must be less than 15 feet; and

3) If suction lift is necessary, provisions must be made for priming the pumps.

A) prime water must not be of lesser sanitary quality than that of the water being pumped;

B) means must be provided to prevent either backsiphonage or backflow; and

C) vacuum priming may be used.

e) Pumps taking suction from ground storage tanks must be provided adequate net positive suction head, but the minimum distribution pressure of 20 psi is not required. The pumps shall be equipped with automatic shutoffs or low-pressure controllers as recommended by the pump manufacturer.

Section 604.1215 Booster Pumps

a) Each booster pumping station must contain not less than two pumps with capacities such that maximum demand can be satisfied with the largest pump out of service.

b) Construction must conform to Section 604.150.

c) Automatic control equipment must be installed to prevent the pump from causing a vacuum and/or lowering water pressure in any part of the distribution system to less than 20 psi as measured at ground surface.

d) Automatic or remote-control devices must have a range between the start and cutoff pressure which will prevent excessive cycling.

e) Booster pumps must have the ability to be bypassed.

f) Pressure for portions of a distribution system served by a booster pump station as required by Section 604.1415 must be provided during periods when the booster station is not in operation.

g) One of the following must be installed if adequate pressure will not be available in any part of the system:

1) hydropneumatic storage designed in accordance with Section 604.1345 on the discharge side of the booster pump station; or

2) elevated storage.

h) All booster pumping stations must be fitted with a flow rate indicating and totalizer meter.

Section 604.1220 Automatic and Remote Controlled Stations

a) All remote-controlled pumping facilities must be electrically operated and controlled and must have signaling apparatus of proven performance.

b) All automatic pumping facilities must be provided with automatic signaling apparatus which will report when the station is out of service, unless otherwise approved by the Agency under Section 604.145(b).

Section 604.1225 Appurtenances

a) Valves.

1) Each pump must have an isolation valve on the inlet and discharge side of the pump to permit satisfactory operation, maintenance and repair of the equipment.

2) Each pump must have a positive acting check valve on the discharge side between the pump and the shut off valve.

3) Surge relief valves or slow acting check valves must be designed to minimize hydraulic transients.

b) Piping must:

1) be designed to minimize friction losses;

2) have watertight joints;

3) be protected against surge or water hammer and provided with suitable restraints where necessary; and

4) be designed such that each pump has an individual suction line or that the lines must be so manifolded that they will ensure similar hydraulic and operating conditions.

c) Gauges and meters:

1) Each pump must have the following gauges and meters:

A) a standard pressure gauge on its discharge line;

B) a compound gauge on its suction line; and

C) a meter for measuring the flow rate.

2) The station must have the following:

A) a flow rate indicator and totalizing meter; and

B) a method of recording the total water pumped.

d) Water seals

1) Water seals must not be supplied with water of a lesser sanitary quality than that of the water being pumped.

2) Where pumps are sealed with potable water and are pumping water of lesser sanitary quality, the seal must:

A) be provided with either an approved reduced pressure principle backflow preventer or a break tank open to atmospheric pressure; and

B) where a break tank is provided, have an air gap as defined in 35 Ill. Adm. Code 601.105 between the feeder line and the flood rim of the tank.

e) Controls.

1) Pumps, their prime movers and accessories, must be controlled in such a manner that they will operate at rated capacity without overload.

2) Provisions must be made to prevent energizing the motor in the event of a backspin cycle.

3) Electrical controls must be located above grade.

4) Equipment must be provided or other arrangements made to prevent surge pressures from activating controls which switch on pumps or activate other equipment outside the normal design cycle of operation.

f) Lubrication

1) When automatic pre-lubrication of pump bearings is necessary and an auxiliary power supply is provided, design must assure that pre-lubrication is provided when auxiliary power is in use, or that bearings can be lubricated manually before the pump is started.

2) All lubricants which come into contact with the potable water must comply with Section 604.105(f).

SUBPART M: STORAGE

Section 604.1300 General Storage Requirements

a) Storage facilities must have sufficient capacity to meet domestic demands, and where fire protection is provided, fire flow demands.

b) Excessive storage capacity must be avoided to prevent potential water quality deterioration problems and freezing.

c) The material used in the construction of water storage structures must be approved by the Agency, under 35 Ill. Adm. Code 602.105. Porous materials, including wood and concrete block, are not acceptable.

d) Storage Structure Drainage.

1) Storage structures must be designed so they can be isolated to prevent loss of pressure in the distribution system when maintenance or cleaning occurs.

2) Each elevated storage tank must have a hydrant or other means to drain for repair, maintenance or cleaning.

3) The storage structure drain must discharge to the ground surface with no direct connection to a sewer or storm drain.

e) The bottom of a water storage structure must be placed above the groundwater table, preferably above grade. At least 50 percent of the water depth must be above grade.

f) Finished water storage must be designed to facilitate turnover of water to avoid stagnation.

g) Freezing.

1) Finished water storage structures and their appurtenances, including the riser pipes, overflows, and vents, must be designed to prevent freezing.

2) Equipment used for freeze protection that will come into contact with the potable water must comply with Section 604.105(f).

h) The discharge pipes from water storage structures must be located to prevent the flow of sediment into the distribution system.

i) The area surrounding a ground level structure must be graded to prevent surface water from standing within 50 feet.

j) Minimum distances from sources of contamination for below ground storage reservoirs must be maintained as specified in Section 604.150(a).

k) A smooth-nosed sampling tap must be provided to facilitate collection of water samples for both bacteriological and chemical analyses.

Section 604.1305 Overflow

a) All water storage structures must be provided with an overflow which is brought down to an elevation between 12 and 24 inches above the ground surface, and discharges over a drainage inlet structure or a splash plate.

b) No overflow may be connected directly to a sewer or a storm drain.

c) All overflow pipes must be located so that any discharge is visible.

d) Overflow for a ground level storage reservoir must meet the following requirements:

1) open downward and be screened with 24 mesh non-corrodible screen; and

2) when a flapper or duckbill valve is used, a screen must be provided inside the pipe.

e) Overflow for an elevated tank must:

1) open downward and be screened with a 4 mesh, non-corrodible screen or mechanical device; and
2) when a flapper or duckbill valve is used, a screen must be provided inside the pipe.

f) the overflow pipe must be of sufficient diameter to permit waste of water in excess of the filling rate.

Section 604.1310 Access to Water Storage Structures

a) Finished water storage structures must be designed with access to the interior for cleaning and maintenance.

b) At least two manholes must be provided above the waterline at each water compartment where space permits.

c) For elevated storage structures:

1) at least one of the access manholes must be framed at least four inches above the surface of the roof at the opening, must be fitted with a solid water tight cover which overlaps the framed opening and extends down around the frame at least two inches, must be hinged on one side, and must have a locking device; and

2) all other manholes or access ways not conforming to subsection (c)(1) must be bolted and gasketed so that they are water tight.

d) For ground level structures or flat roof structures:

1) each manhole must be elevated at least 24 inches above the top of the tank or covering sod, whichever is higher;

2) each manhole must be fitted with a solid water tight cover which overlaps a framed opening and extends down around the frame at least two inches;

3) the frame must be at least four inches high; and

4) each cover must be hinged on one side, and must have a locking device.

Section 604.1315 Vents

a) Finished water storage structures must be vented:
1) the overflow pipe must not be considered a vent; and

2) open construction between the sidewall and roof is not permissible;

b) Vents must:

1) prevent the entrance of surface water and rainwater;

2) exclude birds and animals;

3) exclude insects and dust to the extent practicable;

4) on ground level structures open downward with the opening at least 24 inches above the roof or sod and covered with 24 mesh non-corrodible screen; and

5) on elevated tanks and standpipes

A) open downward; and

B) be fitted with either four mesh non-corrodible screen, or with finer mesh non-corrodible screen in combination with an automatically resetting pressure-vacuum relief mechanism, as required by the Agency.

Section 604.1320 Level Controls

Storage structures must provide:

a) adequate controls, including telemetering equipment, to maintain water levels within the operating range of distribution system storage structures.

b) level indicating devices; and

c) overflow and low-level warnings or alarms.

Section 604.1325 Roof and Sidewalls

a) The roof and sidewalls of all water storage structures must be watertight with no openings except properly constructed vents, manholes, overflows, risers, drains, pump mountings, control ports, or piping for inflow and outflow.

b) Any pipes running through the roof or sidewall of a metal storage structure must be welded or gasketed to prevent leaks.

c) Any pipes running through the roof or sidewall of a concrete tank must be connected to standard wall castings which were poured in place during the forming of the concrete.

d) Openings in the roof of a storage structure designed to accommodate control apparatus or pump columns must be curbed and sleeved with proper additional shielding to prevent contamination from surface or floor drainage.

e) The roof of the storage structure must be well drained.

1) Downspout pipes must not enter or pass through the reservoir.

2) Parapets or similar construction which would tend to hold water and snow on the roof must have adequate waterproofing and drainage.

f) The roof of concrete reservoirs with earthen cover must be sloped to facilitate drainage, and must have an impermeable membrane roof covering.

g) Reservoirs with pre-cast concrete roof structures must be made watertight with the use of a waterproof membrane or similar product.

h) The installation of appurtenances, such as antenna, must be done in a manner that ensures no damage to the tank, coatings or water quality, or corrects any damage that occurred.

Section 604.1330 Painting and Cathodic Protection

a) Metal surfaces must be protected by paints or other protective coatings, by cathodic protective devices, or by both.

b) Paint Systems:

1) Paint systems must comply with Section 604.105(f); and

2) Interior paint must be applied and cured in a manner that does not transfer to the water any substance that will be toxic or cause taste or odor problems;

c) Cathodic protection must be designed, installed and maintained by trained technical personnel and must comply with Section 604.105(f).

Section 604.1335 Treatment Plant Storage

Treatment plant storage must meet the following requirements.

a) Clearwell storage must:

1) provide contact time, where required, under Section 604.715;

2) to ensure adequate disinfectant contact time, size the clearwell to include extra volume to accommodate depletion of storage during the nighttime for intermittently operated filtration plants with automatic high service pumping from the clearwell during non-treatment hours;

3) size clearwell storage, in conjunction with distribution system storage, to relieve the filters from having to follow fluctuations in water use;

4) provide an overflow and vent; and

5) provide a minimum of two clearwells or clearwell compartments.

b) Single wall separation of raw and treated water is prohibited.

c) Other treatment plant storage tanks/basins including detention basins, backwash reclaim tanks, receiving basins and pump wet wells for treated water must be designed as finished water storage structures, unless otherwise approved by the Agency under Section 604.145(b).

d) When provided, filter washwater tanks must be sized to provide adequate treated water for the duration of the backwash cycle, including the sequential backwash of several filters.

Section 604.1340 Elevated Storage

a) The minimum storage capacity must:

1) be equal to the average daily usage or be based on an engineering study of the distribution system hydraulic conditions, anticipated domestic water demands of the system, and, where fire protection is provided, fire flow demands; and

2) be capable of maintaining adequate pressures as described in Section 604.1415(a).

b) Elevated tanks with riser pipes over eight inches in diameter must have protective bars over the riser openings inside the tank.

Section 604.1345 Hydropneumatic Storage

a) Hydropneumatic tanks, when provided as the only water storage, are not acceptable in community water supplies with over 150 service connections.

b) Hydropneumatic tank storage is not to be permitted for fire protection purposes.

c) Hydropneumatic tanks must meet the ASME BPVC – VIII – 1-2015, incorporated by reference in 35 Ill. Adm. Code 601.115.

d) The tank must be located above normal ground surface and be completely housed.

e) Gross volume must equal or exceed 80 gallons per service connection-where only hydropneumatic storage is provided.

f) An air compressor must be provided to maintain an air cushion in the hydropneumatic tanks.

g) Finished water must be delivered at a rate greater than the peak hourly flow as provided in Section 604.115(d).

h) Actual capacity of the well pump or high service pump used to deliver water to the distribution system through the hydropneumatic tank must be greater than the peak hourly flow as provided in Section 604.115(d).

i) Actual capacities of multiple well pumps or high service pumps used to deliver water to the distribution system through the hydropneumatic tank must be greater than the peak hourly flow as provided in Section 604.115(d) with the largest well pump or high service pump out of operation.

j) All hydropneumatic tanks must have bypass piping to permit operation of the system while the tank is being repaired or painted, and each tank must have:

1) an access manhole, and where practical the access manhole should be 24 inches in diameter;

2) a drain; and

3) control equipment consisting of the following:

A) a pressure gauge;

B) water sight glass placed to show the water-air interface;

C) automatic or manual air blow off;

D) means for adding air; and

E) pressure operated start stop controls for the pumps.

Section 604.1350 Combination Pressure Tanks and Ground Storage

A combination of ground storage, hydropneumatic storage and pumps may be considered in water systems for maintaining pressure on the distribution system. Design of such a system must include:

a) a minimum ground storage volume equivalent to 1.5 times the average daily usage;

b) a minimum of two pumps, each capable of meeting the peak hourly flow as provided in Section 604.115(d). If more than two pumps are proposed, the peak hourly flow must be met when any pump is out of service;

c) an electric generator with automatic start capable of providing power to pump(s) which can produce the peak hourly flow as provided in Section 604.115(d), plus sufficient power to operate all chemical feeders, appurtenances and equipment essential to plant operation. Consideration must be given to sizing the generator to provide power for at least one well; and

d) a hydropneumatic tank sized to provide service for a minimum of ten minutes under the peak hourly flow as provided in Section 604.115(d).

SUBPART N: DISTRIBUTION

Section 604.1400 General Distribution System Requirements

a) Water distribution systems must be designed to maintain finished water quality.

b) The community water supply must have a record keeping system to document the nature and frequency of water main breaks.

c) The system must be designed to meet existing demands on the distribution system. Future distribution system demands must be taken into account.

Section 604.1405 Installation of Water Mains

a) Except as provided in 35 Ill. Adm. Code 602.200, a permit from the Agency is required before the installation of a water main.

b) Bedding.

1) A continuous and uniform bedding must be provided in the trench for all buried pipe.

2) Backfill material must be tamped in layers around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe.

3) Stones found in the trench must be removed for a depth of at least six inches below the bottom of the pipe.

c) Water mains must be placed at a sufficient depth, or covered with sufficient earth or other insulation to prevent freezing.

d) All tees, bends, plugs and hydrants must be provided with reaction blocking (thrust blocks), tie rods or joints designed to prevent pipe failure.

e) Installed pipe must be pressure and leak tested.

f) New, cleaned and repaired water mains must be disinfected in accordance with 35 Ill. Adm. Code 602.310 and AWWA C651, incorporated by reference in 35 Ill. Adm. Code 601.115.

g) External corrosion

1) In areas where aggressive soil conditions are suspected, the community water supply must perform analyses to determine the actual aggressiveness of the soil unless protections in subsection (g)(2) are provided.

2) If soils are found or known to be aggressive, the community water supply must protect the water main, by methods including encasement of the water main in polyethylene, provision of cathodic protection (in very severe instances), or using corrosion resistant water main materials.

Section 604.1410 Materials

a) All materials including ductile iron pipe, steel pipe, concrete pipe, plastic pipe, pipe liners, joints, fittings, valves and fire hydrants must conform to the AWWA, ASTM, ANSI or NSF standards incorporated by reference at 35 Ill. Adm. Code 601.115.

b) Plastic Pipe

1) Plastic Pipe Specifications: Polyvinyl Chloride (PVC), Chlorinated Polyvinyl Chloride (CPVC), Molecularly Oriented Polyvinyl Chloride (PVCO) and Polyethylene (PE) must conform to NSF Standard 14, incorporated by reference in 35 Ill. Adm. Code 601.115.

2) PVC, CPVC, PVCO, and PE pipe may be used for water mains in accordance with this Section:

A) PVC may be used for water mains in accordance with the following standards, incorporated by reference in 35 Ill. Adm. Code 601.115:

i) AWWA C900;
ii) ASTM D 1784-11;

iii) ASTM D 1785-15;

iv) ASTM D 2241.

B) PE pipe may be used for water mains in accordance with AWWA C906, incorporated by reference in 35 Ill. Adm. Code 601.115:

C) PVCO pipe may be used for water mains in accordance with AWWA C909, incorporated by reference in 35 Ill. Adm. Code 601.115:

D) CPVC pipe may be used for water mains in accordance with the following standards, incorporated by reference in 35 Ill. Adm. Code 601.115:

i) ASTM F441/F 441M;

ii) ASTM F 442/F 442M;

iii) ASTM D 1784

3) Jointing:

A) Jointing must be pressure slip jointed, solvent welded, heat welded, flange or threaded joint.

B) Clean, dry contact surfaces are required when making solvent or heat welded joints. Adequate setting time must be allowed for maximum strength.

C) Elastomeric seals (gaskets) used for push-on joints must comply with ASTM F 477 and must be pressure rated in accordance with ASTM D 3139.

D) Solvent cement must be specific for the piping material and must comply with ASTM D 2564 for PVC and ASTM F 493 for CPVC, and comply with Section 604.105(f).

4) Plastic Pipe Fittings:

A) PVC fabricated fittings 4 inch through 60-inch must conform to AWWA C900.

B) Polyethylene pressure pipe fitting, 4-inch through 63-inch must conform to AWWA C906.

C) Injection – molded PVC pressure fittings, 4-inch through 12-inch must conform to AWWA C907.

D) Schedule 40 or 80 PVC and CPVC pipe fittings must be of the same material as the pipe and must comply with ASTM Standards as follows:

i) ASTM D 2466 for PVC Schedule 40;

ii) ASTM D 2467 for PVC Schedule 80;

iii) ASTM D 2464 for threaded Schedule 80;

iv) ASTM F 438 for Socket-Type CPVC Schedule 40;

v) ASTM F 439 for CPVC Schedule 80; and

vi) ASTM F 437 for threaded CPVC Schedule 80.

E) Plastic fitting material must conform to ANSI/NSF Standard 14 and comply with Section 604.105(f).

F) All fittings must bear the NSF seal of approval.

c) Protection from organic compounds

1) Where distribution systems are installed in areas contaminated by organic compounds:

A) pipe and joint materials must be protected; and

B) protection must extend at least 25 feet laterally from the areas contaminated by organic compounds.

2) Where distribution systems are installed within 25 feet of potential sources of organic compound contamination, including any unit at a facility or a site that stores or accumulates petroleum at any time above ground or below ground, pipe and joint materials must be protected from organic compounds.

3) Protection from organic compounds may include the following:

A) use of ductile iron pipe with a Viton® or nitrile gaskets, unless otherwise approved by the Agency under Section 604.145(b);

B) remediation;

C) use of steel pipe;

D) encasement of the pipe; and

E) secondary containment of the source.

Section 604.1415 System Design

a) Pressure.

1) The system must be designed to maintain a minimum pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow.

2) The normal working pressure on all transmission mains for finished water must be at least 20 psi. All other water mains must have a normal working pressure of at least 35 psi.

3) When static pressures exceed 100 psi, pressure reducing devices must be provided on water mains or on individual service lines.

4) All water mains, including those not designed to provide fire protection, must be sized after a hydraulic analysis based on flow demands and pressure requirements.

b) Diameter of water mains.

1) The minimum size of water main which provides for fire protection and serving fire hydrants must be six-inch diameter. Larger size mains will be required if necessary to allow the withdrawal of the required fire flow while maintaining the minimum residual pressure specified in subsection (a).

2) The minimum size of water main must be 4-inch nominal diameter in distribution systems serving incorporated areas, subdivisions or other closely situated housing or commercial units.

3) The minimum size of water main must be 3-inch nominal diameter in distribution systems serving rural areas where service connections are widely spaced, water usage per service is low and rates of flow are slow.

c) Dead ends.

1) Dead ends must be minimized.

2) Dead end mains must be equipped with a means to provide adequate flushing as provided in Section 604.1425(b)(1).

Section 604.1420 Valves

a) A sufficient number of valves must be provided to isolate portions of the distribution system during repairs, maintenance and to facilitate unidirectional flushing.

b) Location. Unless otherwise approved by the Agency under Section 604.145(b), valves must be located:

1) at not more than 500-foot intervals in commercial districts;

2) at not more than two blocks or 1200-foot intervals in other districts.

Section 604.1425 Hydrants

a) Only water mains designed to carry fire flows may have fire hydrants connected to them.

1) The fire hydrant lead must be a minimum of six inches in diameter.

2) Auxiliary valves must be installed on all fire hydrant leads.

b) Unless otherwise approved by the Agency under Section 604.145(b), water mains not designed to carry fire-flows must have flushing hydrants.

1) Flushing hydrants must be sized to provide flows which will give a velocity of at least 2.5 feet per second in the water main being flushed.

2) No flushing device may be directly connected to any sewer.

c) Each community water supply must develop and maintain a systematic flushing program.

d) Hydrant drainage

1) When hydrant drains are plugged, the barrels must be pumped dry after use during freezing weather.

2) Where hydrant drains are not plugged, a gravel pocket or dry well must be provided unless the natural soils will provide adequate drainage.

3) Hydrant drains must not be connected to or located within 10 feet of sanitary sewers, storm sewers, or storm drains.

4) Hydrant drains must be above the seasonal groundwater table.

Section 604.1430 Air Relief Valves

a) Air relief valves must be installed at high points in water mains where air can accumulate.

b) Automatic air relief valves must not be used in situations where flooding of the manhole or chamber may occur.

c) Air relief valve piping.

1) The open end of an air relief pipe from a manually operated valve must extend to the top of the pit and be provided with a screened, downward-facing elbow if drainage is provided for the manhole.

2) The open end of an air relief pipe from automatic valves must be extended to at least one foot above grade and provided with a screened, downward-facing elbow.

3) Discharge piping from air relief valves must not connect directly to any storm drain, storm sewer, or sanitary sewer.

Section 604.1435 Valve, Meter and Blow Off Chambers

a) Valves, blow-offs, meters or other such appurtenances to a distribution system must be protected from standing water in the chambers, pits, or manholes.

b) Chambers, pits or manholes containing valves, blow-offs, meters, or other appurtenances to a distribution system must be drained or be equipped with other means to remove standing water.

c) The chambers, pits and manholes containing valves, blow-offs, meters, or other appurtenances to a distribution system must not connect directly to any storm drain or sanitary sewer.

Section 604.1440 Sanitary Separation for Finished Water Mains

Water mains must be protected from sanitary sewers, storm sewers, combined sewers, house sewer service connections and drains as follows:

a) Horizontal Separation:

1) Water mains must be laid at least ten feet horizontally from any existing or proposed drain, storm sewer, sanitary sewer, combined sewer or sewer service connection. The distance must be measured edge to edge.

2) Water mains may be laid closer than ten feet to a sewer line when:

A) local conditions prevent a lateral separation of ten feet;

B) the water main invert is at least 18 inches above the crown of the sewer; and

C) the water main is either in a separate trench or in the same trench on an undisturbed earth shelf located to one side of the sewer.

3) When it is impossible to meet subsections (a)(1) or (a)(2) above, the following requirements must be met:

A) Required Materials:

i) both the water main and drain or sewer must be constructed of materials specified in Section 604.1410; or

ii) the sewer has a structural lining meeting ASTM F1216. The Agency may approve an alternate structural lining under Section 604.145(b).

B) The drain or sewer must be pressure tested to the maximum expected surcharge head before backfilling.

4) Water mains must be laid at least 25 feet horizontally from any existing or proposed sanitary lift station, unless otherwise approved by the Agency under Section 604.145(b).

b) Vertical Separation:

1) When possible, the water main must be placed above the sewer.

A) A water main must be laid so that its invert is 18 inches above the crown of the drain or sewer whenever water mains cross storm sewers, sanitary sewers or sewer service connections.

B) The vertical separation must be maintained for that portion of the water main located within ten feet horizontally of the outer edge of any sewer or drain crossed.

C) A length of water main pipe must be centered over the sewer to be crossed with joints equidistant from the sewer or drain.

D) When it is impossible to maintain an 18-inch separation specified in subsection (b)(1)(A), the Agency may approve an alternate construction method that reduces the risk of sanitary contamination, including:

i) Both the water main and sewer are constructed of water main materials specified in Section 604.1410, extending on each side of the crossing until at least ten feet separates the two pipes;

ii) The sewer has a structural lining meeting ASTM F1216 or an alternate structural lining approved by the Agency under Section 604.145(b).

iii) The water main or the sewer is encased in a carrier pipe equivalent to water main materials specified in Section 604.1410, extending on each side of the crossing until at least ten feet separate the two pipes; or

iv) When the water main crosses a storm sewer, the storm sewer is constructed with reinforced concrete pipe conforming to ASTM C76 with ASTM C443 flat gasket joints or ASTM C361 "O-ring" joints within ten feet of the water main.

2) When it is impossible to place the water main above the storm sewers, sanitary sewers or sewer service connections, the water main may be placed below the sewer if:

A) The water main is laid so that it is at least 18 inches below the invert of the drain or sewer wherever water mains cross storm sewers, sanitary sewers or sewer service connections.

B) Construction.

i) both the water main and sewer are constructed of water main materials specified in Section 604.1410, extending on each side of the crossing until at least ten feet separates the two pipes; or

ii) the sewer has a structural lining meeting ASTM F1216 or an alternate structural lining approved by the Agency under Section 604.145(b); or

iii) the water main or the sewer is encased in a carrier pipe equivalent to water main materials specified in Section 604.1410, extending on each side of the crossing until at least ten feet separate the two pipes; or

iv) when the water main crosses a storm sewer, the storm sewer is constructed with reinforced concrete pipe conforming to ASTM C76 with ASTM C443 flat gasket joints or ASTM C361 "O-ring" joints within ten feet of the water main.

C) The sewer or drain lines must be supported to prevent settling and breaking the water main.

c) Water mains must be separated from sewage disposal systems, disposal fields and seepage beds by a minimum of 25 feet.

d) Notwithstanding subsection (a) or (b), a sanitary sewer force main must have at least the following minimum separation:

1) when the sanitary sewer force main and the water main are parallel, a horizontal separation from water mains; and10-foot

2) when the sanitary sewer force main and the water main cross, an 18-inch vertical separation, with the water main above the sanitary sewer force main.

Section 604.1445 Sanitary Separation for Raw Water Mains

a) Raw water mains from groundwater sources must have the same sanitary separation as provided in Section 604.1440 for finished water mains.

b) Raw water mains from surface water sources must have same sanitary separation between the sanitary sewer, combined sewer, house sewer service connections and drains as provided in Section 604.1440 for finished water mains.

Section 604.1450 Surface Water Crossings

a) For above-water crossings, the pipe must be adequately supported and anchored, protected from damage and freezing, and accessible for repair or replacement.

b) Underwater crossings

1) A minimum cover of five feet must be provided over the pipe.

2) When crossing water courses which are greater than 15 feet in width, the following must be provided:

A) the pipe must be of special construction, having flexible, restrained or welded watertight joints;

B) valves must be provided at both ends of water crossings so that the section can be isolated for testing or repair;

C) the valves must be easily accessible, and not subject to flooding; and

D) permanent taps or other provisions to allow insertion of a small meter to determine leakage and obtain water samples must be made on each side of the valve closest to the supply source.

Section 604.1455 Water Service Line

a) A community water supply must not supply water through a water service line to more than a single property, dwelling or rental unit.

b) If a pipe from the water main or source of potable water supply is accessible to more than one property, dwelling or rental unit, the pipe will be considered a water main subject to all permitting requirements of 35 Ill. Adm. Code 602.

c) A pipe is accessible when it crosses the property boundary of another landowner to reach the property, dwelling or rental unit being served.

Section 604.1460 Water Loading Stations

To prevent contamination of both the public supply and potable water vessels being filled, the following principles must be met in the design of water loading stations:

a) a six inch or larger air gap or other Agency approved cross connection control measure must be included for all water loading stations;

b) the piping arrangement must prevent potential contaminants from being transferred between hauling vessels; and

c) hoses must not be allowed to contact the ground.

SUBPART O: CROSS CONNECTIONS

Section 604.1500 Cross Connections

a) No cross connection must be allowed between water plant piping and any drain or sewer. Backflow prevention installed within the water treatment facility must comply with the Illinois Plumbing Code, 77 Ill. Adm. Code 890.

b) No cross connection must be allowed whereby an unsafe substance may enter a community water supply.

c) No cross connection must be allowed between any portion of a community water supply distribution system and any other water supply that is not a community water supply.

Section 604.1505 Cross Connection Control Program

a) All community water supplies, including those that meet the criteria in Section 17(b) of the Act and any exempt community water supply as defined in section 9.1 of the Public Water Supply Operations Act, must have a cross connection control program to educate and inform water supply consumers regarding prevention of the entry of contaminants into the distribution system.

b) The cross connection control program must include the following:

1) For any new service connection, the community water supply must evaluate the risk of cross connection whereby an unsafe substance may enter a community water supply.

2) A community water supply must conduct a cross connection control survey of the distribution system at least every three years by the owner, official custodian or an authorized delegate. The survey must evaluate the risk of an unsafe substance entering a community water supply through each service connection to the distribution system of the community water supply. This survey is not intended to include an actual visual inspection of piping or plumbing systems.

3) From each completed survey, the community water supply must develop an inventory of the following:

A) all customers surveyed;

B) the number of customers who responded to the survey;

C) identification of service connections not required to have a backflow preventer installed under 77 Ill. Adm. Code 890.1130.

D) identification of service connections required to have a backflow preventer installed under 77 Ill. Adm. Code 890.1130.

E) backflow preventers installed;

F) service connections that require further risk evaluation; and

G) corrective actions to mitigate cross connections.

4) An ordinance, tariff, or required condition for service whichever is applicable which meets the Illinois Plumbing Code, 77 Ill. Adm. Code 890, must be adopted and enforced.

5) The community water supply must maintain records of all backflow preventers that require annual testing under 77 Ill. Adm. Code 890 and identified in Section 604.1505(b)(2) and (b)(3).

Section 604.1510 Cross Connection Control Device Inspectors

a) Except as provided in subsection (c), cross connection control devices must be inspected at least annually by a person approved by the Agency or its designee as a cross connection control device inspector (CCCDI). The inspection of mechanical devices must include physical testing in accordance with the manufacturer's instructions.

1) Records of the annual inspection must be submitted to the community water supply.

2) Each device inspected must have a tag attached listing the date of most recent test, name of CCCDI, and type and date of repairs.

3) A maintenance log must be maintained at the site of installation and must include:

A) make, model, and serial number of the backflow preventer, and its location at the site;

B) date of each test;

C) name and approval number of person performing the test;

D) type of test kit used and date of its most recent calibration:

E) test results and a brief statement indicating whether the results pass or fail the test;

F) repairs or servicing required;

G) repairs and date completed; and

H) servicing performed and date completed.

b) Requirements for Cross Connection Control Device Inspector Approval

1) Each applicant for cross connection control device inspector (CCCDI) approval must meet the following qualifications:

A) Must be a person authorized to perform plumbing as described in the Illinois Plumbing License Law, 225 ILCS 320/3(1).

B) Must complete a training course offered by the Environmental Resource Training Center or the Agency's delegate on cross connection control device which includes hands on practice testing of different types of backflow devices and proper maintenance and repair.

C) Must complete and submit an application for CCCDI Approval.

D) Must successfully complete both written and performance examinations demonstrating competency in the following: the principles of backflow and back-siphonage; the hazard presented to a potable water system; locations which require installation of cross-connection control devices; identifying, locating, inspecting, testing, maintaining and repairing cross-connection control methods and devices in-line, as located throughout each system which connects to a community public water supply.

i) Must successfully complete the written examination with a score of 75% minimum.

ii) Must successfully complete a performance-based examination by demonstrating competency in testing device procedures on all types of devices at the examination center.

2) CCCDIs must-renew the CCCDI Approval each year, between May 1 and June 30. An application for CCCDI renewal will be sent by the Agency or its designee, and must be completed and returned by June 30 of the renewal year. CCCDIs must complete an eight-hour recertification course every three years from the date of the original issuance of the CCCDI license. The course must be offered by the Environmental Resources Training Center or the Agency's delegate and include a written and practical exam demonstrating competency in backflow prevention testing.

3) A CCCDI Approval or admission to examination for CCCDI Approval must be suspended, revoked or not issued by the Agency for any one or more of the following causes:

   A) Practice of any fraud or deceit in obtaining or attempting to obtain a CCCDI Approval, including misrepresentation of approval;

   B) Any repeated, flagrant or willful negligence or misconduct in the inspection, testing or maintenance of cross-connection control devices;

   C) Falsification of reports required by these rules;

   D) Willful violation of the Environmental Protection Act or any rules thereunder.

4) Suspension and Revocation Procedures

   A) Any person may file with the Agency a written complaint regarding the conduct of a CCCDI approved under this Part. The complaint must state the name and address of the complainant, the name of the CCCDI and all information that supports the complaint.

   B) The Agency may initiate the suspension or revocation procedure on the basis of any written complaint or on its own motion. The Agency's decision to institute suspension or revocation proceedings will be based on the seriousness of the violation and its potential deleterious impact upon public health and safety.

   C) When the suspension or revocation procedure is initiated, the Agency must notify the CCCDI by certified mail that suspension or revocation is being sought. Such notice must specify the cause upon which suspension or revocation is sought and include the

procedures for requesting a hearing before the Agency. Request for hearing must be made in writing within 14 days after receipt of the Agency's certified notification. If no hearing is requested, the Agency will suspend or revoke the CCCDI approval.

D) Should a hearing be requested, the Director must appoint one or more Agency employees to chair the proceedings. The hearing must be conducted according to the hearing requirements of 35 Ill. Adm. Code 168.

E) The Director must make a decision within 30 days after receiving the hearing transcript. The Director must give written notice of that decision and reasons for the decision to the CCCDI by certified mail.

F) Within 30 days after receiving a notice of suspension or revocation from the Agency, the CCCDI may appeal the suspension or revocation to the Pollution Control Board. The suspension or revocation of the CCCDI's Approval must be stayed pending a final decision on the appeal by the Pollution Control Board.

c) Backflow preventers located in the treatment plant, wellhouse or booster station of a community public water supply facility must be inspected at least annually by either an approved cross-connection control device inspector or by a certified water supply operator who has completed the qualifications listed in Section 604.1510(b)(1)(B) and (b)(1)(D).

1) When the inspection is conducted by a certified water supply operator who has completed the necessary qualifications, records must be kept as required by Section 604.1510(a)(3).

2) Each device inspected must have a tag attached listing the date of the most recent test, name of CCCDI, and type and date of repairs.

Section 604.1515 Agency Approved Connection Control Measures

a) For all mains, pipes, structures through which water is obtained and distributed to the public, including wells and well structures, intakes and cribs, pumping stations, treatment plants, reservoirs, storage tanks and appurtenances, collectively or severally, actually used or intended for use for the purpose of furnishing water for drinking or domestic use, cross connection devises must be used as set forth in this section.

b) Except as provided in this section, a fixed air gap must be used.

c) Atmospheric vacuum breakers may be installed subject to the following conditions:

1) the location is not subject to back pressure;

2) the substance in the container receiving water is not toxic; and

3) an atmospheric vacuum breaker is installed at the highest point in the waterline and after the last control valve before the point of discharge and a minimum of six inches above the flood level rim of the receptacle.

d) Examples of acceptable installations of atmospheric vacuum breakers include:

1) surface wash piping for a gravity filter;

2) solution tanks of gravimetric dry chemical feeders;

3) faucet with hose attachments; and

4) receptacles with a low-level inlet where the substance contained is nontoxic such as food or beverages.

e) Reduced Pressure Principle Backflow Preventers may be installed subject to the following conditions:

1) Installation.

A) Units must be accessible for maintenance and testing.

B) Minimum clearances recommended by the manufacturer must be used.

C) Units must be protected against flooding and freezing.

D) Relief ports must not be plugged. A drain which will remain free flowing under all conditions must be provided.

E) No reduction must be made in the size of the relief port drain.

2) Bypass lines without reduced pressure principle backflow preventers must not be installed.

3) Reduced pressure principle backflow preventers must be used for installations where a fixed air gap is not possible, and an atmospheric vacuum breaker is not allowed under subsection (c).

Section 604.TABLE A Steel Pipe

Table A
STEEL PIPE

SIZE	DIAMETER (inches)		THICKNESS (inches)	WEIGHT PER FOOT (pounds)	
	EXTERNAL	INTERNAL		PLAIN ENDS (calculated)	WITH THREADS AND COUPLINGS (nominal)
6 id.	6.625	6.065	0.280	18.97	19.18
8	8.625	7.981	0.322	28.55	29.35
10	10.750	10.020	0.365	40.48	41.85
12	12.750	12.000	0.375	49.56	51.15
14 od.	14.000	13.250	0.375	54.57	57.00
16	16.000	15.250	0.375	62.58	
18	18.000	17.250	0.375	70.59	
20	20.000	19.250	0.375	78.60	
22	22.000	21.000	0.500	114.81	
24	24.000	23.000	0.500	125.49	
26	26.000	25.000	0.500	136.17	
28	28.000	27.000	0.500	146.85	
30	30.000	29.000	0.500	157.53	
32	32.000	31.000	0.500	168.21	
34	34.000	33.000	0.500	178.89	
36	36.000	35.000	0.500	189.57	

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE F: PUBLIC WATER SUPPLIES
CHAPTER I: POLLUTION CONTROL BOARD

PART 607
OPERATION AND RECORD KEEPING

Section
607.101 Protection During Repair Work (Repealed)
607.102 Disinfection Following Repair or Reconstruction (Repealed)
607.103 Emergency Operation (Repealed)
607.104 Cross Connections (Repealed)
607.105 Laboratory Testing Equipment (Repealed)
607.106 Record Maintenance (Repealed)

607.APPENDIX A References to Former Rules (Repealed)

AUTHORITY: Implementing Section 17 and authorized by Section 27 of the Environmental Protection Act [415 ILCS 5/17 and 27].

SOURCE: Filed with Secretary of State January 1, 1978; amended and codified at 6 Ill. Reg. 11497, effective September 14, 1982; amended in R88-26 at 14 Ill. Reg. 16512, effective September 20, 1990; amended in R95-17 at 20 Ill. Reg. 14423, effective October 22, 1996; amended in R96-18 at 21 Ill. Reg. 6553, effective May 8, 1997; amended in R18-17 at 42 Ill. Reg. _____, effective _____.

Section 607.103 Emergency Operation (Repealed)

~~a)~~ ~~Whenever contamination is determined to persist in a public water supply, as demonstrated by microbiological analysis results, the owners or official custodians of the supply shall notify all consumers to boil for five minutes all water used for drinking or culinary purposes. This boil order shall remain in effect until microbiological samples demonstrate that the water is safe for domestic use, or until appropriate corrective action approved by the Agency is taken. If the owner or official custodian of the supply fails to take such action on his own or at the recommendation of the Agency, the Agency may issue a boil order directly to the consumers affected.~~

~~b)~~ ~~Any emergency which results in water pressures falling below twenty pounds per square inch on any portion of the distribution system shall be reason for immediate issuance of a boil order by the owner or official custodian of the supply to those consumers affected unless:~~

~~1)~~ ~~There is a historical record of adequate chlorine residual and approved turbidity levels in the general area affected covering at least twelve monthly readings;~~

~~2)~~ ~~Samples for bacteriological examination are taken in the affected area immediately and approximately twelve hours later; and~~

~~3)~~ ~~Tests for residual chlorine and turbidity taken at not more than hourly intervals in the affected area for several hours do not vary significantly from the historical record. If significant decrease in chlorine residual or increase in turbidity occurs, a boil order shall be issued.~~

~~c)~~ ~~Whenever the safety of a supply is endangered for any reason, including but not limited to spillage of hazardous substances, the Agency shall be notified immediately by the owner, official custodian or his authorized representative, and the supply officials shall take appropriate action to protect the supply. The owner, official custodian or his authorized representative shall notify all consumers of appropriate action to protect themselves against any waterborne hazards. If the owner or official custodian of the supply fails to take such action on his own or at the recommendation of the Agency, the Agency shall notify directly the consumers affected.~~

(Source: Repealed at 42 Ill. Reg. _____, effective _____)

Section 607.104 Cross Connections <u>(Repealed)</u>

~~a)~~ ~~No physical connection shall be permitted between the potable portion of a supply and any other water supply not of equal or better bacteriological and chemical quality as determined by inspection and analysis by the Agency, except as provided for in subsection (d) of this Section.~~

~~b)~~ ~~There shall be no arrangement or connection by which an unsafe substance may enter a supply.~~

~~c)~~ ~~Control of all cross-connections to a supply is the responsibility of the owner or official custodian of the supply. If a privately owned water supply source meets the applicable criteria, it may be connected to a water supply upon approval by the owner or official custodian and by the Agency. Where such connections are permitted, it is the responsibility of the public water supply officials to assure submission from such privately owned water supply source or sources samples and operating reports, as required by 35 Ill. Adm. Code 611 as applicable to the cross-connected source.~~

~~d)~~ ~~The Agency may adopt specific conditions for control of unsafe cross-connections, which shall be complied with by the supplies of this State, as applicable. These conditions shall be adopted and/or changed by the Agency as prescribed in 35 Ill. Adm. Code 602.115.~~

~~e)~~ ~~Each community water supply exempted pursuant to 35 Ill. Adm. Code 603.104 or Section 17(b) of the Act shall provide an active program approved by the Agency to continually educate and inform water supply consumers regarding prevention of the entry of contaminants into the distribution system. Conditions under which the Agency will approve this active program shall be adopted or changed by the Agency as prescribed in 35 Ill. Adm. Code 602.115.~~

(Source: Repealed at 42 Ill. Reg. _____, effective _____)

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE F: PUBLIC WATER SUPPLIES
CHAPTER I: POLLUTION CONTROL BOARD

PART 611
PRIMARY DRINKING WATER STANDARDS

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611.102 Incorporations by Reference
611.103 Severability
611.105 Electronic Reporting
611.107 Agency Inspection of PWS Facilities (Repealed)
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SUBPART B: FILTRATION AND DISINFECTION

Section
611.201 Requiring a Demonstration
611.202 Procedures for Agency Determinations
611.211 Filtration Required
611.212 Groundwater under Direct Influence of Surface Water
611.213 No Method of HPC Analysis
611.220 General Requirements

SUBPART C: USE OF NON-CENTRALIZED TREATMENT DEVICES

SUBPART D: TREATMENT TECHNIQUES

SUBPART F: MAXIMUM CONTAMINANT LEVELS (MCLs) AND MAXIMUM RESIDUAL DISINFECTANT LEVELS (MRDLs)

SUBPART G: LEAD AND COPPER

SUBPART I: DISINFECTANT RESIDUALS, DISINFECTION BYPRODUCTS, AND DISINFECTION BYPRODUCT PRECURSORS

SUBPART K: GENERAL MONITORING AND ANALYTICAL REQUIREMENTS

SUBPART L: MICROBIOLOGICAL MONITORING AND ANALYTICAL REQUIREMENTS

SUBPART M: TURBIDITY MONITORING AND ANALYTICAL REQUIREMENTS

SUBPART N: INORGANIC MONITORING AND ANALYTICAL REQUIREMENTS

SUBPART O: ORGANIC MONITORING AND ANALYTICAL REQUIREMENTS

SUBPART P: THM MONITORING AND ANALYTICAL REQUIREMENTS (REPEALED)

SUBPART Q: RADIOLOGICAL MONITORING AND ANALYTICAL REQUIREMENTS

SUBPART R: ENHANCED FILTRATION AND DISINFECTION: SYSTEMS THAT SERVE 10,000 OR MORE PEOPLE

SUBPART S: GROUNDWATER RULE

611.805 Reporting and Recordkeeping for GWS Suppliers

SUBPART T: REPORTING AND RECORDKEEPING

Section
611.830 Applicability
611.831 Monthly Operating Report (Repealed)
611.832 Notice by Agency (Repealed)
611.833 Cross Connection Reporting (Repealed)
611.840 Reporting
611.851 Reporting MCL, MRDL, and other Violations (Repealed)
611.852 Reporting other Violations (Repealed)
611.853 Notice to New Billing Units (Repealed)
611.854 General Content of Public Notice (Repealed)
611.855 Mandatory Health Effects Language (Repealed)
611.856 Fluoride Notice (Repealed)
611.858 Fluoride Secondary Standard (Repealed)
611.860 Record Maintenance
611.870 List of 36 Contaminants (Repealed)

SUBPART U: CONSUMER CONFIDENCE REPORTS

Section
611.881 Purpose and Applicability
611.882 Compliance Dates
611.883 Content of the Reports
611.884 Required Additional Health Information
611.885 Report Delivery and Recordkeeping

SUBPART V: PUBLIC NOTIFICATION OF DRINKING WATER VIOLATIONS

Section
611.901 General Public Notification Requirements
611.902 Tier 1 Public Notice: Form, Manner, and Frequency of Notice
611.903 Tier 2 Public Notice: Form, Manner, and Frequency of Notice
611.904 Tier 3 Public Notice: Form, Manner, and Frequency of Notice
611.905 Content of the Public Notice
611.906 Notice to New Billing Units or New Customers
611.907 Special Notice of the Availability of Unregulated Contaminant Monitoring Results
611.908 Special Notice for Exceedence of the Fluoride Secondary Standard
611.909 Special Notice for Nitrate Exceedences above the MCL by a Non-Community Water System

SUBPART W: INITIAL DISTRIBUTION SYSTEM EVALUATIONS

SUBPART X: ENHANCED FILTRATION AND DISINFECTION—SYSTEMS SERVING FEWER THAN 10,000 PEOPLE

SUBPART Y: STAGE 2 DISINFECTION BYPRODUCTS REQUIREMENTS

SUBPART Z: ENHANCED TREATMENT FOR CRYPTOSPORIDIUM

SUBPART AA: REVISED TOTAL COLIFORM RULE

AUTHORITY: Implementing Sections 7.2, 17, and 17.5 and authorized by Section 27 of the Environmental Protection Act [415 ILCS 5/7.2, 17, 17.5, and 27].

SOURCE: Adopted in R88-26 at 14 Ill. Reg. 16517, effective September 20, 1990; amended in R90-21 at 14 Ill. Reg. 20448, effective December 11, 1990; amended in R90-13 at 15 Ill. Reg. 1562, effective January 22, 1991; amended in R91-3 at 16 Ill. Reg. 19010, effective December 1, 1992; amended in R92-3 at 17 Ill. Reg. 7796, effective May 18, 1993; amended in R93-1 at 17 Ill. Reg. 12650, effective July 23, 1993; amended in R94-4 at 18 Ill. Reg. 12291, effective July 28, 1994; amended in R94-23 at 19 Ill. Reg. 8613, effective June 20, 1995; amended in R95-17 at 20 Ill. Reg. 14493, effective October 22, 1996; amended in R98-2 at 22 Ill. Reg. 5020, effective March 5, 1998; amended in R99-6 at 23 Ill. Reg. 2756, effective February 17, 1999; amended in R99-12 at 23 Ill. Reg. 10348, effective August 11, 1999; amended in R00-8 at 23 Ill. Reg. 14715, effective December 8, 1999; amended in R00-10 at 24 Ill. Reg. 14226, effective September 11, 2000; amended in R01-7 at 25 Ill. Reg. 1329, effective January 11, 2001; amended in R01-20 at 25 Ill. Reg. 13611, effective October 9, 2001; amended in R02-5 at 26 Ill. Reg. 3522, effective February 22, 2002; amended in R03-4 at 27 Ill. Reg. 1183, effective January 10, 2003; amended in R03-15 at 27 Ill. Reg. 16447, effective October 10, 2003; amended in R04-3 at 28 Ill. Reg. 5269, effective March 10, 2004; amended in R04-13 at 28 Ill. Reg. 12666, effective August 26, 2004; amended in R05-6 at 29 Ill. Reg. 2287, effective January 28, 2005; amended in R06-15 at 30 Ill. Reg. 17004, effective October 13, 2006; amended in R07-2/R07-11 at 31 Ill. Reg. 11757, effective July 27, 2007; amended in R08-7/R08-13 at 33 Ill. Reg. 633, effective December 30, 2008; amended in R10-1/R10-17/R11-6 at 34 Ill. Reg. 19848, effective December 7, 2010; amended in R12-4 at 36 Ill. Reg. 36 Ill. Reg. 7110, effective April 25, 2012; amended in R13-2 at 37 Ill. Reg. 1978, effective February 4, 2013; amended in R14-8 at 38 Ill. Reg. 3608, effective January 27, 2014; amended in R14-9 at 38 Ill. Reg. 9792, effective April 21, 2014; amended in R15-6 at 39 Ill. Reg. 3713, effective February 24, 2015; amended in R15-23 at 39 Ill. Reg.15144, effective November 9, 2015; amended in R16-4 at 39 Ill. Reg. 15352, effective November 13, 2015; amended in R17-12 at 42 Ill. Reg. 1140, effective January 4, 2018; amended in R18-9 at 42 Ill. Reg. 9316, effective May 29, 2018; amended in R18-17 at 42 Ill. Reg. _____, effective _____.

SUBPART A: GENERAL

Section 611.101 Definitions

As used in this Part, the following terms have the given meanings:

"Act" means the Environmental Protection Act [415 ILCS 5].

"Agency" means the Illinois Environmental Protection Agency.

BOARD NOTE: The Department of Public Health (Public Health or DPH) regulates non-community water supplies ("non-CWSs", including non-transient, non-community water supplies ("NTNCWSs") and transient non-community water

supplies ("transient non-CWSs")). "Agency" will mean Public Health where implementation by Public Health occurs with regard to non-CWS suppliers.

"Approved source of bottled water", for the purposes of Section 611.130(d)(4), means a source of water and the water therefrom, whether it be from a spring, artesian well, drilled well, municipal water supply, or any other source, that has been inspected and the water sampled, analyzed, and found to be a safe and sanitary quality according to applicable laws and regulations of State and local government agencies having jurisdiction, as evidenced by the presence in the plant of current certificates or notations of approval from each government agency or agencies having jurisdiction over the source, the water it bottles, and the distribution of the water in commerce.
BOARD NOTE: Derived from 40 CFR 142.62(g)(2) and 21 CFR 129.3(a) (2016). The Board cannot compile an exhaustive listing of all federal, State, and local laws to which bottled water and bottling water may be subjected. However, the statutes and regulations of which the Board is aware are the following: the Illinois Food, Drug and Cosmetic Act [410 ILCS 620], the Bottled Water Act [815 ILCS 310], the DPH Water Well Construction Code (77 Ill. Adm. Code 920), the DPH Water Well Pump Installation Code (77 Ill. Adm. Code 925), the federal bottled water quality standards (21 CFR 103.35), the federal drinking water processing and bottling standards (21 CFR 129), the federal Current Good Manufacturing Practice in Manufacturing, Packing, or Holding Human Food (21 CFR 110), the federal Fair Packaging and Labeling Act (15 USC 1451 et seq.), and the federal Fair Packaging and Labeling regulations (21 CFR 201).

"Bag filters" means pressure-driven separation devices that remove particulate matter larger than one micrometer using an engineered porous filtration media. They are typically constructed of a non-rigid, fabric filtration media housed in a pressure vessel in which the direction of flow is from the inside of the bag to outside.

"Bank filtration" means a water treatment process that uses a well to recover surface water that has naturally infiltrated into groundwater through a river bed or banks. Infiltration is typically enhanced by the hydraulic gradient imposed by a nearby pumping water supply or other wells.

"Best available technology" or "BAT" means the best technology, treatment techniques, or other means that USEPA has found are available for the contaminant in question. BAT is specified in Subpart F.

"Bin classification" or "bin" means, for the purposes of Subpart Z, the appropriate of the four treatment categories (Bin 1, Bin 2, Bin 3, or Bin 4) that is assigned to a filtered system supplier pursuant to Section 611.1010 based on the results of the source water Cryptosporidium monitoring described in the previous section. This

bin classification determines the degree of additional Cryptosporidium treatment, if any, the filtered PWS must provide.
BOARD NOTE: Derived from 40 CFR 141.710 (2016) and the preamble discussion at 71 Fed. Reg. 654, 657 (Jan. 5, 2006).

"Board" means the Illinois Pollution Control Board.

"Cartridge filters" means pressure-driven separation devices that remove particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed as rigid or semi-rigid, self-supporting filter elements housed in pressure vessels in which flow is from the outside of the cartridge to the inside.

"CAS No." means "Chemical Abstracts Services Number".

"Clean compliance history" means, for the purposes of Subpart AA, a record of no MCL violations under Section 611.325; no monitoring violations under Subpart L or Subpart AA; and no coliform treatment technique trigger exceedances or treatment technique violations under Subpart AA.

"Coagulation" means a process using coagulant chemicals and mixing by which colloidal and suspended materials are destabilized and agglomerated into flocs.

"Combined distribution system" means the interconnected distribution system consisting of the distribution systems of wholesale systems and of the consecutive systems that receive finished water.

"Community water system" or "CWS" means a public water system (PWS) that serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.
BOARD NOTE: This definition differs slightly from that of Section 3.145 of the Act.

"Compliance cycle" means the nine-year calendar year cycle during which public water systems (PWSs) must monitor. Each compliance cycle consists of three three-year compliance periods. The first calendar cycle began January 1, 1993, and ended December 31, 2001; the second began January 1, 2002, and ended December 31, 2010; the third began January 1, 2011, and ends December 31, 2019.

"Compliance period" means a three-year calendar year period within a compliance cycle. Each compliance cycle has three three-year compliance periods. Within the first compliance cycle, the first compliance period ran from January 1, 1993 to December 31, 1995; the second ran from January 1, 1996 to December 31, 1998; and the third ran from January 1, 1999 to December 31, 2001.

"Comprehensive performance evaluation" or "CPE" is a thorough review and analysis of a treatment plant's performance-based capabilities and associated administrative, operation, and maintenance practices. It is conducted to identify factors that may be adversely impacting a plant's capability to achieve compliance and emphasizes approaches that can be implemented without significant capital improvements.
BOARD NOTE: The final sentence of the definition of "comprehensive performance evaluation" in 40 CFR 141.2 is codified as Section 611.160(a)(2), since it contains substantive elements that are more appropriately codified in a substantive provision.

"Confluent growth" means a continuous bacterial growth covering the entire filtration area of a membrane filter or a portion thereof, in which bacterial colonies are not discrete.

"Consecutive system" means a public water system that receives some or all of its finished water from one or more wholesale systems. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.

"Contaminant" means any physical, chemical, biological, or radiological substance or matter in water.

"Conventional filtration treatment" means a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in substantial "particulate removal.":

"CT" or "CT_{calc}" is the product of residual disinfectant concentration (RDC or C) in mg/ℓ determined before or at the first customer, and the corresponding disinfectant contact time (T) in minutes. If a supplier applies disinfectants at more than one point prior to the first customer, it must determine the CT of each disinfectant sequence before or at the first customer to determine the total percent inactivation or "total inactivation ratio". In determining the total inactivation ratio, the supplier must determine the RDC of each disinfection sequence and corresponding contact time before any subsequent disinfection application points. (See the definition of "$CT_{99.9}$".)

"$CT_{99.9}$" is the CT value required for 99.9 percent (3-log) inactivation of Giardia lamblia cysts. $CT_{99.9}$ values for a variety of disinfectants and conditions appear in Tables 1.1 through 1.6, 2.1 and 3.1 of Appendix B. (See the definition of "inactivation ratio".)
BOARD NOTE: Derived from the definition of "CT" in 40 CFR 141.2 (2016).

"Diatomaceous earth filtration" means a process resulting in substantial particulate removal in which the following occur:

A precoat cake of diatomaceous earth filter media is deposited on a support membrane (septum); and

While the water is filtered by passing through the cake on the septum, additional filter media known as body feed is continuously added to the feed water to maintain the permeability of the filter cake.

"Direct filtration" means a series of processes including coagulation and filtration but excluding sedimentation resulting in substantial particulate removal.

"Disinfectant" means any oxidant, including but not limited to chlorine, chlorine dioxide, chloramines, and ozone added to water in any part of the treatment or distribution process, that is intended to kill or inactivate pathogenic microorganisms.

"Disinfectant contact time" or "T" means the time in minutes that it takes for water to move from the point of disinfectant application or the previous point of RDC measurement to a point before or at the point where RDC is measured.

Where only one RDC is measured, T is the time in minutes that it takes for water to move from the point of disinfectant application to a point before or at the point where RDC is measured.

Where more than one RDC is measured, T is as follows:

For the first measurement of RDC, the time in minutes that it takes for water to move from the first or only point of disinfectant application to a point before or at the point where the first RDC is measured; and

For subsequent measurements of RDC, the time in minutes that it takes for water to move from the previous RDC measurement point to the RDC measurement point for which the particular T is being calculated.

T in pipelines must be calculated based on "plug flow" by dividing the internal volume of the pipe by the maximum hourly flow rate through that pipe.

T within mixing basins and storage reservoirs must be determined by tracer studies or an equivalent demonstration.

"Disinfection" means a process that inactivates pathogenic organisms in water by chemical oxidants or equivalent agents.

"Disinfection byproduct" or "DBP" means a chemical byproduct that forms when disinfectants used for microbial control react with naturally occurring compounds already present in source water. DBPs include, but are not limited to, bromodichloromethane, bromoform, chloroform, dichloroacetic acid, bromate, chlorite, dibromochloromethane, and certain haloacetic acids.

"Disinfection profile" is a summary of daily Giardia lamblia inactivation through the treatment plant. The procedure for developing a disinfection profile is contained in Section 611.742.

"Distribution system" includes all points downstream of an "entry point" to the point of consumer ownership.

"Domestic or other non-distribution system plumbing problem" means a coliform contamination problem in a PWS with more than one service connection that is limited to the specific service connection from which the coliform-positive sample was taken.

"Dose equivalent" means the product of the absorbed dose from ionizing radiation and such factors as account for differences in biological effectiveness due to the type of radiation and its distribution in the body as specified by the International Commission on Radiological Units and Measurements (ICRU).

"Dual sample set" means a set of two samples collected at the same time and same location, with one sample analyzed for TTHM and the other sample analyzed for HAA5. Dual sample sets are collected for the purposes of conducting an IDSE under Subpart W and determining compliance with the TTHM and HAA5 MCLs under Subpart Y.

"E. coli" means Escherichia coli, a species of bacteria used as a specific indicator of fecal contamination and potential harmful pathogens.
BOARD NOTE: Derived from the discussion at 78 Fed. Reg. 10270, 10271 (Feb. 13, 2013).

"Enhanced coagulation" means the addition of sufficient coagulant for improved removal of disinfection byproduct (DBP) precursors by conventional filtration treatment.

"Enhanced softening" means the improved removal of disinfection byproduct (DBP) precursors by precipitative softening.

"Entry point" means a point just downstream of the final treatment operation, but upstream of the first user and upstream of any mixing with other water. If raw water is used without treatment, the "entry point" is the raw water source. If a PWS receives treated water from another PWS, the "entry point" is a point just downstream of the other PWS, but upstream of the first user on the receiving PWS, and upstream of any mixing with other water.

"Filter profile" is a graphical representation of individual filter performance, based on continuous turbidity measurements or total particle counts versus time for an entire filter run, from startup to backwash inclusively, that includes an assessment of filter performance while another filter is being backwashed.

"Filtration" means a process for removing particulate matter from water by passage through porous media.

"Finished water" means water that is introduced into the distribution system of a public water system which is intended for distribution and consumption without further treatment, except that treatment which is necessary to maintain water quality in the distribution system (e.g., booster disinfection, addition of corrosion control chemicals, etc.).

"Flocculation" means a process to enhance agglomeration or collection of smaller floc particles into larger, more easily settleable particles through gentle stirring by hydraulic or mechanical means.

"Flowing stream" means a course of running water flowing in a definite channel.

"40/30 certification" means the certification, submitted by the supplier to the Agency pursuant to Section 611.923, that the supplier had no TTHM or HAA5 monitoring violations, and that no individual sample from its system exceeded 0.040 mg/ℓ TTHM or 0.030 mg/ℓ HAA5 during eight consecutive calendar quarters.
BOARD NOTE: Derived from 40 CFR 141.603(a) (2016).

"GAC10" means granular activated carbon (GAC) filter beds with an empty-bed contact time of 10 minutes based on average daily flow and a carbon reactivation frequency of every 180 days, except that the reactivation frequency for GAC10 that is used as a best available technology for compliance with the MCLs set forth in Subpart Y pursuant to Section 611.312(b)(2) is 120 days.

"GAC20" means granular activated carbon filter beds with an empty-bed contact time of 20 minutes based on average daily flow and a carbon reactivation frequency of every 240 days.

"GC" means "gas chromatography" or "gas-liquid phase chromatography".

"GC/MS" means gas chromatography (GC) followed by mass spectrometry (MS).

"Gross alpha particle activity" means the total radioactivity due to alpha particle emission as inferred from measurements on a dry sample.

"Gross beta particle activity" means the total radioactivity due to beta particle emission as inferred from measurements on a dry sample.

"Groundwater system" or "GWS" means a public water supply (PWS) that uses only groundwater sources, including a consecutive system that receives finished groundwater.
BOARD NOTE: Derived from 40 CFR 141.23(b)(2), 141.24(f)(2) note, and 40 CFR 141.400(b) (2016).

"Groundwater under the direct influence of surface water" means any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens, such as Giardia lamblia or Cryptosporidium, or significant and relatively rapid shifts in water characteristics, such as turbidity, temperature, conductivity, or pH, that closely correlate to climatological or surface water conditions. "Groundwater under the direct influence of surface water" is as determined in Section 611.212.

"Haloacetic acids (five)" or "HAA5" means the sum of the concentrations in milligrams per liter (mg/ℓ) of five haloacetic acid compounds (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid), rounded to two significant figures after addition.

"Halogen" means one of the chemical elements chlorine, bromine, or iodine.

"HPC" means "heterotrophic plate count", measured as specified in Section 611.531(a)(2)(C).

"Hydrogeologic sensitivity assessment," for the purposes of Subpart S, means a determination of whether a GWS supplier obtains water from a hydrogeologically sensitive setting.
BOARD NOTE: Derived from 40 CFR 141.400(c)(5) (2016).

"Inactivation ratio" or "Ai" means as follows:

$$Ai = CT_{calc}/CT_{99.9}$$

The sum of the inactivation ratios, or "total inactivation ratio" (B), is calculated by adding together the inactivation ratio for each disinfection sequence as follows:

$B = \sum(Ai)$

A total inactivation ratio equal to or greater than 1.0 is assumed to provide a 3-log inactivation of Giardia lamblia cysts.

BOARD NOTE: Derived from the definition of "CT" in 40 CFR 141.2 (2016).

"Initial compliance period" means the three-year compliance period that began January 1, 1993, except for the MCLs for dichloromethane, 1,2,4-trichlorobenzene, 1,1,2-trichloroethane, benzo(a)pyrene, dalapon, di(2-ethylhexyl)adipate, di(2-ethyl-hexyl)phthalate, dinoseb, diquat, endothall, endrin, glyphosate, hexachlorobenzene, hexachlorocyclopentadiene, oxamyl, picloram, simazine, 2,3,7,8-TCDD, antimony, beryllium, cyanide, nickel, and thallium, as they apply to a supplier whose system has fewer than 150 service connections, for which it means the three-year compliance period that began on January 1, 1996.

"Initial distribution system evaluation" or "IDSE" means the evaluation, performed by the supplier pursuant to Section 611.921(c), to determine the locations in a distribution system that are representative of high TTHM and HAA5 concentrations throughout the distribution system. An IDSE is used in conjunction with, but is distinct from, the compliance monitoring undertaken to identify and select monitoring locations used to determine compliance with Subpart I.
BOARD NOTE: Derived from 40 CFR 141.601(c) (2016).

"Inorganic contaminants" or "IOCs" refers to that group of contaminants designated as such in United States Environmental Protection Agency (USEPA) regulatory discussions and guidance documents. IOCs include antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, mercury, nickel, nitrate, nitrite, selenium, and thallium.
BOARD NOTE: The IOCs are derived from 40 CFR 141.23(a)(4) (2016).

"ℓ" means "liter".

"Lake or reservoir" means a natural or man made basin or hollow on the Earth's surface in which water collects or is stored that may or may not have a current or single direction of flow.

"Legionella" means a genus of bacteria, some species of which have caused a type of pneumonia called Legionnaires Disease.

"Level 1 assessment" means an evaluation to identify the possible presence of sanitary defects, defects in distribution system coliform monitoring practices, and (when possible) the likely reason that the system triggered the assessment. A

Level 1 assessment is conducted by the system operator or owner. Minimum elements include review and identification of atypical events that could affect distributed water quality or indicate that distributed water quality was impaired; changes in distribution system maintenance and operation that could affect distributed water quality (including water storage); source and treatment considerations that bear on distributed water quality, where appropriate (e.g., whether a groundwater system is disinfected); existing water quality monitoring data; and inadequacies in sample sites, sampling protocol, and sample processing. The supplier must conduct the assessment consistent with any Agency-imposed permit conditions that tailor specific assessment elements with respect to the size and type of the system and the size, type, and characteristics of the distribution system.

"Level 2 assessment" means an evaluation to identify the possible presence of sanitary defects, defects in distribution system coliform monitoring practices, and (when possible) the likely reason that the system triggered the assessment. A Level 2 assessment provides a more detailed examination of the system (including the system's monitoring and operational practices) than does a Level 1 assessment through the use of more comprehensive investigation and review of available information, additional internal and external resources, and other relevant practices. A Level 2 assessment is conducted by a person approved by a SEP granted by the Agency pursuant to Section 611.130, and that person may include the system operator. Minimum elements include review and identification of atypical events that could affect distributed water quality or indicate that distributed water quality was impaired; changes in distribution system maintenance and operation that could affect distributed water quality (including water storage); source and treatment considerations that bear on distributed water quality, where appropriate (e.g., whether a groundwater system is disinfected); existing water quality monitoring data; and inadequacies in sample sites, sampling protocol, and sample processing. The supplier must conduct the assessment consistent with any Agency-imposed permit conditions that tailor specific assessment elements with respect to the size and type of the system and the size, type, and characteristics of the distribution system. The supplier must comply with any expedited actions or additional actions required by a SEP granted by the Agency pursuant to Section 611.130 in the instance of an E. coli MCL violation.

"Locational running annual average" or "LRAA" means the average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters.

"Man-made beta particle and photon emitters" means all radionuclides emitting beta particles or photons listed in NBS Handbook 69, incorporated by reference in Section 611.102, except the daughter products of thorium-232, uranium-235 and uranium-238.

"Maximum contaminant level" or "MCL" means the maximum permissible level of a contaminant in water that is delivered to any user of a public water system. (See Section 611.121.)

"Maximum contaminant level goal" or "MCLG" means the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety. MCLGs are nonenforceable health goals.
BOARD NOTE: The Board has not routinely adopted the regulations relating to the federal MCLGs because they are outside the scope of the Board's identical-in-substance mandate under Section 17.5 of the Act.

"Maximum residual disinfectant level" or "MRDL" means the maximum permissible level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap without an unacceptable possibility of adverse health effects. MRDLs are enforceable in the same manner as are MCLs. (See Section 611.313 and Section 611.383.)

"Maximum residual disinfectant level goal" or "MRDLG" means the maximum level of a disinfectant added for water treatment at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety. MRDLGs are nonenforceable health goals and do not reflect the benefit of the addition of the chemical for control of waterborne microbial contaminants.

"Maximum total trihalomethane potential" or "MTP" means the maximum concentration of total trihalomethanes (TTHMs) produced in a given water containing a disinfectant residual after seven days at a temperature of 25° C or above.

"Membrane filtration" means a pressure or vacuum driven separation process in which particulate matter larger than one micrometer is rejected by an engineered barrier, primarily through a size exclusion mechanism, and which has a measurable removal efficiency of a target organism that can be verified through the application of a direct integrity test. This definition includes the common membrane technologies of microfiltration, ultrafiltration, nanofiltration, and reverse osmosis.

"MFL" means millions of fibers per liter larger than 10 micrometers.
BOARD NOTE: Derived from 40 CFR 141.23(a)(4)(i) (2016).

"mg" means milligrams (1/1000 of a gram).

"mg/ℓ" means milligrams per liter.

"Mixed system" means a PWS that uses both groundwater and surface water sources.
BOARD NOTE: Derived from 40 CFR 141.23(b)(2) and 141.24(f)(2) note (2016).

"MUG" means 4-methyl-umbelliferyl-beta-d-glucuronide.

"Near the first service connection" means at one of the 20 percent of all service connections in the entire system that are nearest the public water system (PWS) treatment facility, as measured by water transport time within the distribution system.

"nm" means nanometer (1/1,000,000,000 of a meter).

"Non-community water system" or "NCWS" or "non-CWS" means a public water system (PWS) that is not a community water system (CWS). A non-community water system is either a "transient non-community water system (TWS)" or a "non-transient non-community water system (NTNCWS)".

"Non-transient, non-community water system" or "non-transient, non-CWS" or "NTNCWS" means a public water system (PWS) that is not a community water system (CWS) and that regularly serves at least 25 of the same persons over six months per year.

"NPDWR" means "national primary drinking water regulation".

"NTU" means "nephelometric turbidity units".

"Old MCL" means one of the inorganic maximum contaminant levels (MCLs), codified at Section 611.300, or organic MCLs, codified at Section 611.310, including any marked as "additional State requirements".
BOARD NOTE: Old MCLs are those derived prior to the implementation of the USEPA "Phase II" regulations. The Section 611.640 definition of this term, which applies only to Subpart O, differs from this definition in that the definition does not include the Section 611.300 inorganic MCLs.

"P-A Coliform Test" means "Presence-Absence Coliform Test".

"Paired sample" means two samples of water for Total Organic Carbon (TOC). One sample is of raw water taken prior to any treatment. The other sample is taken after the point of combined filter effluent and is representative of the treated water. These samples are taken at the same time. (See Section 611.382.)

"Performance evaluation sample" or "PE sample" means a reference sample provided to a laboratory for the purpose of demonstrating that the laboratory can successfully analyze the sample within limits of performance specified by the

Agency; or, for bacteriological laboratories, Public Health; or, for radiological laboratories, the Illinois Department of Nuclear Safety. The true value of the concentration of the reference material is unknown to the laboratory at the time of the analysis.

"Person" means an individual, corporation, company, association, partnership, state, unit of local government, or federal agency.

"Phase I" refers to that group of chemical contaminants and the accompanying regulations promulgated by USEPA on July 8, 1987, at 52 Fed. Reg. 25712.

"Phase II" refers to that group of chemical contaminants and the accompanying regulations promulgated by USEPA on January 30, 1991, at 56 Fed. Reg. 3578.

"Phase IIB" refers to that group of chemical contaminants and the accompanying regulations promulgated by USEPA on July 1, 1991, at 56 Fed. Reg. 30266.

"Phase V" refers to that group of chemical contaminants promulgated by USEPA on July 17, 1992, at 57 Fed. Reg. 31776.

"Picocurie" or "pCi" means the quantity of radioactive material producing 2.22 nuclear transformations per minute.

"Plant intake" means the works or structures at the head of a conduit through which water is diverted from a source (e.g., a river or lake) into the treatment plant.

"Point of disinfectant application" is the point at which the disinfectant is applied and downstream of which water is not subject to recontamination by surface water runoff.

"Point-of-entry treatment device" or "POE" is a treatment device applied to the drinking water entering a house or building for the purpose of reducing contaminants in the drinking water distributed throughout the house or building.

"Point-of-use treatment device" or "POU" is a treatment device applied to a single tap used for the purpose of reducing contaminants in drinking water at that one tap.

"Presedimentation" means a preliminary treatment process used to remove gravel, sand, and other particulate material from the source water through settling before the water enters the primary clarification and filtration processes in a treatment plant.

"Public Health" or "DPH" means the Illinois Department of Public Health.
BOARD NOTE: See the definition of "Agency" in this Section.

"Public water system" or "PWS" means a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. A PWS is either a community water system (CWS) or a non-community water system (non-CWS). A PWS does not include any facility defined as "special irrigation district". Such term includes the following:

> Any collection, treatment, storage, and distribution facilities under control of the operator of such system and used primarily in connection with such system; and
>
> Any collection or pretreatment storage facilities not under such control that are used primarily in connection with such system.

BOARD NOTE: Where used in Subpart F, "public water supply" means the same as "public water system".

"Radioactive contaminants" refers to that group of contaminants designated "radioactive contaminants" in USEPA regulatory discussions and guidance documents. "Radioactive contaminants" include tritium, strontium-89, strontium-90, iodine-131, cesium-134, gross beta emitters, and other nuclides.
BOARD NOTE: Derived from 40 CFR 141.25(c) Table B (2016). These radioactive contaminants must be reported in Consumer Confidence Reports under Subpart U when they are detected above the levels indicated in Section 611.720(c)(3).

"Reliably and consistently" below a specified level for a contaminant means an Agency determination based on analytical results following the initial detection of a contaminant to determine the qualitative condition of water from an individual sampling point or source. The Agency must base this determination on the consistency of analytical results, the degree below the MCL, the susceptibility of source water to variation, and other vulnerability factors pertinent to the contaminant detected that may influence the quality of water.
BOARD NOTE: Derived from 40 CFR 141.23(b)(9), 141.24(f)(11)(ii), and 141.24(f)(11)(iii) (2016).

"Rem" means the unit of dose equivalent from ionizing radiation to the total body or any internal organ or organ system. A "millirem (mrem)" is 1/1000 of a rem.

"Repeat compliance period" means a compliance period that begins after the initial compliance period.

"Representative" means that a sample must reflect the quality of water that is delivered to consumers under conditions when all sources required to supply water under normal conditions are in use and all treatment is properly operating.

"Residual disinfectant concentration" ("RDC" or "C" in CT calculations) means the concentration of disinfectant measured in mg/ℓ in a representative sample of water. For purposes of the requirement of Section 611.241(d) of maintaining a detectable RDC in the distribution system, "RDC" means a residual of free or combined chlorine.

"Safe Drinking Water Act" or "SDWA" means the Public Health Service Act, as amended by the Safe Drinking Water Act, Pub. L. 93-523, 42 USC 300f et seq.

"Sanitary defect" means a defect that could provide a pathway of entry for microbial contamination into the distribution system or which is indicative of a failure or imminent failure in a barrier to microbial contamination that is already in place.

"Sanitary survey" means an onsite review of the delineated WHPAs (identifying sources of contamination within the WHPAs and evaluations or the hydrogeologic sensitivity of the delineated WHPAs conducted under source water assessments or utilizing other relevant information where available), facilities, equipment, operation, maintenance, and monitoring compliance of a public water system (PWS) to evaluate the adequacy of the system, its sources, and operations for the production and distribution of safe drinking water.
BOARD NOTE: Derived from 40 CFR 141.2 and 40 CFR 142.16(o)(2) (2016).

"Seasonal system" means a non-CWS that is not operated as a PWS on a year-round basis and which starts up and shuts down at the beginning and end of each operating season.

"Sedimentation" means a process for removal of solids before filtration by gravity or separation.

"SEP" means special exception permit <u>issued under 35 Ill. Adm. Code 602.200</u>~~(Section 611.110)~~.

"Service connection", as used in the definition of public water system, does not include a connection to a system that delivers water by a constructed conveyance other than a pipe if any of the following is true:

> The water is used exclusively for purposes other than residential use (consisting of drinking, bathing, and cooking, or other similar uses);

The Agency determines by issuing a SEP that alternative water for residential use or similar uses for drinking and cooking is provided to achieve the equivalent level of public health protection provided by the applicable national primary drinking water regulations; or

The Agency determines by issuing a SEP that the water provided for residential use or similar uses for drinking, cooking, and bathing is centrally treated or treated at the point of entry by the provider, a pass-through entity, or the user to achieve the equivalent level of protection provided by the applicable national primary drinking water regulations.

BOARD NOTE: See sections 1401(4)(B)(i)(II) and (4)(B)(i)(III) of SDWA (42 USC 300f(4)(B)(i)(II) and (4)(B)(i)(III) (2015)).

"Significant deficiency" means a deficiency identified by the Agency in a groundwater system pursuant to Section 611.803. A significant deficiency might include, but is not limited to, a defect in system design, operation, or maintenance or a failure or malfunction of the sources, treatment, storage, or distribution system that the Agency determines to be causing or have potential for causing the introduction of contamination into the water delivered to consumers.
BOARD NOTE: Derived from 40 CFR 142.16(o)(2)(iv) (2016). The Agency must submit to USEPA a definition and description of at least one significant deficiency in each of the eight sanitary survey elements listed in Section 611.801(c) as part of the federal primacy requirements. The Board added the general description of what a significant deficiency might include in non-limiting terms, in order to provide this important definition within the body of the Illinois rules. No Agency submission to USEPA can provide definition within the context of Board regulations.

"Slow sand filtration" means a process involving passage of raw water through a bed of sand at low velocity (generally less than 0.4 meters per hour (m/h)) resulting in substantial particulate removal by physical and biological mechanisms.

"SOC" or "Synthetic organic chemical contaminant" refers to that group of contaminants designated as "SOCs", or "synthetic organic chemicals" or "synthetic organic contaminants", in USEPA regulatory discussions and guidance documents. "SOCs" include alachlor, aldicarb, aldicarb sulfone, aldicarb sulfoxide, atrazine, benzo(a)pyrene, carbofuran, chlordane, dalapon, dibromoethylene (ethylene dibromide or EDB), dibromochloropropane (DBCP), di(2-ethylhexyl)adipate, di(2-ethylhexyl)phthalate, dinoseb, diquat, endothall, endrin, glyphosate, heptachlor, heptachlor epoxide, hexachlorobenzene, hexachlorocyclopentadiene, lindane, methoxychlor, oxamyl, pentachlorophenol, picloram, simazine, toxaphene, poly-chlorinated biphenyls (PCBs), 2,4-D, 2,3,7,8-TCDD, and 2,4,5-TP.

BOARD NOTE: See the Board note appended to Section 611.311 for information relating to implementation of requirements relating to aldicarb, aldicarb sulfone, and aldicarb sulfoxide.

"Source" means a well, reservoir, or other source of raw water.

"Special irrigation district" means an irrigation district in existence prior to May 18, 1994 that provides primarily agricultural service through a piped water system with only incidental residential use or similar use, where the system or the residential users or similar users of the system comply with either of the following exclusion conditions:

The Agency determines by issuing a SEP that alternative water is provided for residential use or similar uses for drinking or cooking to achieve the equivalent level of public health protection provided by the applicable national primary drinking water regulations; or

The Agency determines by issuing a SEP that the water provided for residential use or similar uses for drinking, cooking, and bathing is centrally treated or treated at the point of entry by the provider, a pass-through entity, or the user to achieve the equivalent level of protection provided by the applicable national primary drinking water regulations.

BOARD NOTE: Derived from 40 CFR 141.2 (2016) and sections 1401(4)(B)(i)(II) and (4)(B)(i)(III) of SDWA (42 USC 300f(4)(B)(i)(II) and (4)(B)(i)(III) (2015)).

"Standard monitoring" means the monitoring, performed by the supplier pursuant to Section 611.921(a) and (b), at various specified locations in a distribution system including near entry points, at points that represent the average residence time in the distribution system, and at points in the distribution system that are representative of high TTHM and HAA5 concentrations throughout the distribution system.

BOARD NOTE: Derived from 40 CFR 141.601(a) and (b) (2016).

"Standard sample" means the aliquot of finished drinking water that is examined for the presence of coliform bacteria.

"Subpart B system" means a public water system that uses surface water or groundwater under the direct influence of surface water as a source and which is subject to the requirements of Subpart B and the analytical and monitoring requirements of Sections 611.531, 611.532, 611.533, Appendix B, and Appendix C.

"Subpart I compliance monitoring" means monitoring required to demonstrate compliance with disinfectant residuals, disinfection byproducts, and disinfection byproduct precursors requirements of Subpart I.

"Subpart I system" means a public water system that uses surface water or groundwater as a source and which is subject to the disinfectant residuals, disinfection byproducts, and disinfection byproduct precursors requirements of Subpart I.

"Subpart Y compliance monitoring" means monitoring required to demonstrate compliance with Stage 2 disinfection byproducts requirements of Subpart Y.

"Supplier of water" or "supplier" means any person who owns or operates a public water system (PWS). This term includes the "official custodian".

"Surface water" means all water that is open to the atmosphere and subject to surface runoff.

"SUVA" means specific ultraviolet absorption at 254 nanometers (nm), which is an indicator of the humic content of water. It is a calculated parameter obtained by dividing a sample's ultraviolet absorption at a wavelength of 254 nm (UV_{254}) (in m^{-1}) by its concentration of dissolved organic carbon (in mg/ℓ).

"SWS" means "surface water system", a public water supply (PWS) that uses only surface water sources, including "groundwater under the direct influence of surface water".
BOARD NOTE: Derived from 40 CFR 141.23(b)(2) and 141.24(f)(2) note (2016).

"System-specific study plan" means the plan, submitted by the supplier to the Agency pursuant to Section 611.922, for studying the occurrence of TTHM and HAA5 in a supplier's distribution system based on either monitoring results or modelling of the system.
BOARD NOTE: Derived from 40 CFR 141.602 (2016).

"System with a single service connection" means a system that supplies drinking water to consumers via a single service line.

"Too numerous to count" means that the total number of bacterial colonies exceeds 200 on a 47-mm diameter membrane filter used for coliform detection.

"Total organic carbon" or "TOC" means total organic carbon (in mg/ℓ) measured using heat, oxygen, ultraviolet irradiation, chemical oxidants, or combinations of these oxidants that convert organic carbon to carbon dioxide, rounded to two significant figures.

"Total trihalomethanes" or "TTHM" means the sum of the concentration of trihalomethanes (THMs), in milligrams per liter (mg/ℓ), rounded to two significant figures.

BOARD NOTE: See the definition of "trihalomethanes" for a listing of the four compounds that USEPA considers TTHMs to comprise.

"Transient, non-community water system" or "transient non-CWS" means a non-CWS that does not regularly serve at least 25 of the same persons over six months of the year.
BOARD NOTE: The federal regulations apply to all "public water systems", which are defined as all systems that have at least 15 service connections or which regularly serve water to at least 25 persons. (See 42 USC 300f(4).) The Act mandates that the Board and the Agency regulate "public water supplies", which it defines as having at least 15 service connections or regularly serving 25 persons daily at least 60 days per year. (See Section 3.365 of the Act.) The Department of Public Health regulates transient, non-community water systems.

"Treatment" means any process that changes the physical, chemical, microbiological, or radiological properties of water, is under the control of the supplier, and is not a point-of-use treatment device or a point-of-entry treatment device as defined in this Section. Treatment includes, but is not limited to, aeration, coagulation, sedimentation, filtration, activated carbon treatment, disinfection, and fluoridation.

"Trihalomethane" or "THM" means one of the family of organic compounds, named as derivatives of methane, in which three of the four hydrogen atoms in methane are each substituted by a halogen atom in the molecular structure. The THMs are the following compounds:

Trichloromethane (chloroform),

Dibromochloromethane,

Bromodichloromethane, and

Tribromomethane (bromoform)

"Two-stage lime softening" means a process in which chemical addition and hardness precipitation occur in each of two distinct unit clarification processes in series prior to filtration.

"µg" means micrograms (1/1,000,000 of a gram).

"USEPA" means the U.S. Environmental Protection Agency.

"Uncovered finished water storage facility" is a tank, reservoir, or other facility that is used to store water which will undergo no further treatment to reduce

microbial pathogens except residual disinfection and which is directly open to the atmosphere.

"Very small system waiver" means the conditional waiver from the requirements of Subpart W applicable to a supplier that serves fewer than 500 persons and which has taken TTHM and HAA5 samples pursuant to Subpart I.
BOARD NOTE: Derived from 40 CFR 141.604 (2016).

"Virus" means a virus of fecal origin that is infectious to humans by waterborne transmission.

"VOC" or "volatile organic chemical contaminant" refers to that group of contaminants designated as "VOCs", "volatile organic chemicals", or "volatile organic contaminants", in USEPA regulatory discussions and guidance documents. "VOCs" include benzene, dichloromethane, tetrachloromethane (carbon tetrachloride), trichloroethylene, vinyl chloride, 1,1,1-trichloroethane (methyl chloroform), 1,1-dichloroethylene, 1,2-dichloroethane, cis-1,2-dichloroethylene, ethylbenzene, monochlorobenzene, o-dichlorobenzene, styrene, 1,2,4-trichlorobenzene, 1,1,2-trichloroethane, tetrachloroethylene, toluene, trans-1,2-dichloroethylene, xylene, and 1,2-dichloropropane.

"Waterborne disease outbreak" means the significant occurrence of acute infectious illness, epidemiologically associated with the ingestion of water from a public water system (PWS) that is deficient in treatment, as determined by the appropriate local or State agency.

"Wellhead protection area" or "WHPA" means the surface and subsurface recharge area surrounding a community water supply well or well field, delineated outside of any applicable setback zones (pursuant to Section 17.1 of the Act) pursuant to Illinois' Wellhead Protection Program, through which contaminants are reasonably likely to move toward such well or well field.
BOARD NOTE: The Agency uses two guidance documents for identification of WHPAs:

> "Guidance Document for Groundwater Protection Needs Assessments", Illinois Environmental Protection Agency, Illinois State Water Survey, and Illinois State Geologic Survey joint report, January 1995; and
>
> "The Illinois Wellhead Protection Program Pursuant to Section 1428 of the Federal Safe Drinking Water Act", Illinois Environmental Protection Agency, No. 22480, October 1992.

"Wellhead protection program" means the wellhead protection program for the State of Illinois, approved by USEPA under section 1428 of the SDWA, 42 USC 300h-7.

BOARD NOTE: Derived from 40 CFR 141.71(b) (2013). The wellhead protection program includes the "groundwater protection needs assessment" under Section 17.1 of the Act and 35 Ill. Adm. Code 615-617.

"Wholesale system" means a public water system that treats source water as necessary to produce finished water, which then delivers some or all of that finished water to another public water system. Delivery by a wholesale system may be through a direct connection or through the distribution system of one or more consecutive systems.

BOARD NOTE: Derived from 40 CFR 141.2 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.107 Agency Inspection of PWS Facilities <u>(Repealed)</u>

~~a)~~ ~~THE AGENCY SHALL HAVE AUTHORITY TO CONDUCT A PROGRAM OF CONTINUING SURVEILLANCE AND OF REGULAR OR PERIODIC INSPECTION OF PUBLIC WATER SUPPLIES. (Section 4(c) of the Act [415 ILCS 5/4(c)].)~~

~~b)~~ ~~IN ACCORDANCE WITH CONSTITUTIONAL LIMITATIONS, THE AGENCY SHALL HAVE AUTHORITY TO ENTER AT ALL REASONABLE TIMES UPON ANY PRIVATE OR PUBLIC PROPERTY FOR THE PURPOSE OF INSPECTING AND INVESTIGATING TO ASCERTAIN POSSIBLE VIOLATIONS OF THE ACT OR OF REGULATIONS THEREUNDER, OR OF PERMITS OR CONDITIONS THEREOF. (Section 4(d) of the Act [415 ILCS 5/4(d)].)~~

~~BOARD NOTE: In setting forth this provision to make clear the Agency's statutory authority to conduct inspections, the Board does not intend to either broaden or circumscribe that authority or to modify it in any way. Rather, the Board sets this provision forth to make that authority clear for the benefit of the regulated community.~~

(Source: Repealed at 42 Ill. Reg. _____, effective _____)

Section 611.110 Special Exception Permits

~~a)~~ ~~Unless otherwise specified, each Agency determination in this Part is to be made by way of a written permit pursuant to Section 39(a) of the Act. Such permit is titled a "special exception" permit ("SEP").~~

~~b)~~ ~~No person may cause or allow the violation of any condition of a SEP.~~

~~c) The supplier may appeal the denial of or the conditions of a SEP to the Board pursuant to Section 40 of the Act.~~

~~d) A SEP may be initiated in either of the following ways:~~

~~1) By an application filed by the supplier; or~~

~~2) By the Agency, when authorized by Board regulations.~~

~~BOARD NOTE: The Board does not intend to mandate by any provision of this Part that the Agency exercise its discretion and initiate a SEP pursuant to this subsection (d)(2). Rather, the Board intends to clarify by this subsection (d)(2) that the Agency may opt to initiate a SEP without receiving a request from the supplier.~~

a)~~e)~~ The Agency must evaluate a request for a SEP from the monitoring requirements of Section 611.601, 611.602, or 611.603 (IOCs, excluding the Section 611.603 monitoring frequency requirements for cyanide); Section 611.646(e) and (f) (Phase I, Phase II, and Phase V VOCs); Section 611.646(d), only as to initial monitoring for 1,2,4-trichlorobenzene; or Section 611.648(d) (for Phase II, Phase IIB, and Phase V SOCs) on the basis of knowledge of previous use (including transport, storage, or disposal) of the contaminant in the watershed or zone of influence of the system, as determined underpursuant to 35 Ill. Adm. Code 671.

BOARD NOTE: The Agency must grant a SEP from the Section 611.603 monitoring frequency requirements for cyanide only on the basis of subsection (cg), not on the basis of this subsection (ae).

1) If the Agency determines that there was no prior use of the contaminant, it must grant the SEP; or

2) If the contaminant was previously used or the previous use was unknown, the Agency must consider the following factors:

A) Previous analytical results;

B) The proximity of the system to any possible point source of contamination (including spills or leaks at or near a water treatment facility; at manufacturing, distribution, or storage facilities; from hazardous and municipal waste land fills; or from waste handling or treatment facilities) or non-point source of contamination (including the use of pesticides and other land application uses of the contaminant);

C) The environmental persistence and transport of the contaminant;

D) How well the water source is protected against contamination, including whether it is a SWS or a GWS.

i) A GWS must consider well depth, soil type, well casing integrity, and wellhead protection; and

ii) A SWS must consider watershed protection;

E) For Phase II, Phase IIB, and Phase V SOCs, as follows:

i) Elevated nitrate levels at the water source; and

ii) The use of PCBs in equipment used in the production, storage, or distribution of water (including pumps, transformers, etc.); and

F) For Phase I, Phase II, and Phase V VOCs (underpursuant to Section 611.646): the number of persons served by the PWS and the proximity of a smaller system to a larger one.

b)f) If a supplier refuses to provide any necessary additional information requested by the Agency, or if a supplier delivers any necessary information late in the Agency's deliberations on a request, the Agency may deny the requested SEP or grant the SEP with conditions within the time allowed by law.

c)g) The Agency must grant a supplier a SEP that allows it to discontinue monitoring for cyanide if it determines that the supplier's water is not vulnerable due to a lack of any industrial source of cyanide.

BOARD NOTE: Subsection (ae) is derived from 40 CFR 141.24(f)(8) and (h)(6) (2016). Subsection (bf) is derived from 40 CFR 141.82(d)(2), and 141.83(b)(2) (2016). Subsection (cg) is derived from 40 CFR 141.23(c)(2) (2016). USEPA has reserved the discretion, at 40 CFR 142.18 (2016), to review and nullify Agency determinations of the types made underpursuant to Sections 611.602, 611.603, 611.646, and 611.648 and the discretion, at 40 CFR 141.82(i), 141.83(b)(7), and 142.19 (2016), to establish federal standards for any supplier, superseding any Agency determination made underpursuant to Sections 611.352(d), 611.352(f), 611.353(b)(2), and 611.353(b)(4).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.115 Source Water Quantity (Repealed)

~~a)~~ ~~Surface Supply. The quantity of surface water at the source must be adequate to supply the total water demand of that CWS, as well as a reasonable surplus for anticipated growth.~~

~~b)~~ ~~Groundwater supply. The quantity of groundwater from the source of supply must be adequate to supply the total water demand of that CWS, as well as a reasonable surplus for anticipated growth, without excessive depletion of the aquifer.~~

~~c)~~ ~~In determining the adequacy of supply for compliance with this Section, each individual CWS must be considered in relation to the percentage of the total requirements it is expected to provide.~~

~~BOARD NOTE: This is an additional State requirement.~~

(Source: Repealed at 42 Ill. Reg. _____, effective _____)

Section 611.121 Maximum Contaminant Levels ~~and Finished Water Quality~~

a) Maximum Contaminant Levels: No person may cause or allow water that is delivered to any user to exceed the MCL for any contaminant.

~~b)~~ ~~Finished Water Quality.~~

~~1)~~ ~~The finished water delivered to any user at any point in the distribution system must contain no impurity at a concentration that may be hazardous to the health of the consumer or that would be excessively corrosive or otherwise deleterious to the water supply. Drinking water delivered to any user at any point in the distribution system must contain no impurity that could reasonably be expected to cause offense to the sense of sight, taste, or smell.~~

~~2)~~ ~~No substance used in treatment should remain in the water at a concentration greater than that required by good practice. A substance that may have a deleterious physiological effect, or one for which physiological effects are not known, must not be used in a manner that would permit it to reach the consumer.~~

b)~~c)~~ An MCL for a particular contaminant applies in lieu of any finished water quality narrative standard.

BOARD NOTE: Derived from the definition of "MCL" in 40 CFR 141.2 (2002) and former 35 Ill. Adm. Code 604.201, repealed in R88-26, at 14 Ill. Reg. 16435, effective September 20, 1990.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.161 Case-by-Case Reduced Subpart Y Monitoring for Wholesale and Consecutive Systems

The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, reduce the monitoring requirements of Subpart Y ~~of this Part~~ as they apply to a wholesale system or a consecutive system, otherwise than by use of the provisions of Section 611.500 subject to the following limitations:

a) The Agency must consider the following system-specific knowledge in making its determination:

1) The amount and percentage of finished water provided;

2) Whether finished water is provided seasonally, intermittently, or full-time;

3) Improved DBP occurrence information based on IDSE results;

4) Significant changes in the supplier's raw water quality, treatment, or distribution system after completion of the IDSE; and

5) Such other considerations as would bear on the occurrence of DBP in the distribution system and the ability of the reduced monitoring to detect DBP in the supplier's distribution system.

b) Any reduced monitoring allowed <u>under</u>~~pursuant to~~ this Section must require a minimum of one compliance monitoring location for each supplier.

c) The supplier must report any changes in its raw water quality, treatment, or distribution system or any other factors that come to its attention after the issuance of a SEP that allows reduced monitoring <u>under</u>~~pursuant to~~ this Section that would bear on the occurrence of DBP in the distribution system and the ability of the reduced monitoring to detect DBP in the supplier's distribution system.

d) The Agency may allow the reduced monitoring provided by this Section only after USEPA has approved the State program revisions involving Subparts W and Y ~~of this Part~~.

BOARD NOTE: Derived from 40 CFR 142.16(m) and the preamble discussion at 71 Fed. Reg. 388, 430-31 (Jan. 4, 2006). USEPA stated that it will allow the State to elect to authorize reduced monitoring according to a procedure devised by the State. The Board borrowed from the special primacy requirements applicable to the Subpart Y provisions and the accompanying preamble discussion to derive the procedure set forth in this Section.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART B: FILTRATION AND DISINFECTION

Section 611.202 Procedures for Agency Determinations

The determinations in this Subpart B are by a SEP ~~issued pursuant to Section 611.110~~.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.231 Source Water Quality Conditions

The Agency must consider the following source water quality conditions in determining whether to require filtration <u>under</u>~~pursuant to~~ Section 611.211:

a) The fecal coliform concentration must be equal to or less than 20/100 ml, or the total coliform concentration must be equal to or less than 100/100 ml (measured as specified in Section 611.531(a) or (b) and 611.532(a)) in representative samples of the source water immediately prior to the first or only point of disinfectant application in at least 90 percent of the measurements made for the 6 previous months that the system served water to the public on an ongoing basis. If a system measures both fecal and total coliforms, the fecal coliform criterion, but not the total coliform criterion, in this subsection, must be met.

b) The turbidity level cannot exceed 5 NTU (measured as specified in Section 611.531(a) and 611.532(b) in representative samples of the source water immediately prior to the first or only point of disinfectant application unless the following are true:

1) The Agency determines that any such event was caused by circumstances that were unusual and unpredictable; and

2) As a result of any such event there have not been more than two events in the past 12 months the system served water to the public, or more than five events in the past 120 months the system served water to the public, in which the turbidity level exceeded 5 NTU. An "event" is a series of consecutive days during which at least one turbidity measurement each day exceeds 5 NTU.

BOARD NOTE: Derived from 40 CFR 141.71(a) (2003).

~~e)~~ ~~Each CWS must take its raw water from the best available source that is economically reasonable and technically possible.~~

~~BOARD NOTE: This is an additional State requirement.~~

c)~~d)~~ Use of recycled sewage treatment plant effluent by a CWS on a routine basis must not be permitted.

BOARD NOTE: This is an additional State requirement.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.240 Disinfection

a) A supplier that uses a surface water source and does not provide filtration treatment must provide the disinfection treatment specified in Section 611.241.

b) A supplier that uses a groundwater source under the influence of surface water and does not provide filtration treatment must provide disinfection treatment specified in Section 611.241 beginning 18 months after the Agency determines that the groundwater source is under the influence of surface water, unless the Agency has determined that filtration is required.

c) If the Agency determines that filtration is required, the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, require the supplier to comply with interim disinfection requirements before filtration is installed.

d) A system that uses a surface water source that provides filtration treatment must provide the disinfection treatment specified in Section 611.242 when filtration is installed.

e) A system that uses a groundwater source under the direct influence of surface water and provides filtration treatment must have provided disinfection treatment as specified in Section 611.242 beginning when filtration is installed.

f) Failure to meet any requirement of the following Sections after the applicable date specified in this Section is a treatment technique violation.

BOARD NOTE: Derived from 40 CFR 141.72 preamble (2016).

~~g)~~ ~~CWS suppliers using groundwater that is not under the direct influence of surface water must chlorinate the water before it enters the distribution system, unless the~~

~~Agency has granted the supplier an exemption pursuant to Section 17(b) of the Act.~~

~~1)~~ ~~All GWS supplies that are required to chlorinate pursuant to this Section must maintain residuals of free or combined chlorine at levels sufficient to provide adequate protection of human health and the ability of the distribution system to continue to deliver potable water that complies with the requirements of this Part.~~

~~2)~~ ~~The Agency may establish procedures and levels for chlorination applicable to a GWS using groundwater that is not under the direct influence of surface water by a SEP pursuant to Section 610.110.~~

~~3)~~ ~~Those supplies having hand-pumped wells and no distribution system are exempted from the requirements of this Section.~~

~~BOARD NOTE: This is an additional State requirement originally codified at 35 Ill. Adm. Code 604.401.~~

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.241 Unfiltered PWSs

Each supplier that does not provide filtration treatment must provide disinfection treatment as follows:

a) The disinfection treatment must be sufficient to ensure at least 99.9 percent (3-log) inactivation of Giardia lamblia cysts and 99.99 percent (4-log) inactivation of viruses, every day the system serves water to the public, except any one day each month. Each day a system serves water to the public, the supplier must calculate the $CT_{99.9}$ value from the system's treatment parameters using the procedure specified in Section 611.532(c) and determine whether this value is sufficient to achieve the specified inactivation rates for Giardia lamblia cysts and viruses.

1) If a system uses a disinfectant other than chlorine, the system may demonstrate to the Agency, through the use of an Agency-approved protocol for on-site disinfection challenge studies or other information, that $CT_{99.9}$ values other than those specified in Appendix B ~~of this Part~~, Tables 2.1 and 3.1 or other operational parameters are adequate to demonstrate that the system is achieving minimum inactivation rates required by this subsection.

2) The demonstration must be made by way of a SEP application ~~pursuant to Section 611.110~~.

b) The disinfection system must have either of the following:

1) Redundant components, including an auxiliary power supply with automatic start-up and alarm to ensure that disinfectant application is maintained continuously while water is being delivered to the distribution system; or

2) Automatic shut-off of delivery of water to the distribution system whenever there is less than 0.2 mg/ℓ of RDC in the water. If the Agency determines, by a SEP ~~issued pursuant to Section 611.110~~, that automatic shut-off would cause unreasonable risk to health or interfere with fire protection, the system must comply with subsection (b)(1).

c) The RDC in the water entering the distribution system, measured as specified in Sections 611.531(b) and 611.532(e), cannot be less than 0.2 mg/ℓ for more than 4 hours.

d) RDC in the distribution system.

1) The RDC in the distribution system, measured as total chlorine, combined chlorine or chlorine dioxide, as specified in Sections 611.531(b) and 611.532(f), cannot be undetectable in more than 5 percent of the samples each month for any two consecutive months that the system serves water to the public. Water in the distribution system with HPC less than or equal to 500/ml, measured as specified in Section 611.531(a), is deemed to have a detectable RDC for purposes of determining compliance with this requirement. Thus, the value "V" in the following formula cannot exceed 5 percent in one month, for any two consecutive months.

$$V = \frac{100(c + d + e)}{(a + b)}$$

where the terms mean the following:

a = Number of instances where the RDC is measured;

b = Number of instances where the RDC is not measured, but HPC is measured;

c = Number of instances where the RDC is measured but not detected and no HPC is measured;

d = Number of instances where the RDC is measured but not detected, and where the HPC is greater than 500/ml; and

e = Number of instances where the RDC is not measured and HPC is greater than 500/ml.

2) Subsection (d)(1) does not apply if the Agency determines, under~~pursuant to~~ Section 611.213, that a supplier has no means for having a sample analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified by Section 611.531(a) and that the supplier is providing adequate disinfection in the distribution system.

BOARD NOTE: Derived from 40 CFR 141.72(a) (2003).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.250 Filtration

A supplier that uses a surface water source or a groundwater source under the direct influence of surface water, and does not meet all of the criteria in Sections 611.231 and 611.232 for avoiding filtration, must provide treatment consisting of both disinfection, as specified in Section 611.242, and filtration treatment that complies with the requirements of subsection (a), (b), (c), (d), or (e) within 18 months after the failure to meet any one of the criteria for avoiding filtration in Sections 611.231 and 611.232. Failure to meet any requirement after the date specified in this introductory paragraph is a treatment technique violation.

a) Conventional filtration treatment or direct filtration.

1) For a system using conventional filtration or direct filtration, the turbidity level of representative samples of the system's filtered water must be less than or equal to 0.5 NTU in at least 95 percent of the measurements taken each month, measured as specified in Section 611.531(a) and 611.533(a), except that if the Agency determines, by a SEP ~~issued pursuant to Section 611.110~~, that the system is capable of achieving at least 99.9 percent removal or inactivation of Giardia lamblia cysts at some turbidity level higher than 0.5 NTU in at least 95 percent of the measurements taken each month, the Agency must substitute this higher turbidity limit for that system. However, in no case may the Agency approve a turbidity limit that allows more than 1 NTU in more than five percent of the samples taken each month, measured as specified in Section 611.531(a) and 611.533(a).

2) The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU.

3) A supplier serving at least 10,000 or more persons must meet the turbidity requirements of Section 611.743(a).

4) A supplier that serves fewer than 10,000 people must meet the turbidity requirements in Section 611.955.

b) Slow sand filtration.

1) For a system using slow sand filtration, the turbidity level of representative samples of the system's filtered water must be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month, measured as specified in Section 611.531(a) and 611.533(a), except that if the Agency determines, by a SEP ~~issued pursuant to Section 611.110~~, that there is no significant interference with disinfection at a higher level, the Agency must substitute the higher turbidity limit for that system.

2) The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in Section 611.531(a) and 611.533(a).

c) Diatomaceous earth filtration.

1) For a system using diatomaceous earth filtration, the turbidity level of representative samples of the system's filtered water must be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month, measured as specified in Section 611.531(a) and 611.533(a).

2) The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in Section 611.531(a) and 611.533(a).

d) Other filtration technologies. A supplier may use a filtration technology not listed in subsections (a) through (c) if it demonstrates, by a SEP application ~~pursuant to Section 611.110~~, to the Agency, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of Section 611.242, consistently achieves 99.9 percent removal or inactivation of Giardia lamblia cysts and 99.99 percent removal or inactivation of viruses. For a supplier that makes this demonstration, the requirements of subsection (b) apply. A supplier serving 10,000 or more persons must meet the requirements for other filtration technologies in Section 611.743(b). A supplier that serves fewer than 10,000 people must meet the requirements for other filtration technologies in Section 611.955.

BOARD NOTE: Derived from 40 CFR 141.73 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.261 Unfiltered PWSs: Reporting and Recordkeeping

A supplier that uses a surface water source and does not provide filtration treatment must report monthly to the Agency the information specified in this Section unless the Agency has determined that filtration is required, in which case the Agency must, by a SEP ~~issued pursuant to Section 611.110~~, specify alternative reporting requirements, as appropriate, until filtration is in place. A supplier that uses a groundwater source under the direct influence of surface water and does not provide filtration treatment must report monthly to the Agency the information specified in this Section six months after the Agency determines that the groundwater source is under the direct influence of surface water, unless the Agency has determined that filtration is required, in which case the Agency must, by a SEP ~~issued pursuant to Section 611.110~~, specify alternative reporting requirements, as appropriate, until filtration is in place.

a) Source water quality information must be reported to the Agency within ten days after the end of each month the system serves water to the public. Information that must be reported includes the following:

1) The cumulative number of months for which results are reported.

2) The number of fecal or total coliform samples, whichever are analyzed during the month (if a system monitors for both, only fecal coliforms must be reported), the dates of sample collection, and the dates when the turbidity level exceeded 1 NTU.

3) The number of samples during the month that had equal to or fewer than 20/100 ml fecal coliforms or equal to or fewer than 100/100 ml total coliforms, whichever are analyzed.

4) The cumulative number of fecal or total coliform samples, whichever are analyzed, during the previous six months the system served water to the public.

5) The cumulative number of samples that had equal to or fewer than 20/100 ml fecal coliforms or equal to or fewer than 100/100 ml total coliforms, whichever are analyzed, during the previous six months the system served water to the public.

6) The percentage of samples that had equal to or fewer than 20/100 ml fecal coliforms or equal to or fewer than 100/100 ml total coliforms, whichever are analyzed, during the previous six months the system served water to the public.

7) The maximum turbidity level measured during the month, the dates of occurrence for any measurements that exceeded 5 NTU and the dates the occurrences were reported to the Agency.

8) For the first 12 months of recordkeeping, the dates and cumulative number of events during which the turbidity exceeded 5 NTU, and after one year of recordkeeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded 5 NTU in the previous 12 months the system served water to the public.

9) For the first 120 months of recordkeeping, the dates and cumulative number of events during which the turbidity exceeded 5 NTU, and after ten years of recordkeeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded 5 NTU in the previous 120 months the system served water to the public.

b) Disinfection information specified in Section 611.532 must be reported to the Agency within ten days after the end of each month the system serves water to the public. Information that must be reported includes the following:

1) For each day, the lowest measurement of RDC in mg/ℓ in water entering the distribution system.

2) The date and duration of each period when the RDC in water entering the distribution system fell below 0.2 mg/ℓ and when the Agency was notified of the occurrence.

3) The daily RDCs (in mg/ℓ) and disinfectant contact times (in minutes) used for calculating the CT values.

4) If chlorine is used, the daily measurements of pH of disinfected water following each point of chlorine disinfection.

5) The daily measurements of water temperature in degrees C following each point of disinfection.

6) The daily CTcalc and Ai values for each disinfectant measurement or sequence and the sum of all Ai values (B) before or at the first customer.

7) The daily determination of whether disinfection achieves adequate Giardia cyst and virus inactivation, i.e., whether Ai is at least 1.0 or, where disinfectants other than chlorine are used, other indicator conditions that the Agency, under~~pursuant to~~ Section 611.241(a)(1), determines are appropriate, are met.

8) The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to Section 611.240 through 611.242:

A) Number of instances where the RDC is measured;

B) Number of instances where the RDC is not measured but HPC is measured;

C) Number of instances where the RDC is measured but not detected and no HPC is measured;

D) Number of instances where no RDC is detected and where HPC is greater than 500/ml;

E) Number of instances where the RDC is not measured and HPC is greater than 500/ml;

F) For the current and previous month the system served water to the public, the value of "V" in the following formula:

$$V = \frac{100(c + d + e)}{(a + b)}$$

where the terms mean the following:

a = Value in subsection (b)(8)(A);
b = Value in subsection (b)(8)(B);
c = Value in subsection (b)(8)(C);
d = Value in subsection (b)(8)(D); and
e = Value in subsection (b)(8)(E).

G) The requirements of subsections (b)(8)(A) through (b)(8)(F) do not apply if the Agency determines, under~~pursuant to~~ Section 611.213, that a system has no means for having a sample analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified by Section 611.531(a) and that the supplier is providing adequate disinfection in the distribution system.

9) A system need not report the data listed in subsections (b)(1) and (b)(3) through (b)(6), if all data listed in subsections (b)(1) through (b)(8) remain on file at the system, and the Agency determines, by a SEP ~~issued pursuant to Section 611.110~~, that the following is true:

A) The system has submitted to the Agency all the information required by subsections (b)(1) through (b)(8) for at least 12 months; and

B) The Agency has determined that the system is not required to provide filtration treatment.

c) By October 10 of each year, each system must provide to the Agency a report that summarizes its compliance with all watershed control program requirements specified in Section 611.232(b).

d) By October 10 of each year, each system must provide to the Agency a report on the on-site inspection conducted during that year under~~pursuant to~~ Section 611.232(c), unless the on-site inspection was conducted by the Agency. If the inspection was conducted by the Agency, the Agency must provide a copy of its report to the supplier.

e) Reporting health threats.

1) Each system, upon discovering that a waterborne disease outbreak potentially attributable to that water system has occurred, must report that occurrence to the Agency as soon as possible, but no later than by the end of the next business day.

2) If at any time the turbidity exceeds 5 NTU, the system must consult with the Agency as soon as practical, but no later than 24 hours after the exceedance is known, in accordance with the public notification requirements under Section 611.903(b)(3).

3) If at any time the RDC falls below 0.2 mg/ℓ in the water entering the distribution system, the system must notify the Agency as soon as possible, but no later than by the end of the next business day. The system also must notify the Agency by the end of the next business day whether or not the RDC was restored to at least 0.2 mg/ℓ within four hours.

BOARD NOTE: Derived from 40 CFR 141.75(a) (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.271 Protection during Repair Work (Repealed)

~~The supplier must prevent contamination of water at the source or in the CWS during repair, reconstruction, or alteration.~~

~~BOARD NOTE: This is an additional State requirement.~~

(Source: Repealed at 42 Ill. Reg. _____, effective _____)

Section 611.272 Disinfection Following Repair (Repealed)

~~a)~~ ~~After any portion of the CWS has been repaired, reconstructed, or altered, the supplier must disinfect that portion before putting it into operation.~~

~~b)~~ ~~The disinfection procedure must be approved by a SEP issued pursuant to Section 611.110.~~

~~BOARD NOTE: This is an additional State requirement.~~

(Source: Repealed at 42 Ill. Reg. _____, effective _____)

Section 611.280 Point-of-Entry Devices

a) Suppliers may use point-of-entry devices to comply with MCLs only if they meet the requirements of this Section.

b) It is the responsibility of the supplier to operate and maintain the point-of entry treatment system.

c) The supplier must develop a monitoring plan before point-of-entry devices are installed for compliance.

1) Point-of-entry devices must provide health protection equivalent to central water treatment. "Equivalent" means that the water would meet all NPDWR and would be of acceptable quality similar to water distributed by a well-operated central treatment plant.

2) In addition to the VOCs, monitoring must include physical measurements and observations such as total flow treated and mechanical condition of the treatment equipment.

3) Use of point-of-entry devices must be approved by a SEP granted by the Agency ~~pursuant to Section 611.110~~.

d) Effective technology must be properly applied under a plan approved by the Agency and the microbiological safety of the water must be maintained.

1) The Agency must require adequate certification of performance, field testing, and, if not included in the certification process, a rigorous engineering design review of the point-of-entry devices.

2) The design and application of the point-of-entry devices must consider the tendency for increase in heterotrophic bacteria concentrations in water treated with activated carbon. The Agency may require, by a SEP ~~issued pursuant to Section 611.110~~, frequent backwashing, post-contactor disinfection and HPC monitoring to ensure that the microbiological safety of the water is not compromised.

e) All consumers must be protected. Every building connected to the system must have a point-of-entry device installed, maintained and adequately monitored. The Agency must be assured that every building is subject to treatment and monitoring, and that the rights and responsibilities of the PWS customer convey with title upon sale of property.

f) Use of any point-of-entry device must not cause increased corrosion of lead and copper bearing materials located between the device and the tap that could increase contaminant levels at the tap.

BOARD NOTE: Derived from 40 CFR 141.100 and 142.62(h)(7) (2002).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.290 Use of Point-of-Use Devices or Bottled Water

a) Suppliers must not use bottled water to achieve compliance with an MCL.

b) Bottled water or point-of-use devices may be used on a temporary basis to avoid an unreasonable risk to health pursuant to a SEP granted by the Agency ~~under Section 611.110~~.

c) Any use of bottled water must comply with the substantive requirements of Section 611.130(d), except that the supplier must submit its quality control plan for Agency review as part of its SEP request, rather than for Board review.

BOARD NOTE: Derived from 40 CFR 141.101 (2003).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.297 Corrosion Control <u>(Repealed)</u>

~~A supplier may be required to install and maintain optimal corrosion control pursuant to Section 611.352.~~

(Source: Repealed at 42 Ill. Reg. _____, effective _____)

SUBPART F: MAXIMUM CONTAMINANT LEVELS (MCLs) AND MAXIMUM RESIDUAL DISINFECTANT LEVELS (MRDLs)

Section 611.300 Old MCLs for Inorganic Chemical Contaminants

a) The old MCLs listed in subsection (b) for inorganic chemical contaminants (IOCs) apply only to CWS suppliers. Compliance with old MCLs for inorganic chemicals is calculated under~~pursuant to~~ Section 611.612.
BOARD NOTE: Formerly derived from 40 CFR 141.11(a), this subsection (a) has become an additional State requirement.

b) The following are the old MCLs for IOCs:

Contaminant	Level, mg/ℓ	Additional State Requirement (*)
Iron	1.0	*
Manganese	0.15	*
Zinc	5.	*

BOARD NOTE: Formerly derived from 40 CFR 141.11(b), this subsection (b) has become an additional State requirement.

c) This subsection corresponds with 40 CFR 141.11(c), marked as reserved by USEPA. This statement maintains structural parity with the federal rules.

d) Nitrate.

Non-CWSs may exceed the MCL for nitrate under the following circumstances:

1) The nitrate level must not exceed 20 mg/ℓ,

2) The water must not be available to children under six months of age,

3) The NCWS supplier is meeting the public notification requirements under Section 611.909, including continuous posting of the fact that the nitrate level exceeds 10 mg/ℓ together with the potential health effects of exposure,

4) The supplier will annually notify local public health authorities and the Department of Public Health of the nitrate levels that exceed 10 mg/ℓ; and

5) No adverse public health effects result.

BOARD NOTE: Derived from 40 CFR 141.11(d) (2012). The Department of Public Health regulations may impose a nitrate limitation requirement. Those regulations are at 77 Ill. Adm. Code 900.50.

e) The following supplementary condition applies to the MCLs listed in subsection (b) for iron and manganese:

1) CWS suppliers that serve a population of 1000 or fewer, or 300 service connections or fewer, are exempt from the standards for iron and manganese.

2) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, allow iron and manganese in excess of the MCL if sequestration tried on an experimental basis proves to be effective. If sequestration is not effective, positive iron or manganese reduction treatment as applicable must be provided. Experimental use of a sequestering agent may be tried only if approved by a SEP ~~issued pursuant to Section 611.110~~.

BOARD NOTE: This subsection (e) is an additional State requirement.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART G: LEAD AND COPPER

Section 611.350 General Requirements

a) Applicability and Scope.

1) Applicability. The requirements of this Subpart G constitute national primary drinking water regulations for lead and copper. This Subpart G applies to all community water systems (CWSs) and non-transient, non-community water systems (NTNCWSs).

2) Scope. This Subpart G establishes a treatment technique that includes requirements for corrosion control treatment, source water treatment, lead service line replacement, and public education. These requirements are triggered, in some cases, by lead and copper action levels measured in samples collected at consumers' taps.

b) Definitions. For the purposes of only this Subpart G, the following terms have the following meanings:

"Action level" means that concentration of lead or copper in water computed under~~pursuant to~~ subsection (c) that determines, in some cases, the treatment requirements of this Subpart G that a supplier must complete. The action level for lead is 0.015 mg/ℓ. The action level for copper is 1.3 mg/ℓ.

"Corrosion inhibitor" means a substance capable of reducing the corrosivity of water toward metal plumbing materials, especially lead and copper, by forming a protective film on the interior surface of those materials.

"Effective corrosion inhibitor residual" means a concentration of inhibitor in the drinking water sufficient to form a passivating film on the interior walls of a pipe.

"Exceed," as this term is applied to either the lead or the copper action level, means that the 90th percentile level of the supplier's samples collected during a six-month monitoring period is greater than the action level for that contaminant.

"First draw sample" means a one-liter sample of tap water, collected in accordance with Section 611.356(b)(2), that has been standing in plumbing pipes for at least six hours and which is collected without flushing the tap.

"Large system" means a water system that regularly serves water to more than 50,000 persons.

"Lead service line" means a service line made of lead that connects the water main to the building inlet, including any lead pigtail, gooseneck, or other fitting that is connected to such lead line.

"Maximum permissible concentration" or "MPC" means that concentration of lead or copper for finished water entering the supplier's distribution system, designated by the Agency by a SEP ~~pursuant to Sections 611.110 and 611.353(b)~~ that reflects the contaminant removal capability of the treatment properly operated and maintained.
BOARD NOTE: Derived from 40 CFR 141.83(b)(4) (2016). (See Section 611.353(b)(4)(B).)

"Medium-sized system" means a water system that regularly serves water to more than 3,300 up to 50,000 or fewer persons.

"Meet," as this term is applied to either the lead or the copper action level, means that the 90th percentile level of the supplier's samples collected during a six-month monitoring period is less than or equal to the action level for that contaminant.

"Method detection limit" or "MDL" is as defined at Section 611.646(a). The MDL for lead is 0.001 mg/ℓ. The MDL for copper is 0.001 mg/ℓ, or 0.020 mg/ℓ by atomic absorption direct aspiration method.
BOARD NOTE: Derived from 40 CFR 141.89(a)(1)(iii) (2016).

"Monitoring period" means any of the six-month periods of time during which a supplier must complete a cycle of monitoring under this Subpart G.
BOARD NOTE: USEPA refers to these as "monitoring periods." The Board uses "six-month monitoring period" to avoid confusion with "compliance period," as used elsewhere in this Part and defined at Section 611.101.

"Multiple-family residence" means a building that is currently used as a multiple-family residence, but not one that is also a "single-family structure."

"90th percentile level" means that concentration of lead or copper contaminant exceeded by ten percent or fewer of all samples collected during a six-month monitoring period underpursuant to Section 611.356 (i.e., that concentration of contaminant greater than or equal to the results obtained from 90 percent of the samples). The 90th percentile levels for copper and lead must be determined underpursuant to subsection (c)(3).
BOARD NOTE: Derived from 40 CFR 141.80(c) (2016).

"Optimal corrosion control treatment" means the corrosion control treatment that minimizes the lead and copper concentrations at users' taps while ensuring that the treatment does not cause the water system to violate any national primary drinking water regulations.
"Practical quantitation limit" or "PQL" means the lowest concentration of a contaminant that a well-operated laboratory can reliably achieve within specified limits of precision and accuracy during routine laboratory operating conditions. The PQL for lead is 0.005 mg/ℓ. The PQL for copper is 0.050 mg/ℓ.

BOARD NOTE: Derived from 40 CFR 141.89(a)(1)(ii) and (a)(1)(iv) (2016).

"Service line sample" means a one-liter sample of water, collected in accordance with Section 611.356(b)(3), that has been standing for at least six hours in a service line.

"Single-family structure" means a building that was constructed as a single-family residence and which is currently used as either a residence or a place of business.

"Small system" means a water system that regularly serves water to 3,300 or fewer persons.

BOARD NOTE: Derived from 40 CFR 141.2 (2016).

c) Lead and Copper Action Levels.

1) The lead action level is exceeded if the 90th percentile lead level is greater than 0.015 mg/ℓ.

2) The copper action level is exceeded if the 90th percentile copper level is greater than 1.3 mg/ℓ.

3) Suppliers must compute the 90th percentile lead and copper levels as follows:

A) List the results of all lead or copper samples taken during a six-month monitoring period in ascending order, ranging from the sample with the lowest concentration first to the sample with the highest concentration last. Assign each sampling result a number, ascending by single integers beginning with the number 1 for the sample with the lowest contaminant level. The number assigned to the sample with the highest contaminant level must be equal to the total number of samples taken.

B) Determine the number for the 90th percentile sample by multiplying the total number of samples taken during the six-month monitoring period by 0.9.

C) The contaminant concentration in the sample with the number yielded by the calculation in subsection (c)(3)(B) is the 90th percentile contaminant level.

D) For suppliers that collect five samples per six-month monitoring period, the 90th percentile is computed by taking the average of the highest and second highest concentrations.

E) For a supplier that has been allowed by the Agency to collect fewer than five samples in accordance with Section 611.356(c), the sample result with the highest concentration is considered the 90th percentile value.

d) Corrosion Control Treatment Requirements.

1) All suppliers must install and operate optimal corrosion control treatment.

2) Any supplier that complies with the applicable corrosion control treatment requirements specified by the Agency under~~pursuant to~~ Sections 611.351 and 611.352 is deemed in compliance with the treatment requirement of subsection (d)(1).

e) Source Water Treatment Requirements. Any supplier whose system exceeds the lead or copper action level must implement all applicable source water treatment requirements specified by the Agency under~~pursuant to~~ Section 611.353.

f) Lead Service Line Replacement Requirements. Any supplier whose system exceeds the lead action level after implementation of applicable corrosion control and source water treatment requirements must complete the lead service line replacement requirements contained in Section 611.354.

g) Public Education Requirements. Under~~Pursuant to~~ Section 611.355, the supplier must provide a consumer notice of the lead tap water monitoring results to the persons served at each site (tap) that is tested. Any supplier whose system exceeds the lead action level must implement the public education requirements.

h) Monitoring and Analytical Requirements. Suppliers must complete all tap water monitoring for lead and copper, monitoring for water quality parameters, source water monitoring for lead and copper, and analyses of the monitoring results under this Subpart G in compliance with Sections 611.356, 611.357, 611.358, and 611.359.

i) Reporting Requirements. Suppliers must report to the Agency any information required by the treatment provisions of this Subpart G and Section 611.360.

j) Recordkeeping Requirements. Suppliers must maintain records in accordance with Section 611.361.

k) Violation of National Primary Drinking Water Regulations. Failure to comply with the applicable requirements of this Subpart G, including conditions imposed by the Agency by SEP ~~pursuant to these provisions and Section 611.110~~, will constitute a violation of the national primary drinking water regulations for lead or copper.

BOARD NOTE: Derived from 40 CFR 141.80 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.351 Applicability of Corrosion Control

a) Corrosion control required. Suppliers must complete the applicable corrosion control treatment requirements described in Section 611.352 on or before the deadlines set forth in this Section.

1) Large systems. Each large system supplier (one regularly serving more than 50,000 persons) must complete the corrosion control treatment steps specified in subsection (d), unless it is deemed to have optimized corrosion control under subsection (b)(2) or (b)(3).

2) Medium-sized and small systems. Each small system supplier (one regularly serving 3,300 or fewer persons) and each medium-sized system (one regularly serving more than 3,300 up to 50,000 persons) must complete the corrosion control treatment steps specified in subsection (e), unless it is deemed to have optimized corrosion control under one of subsections (b)(1), (b)(2), or (b)(3).

b) Suppliers deemed to have optimized corrosion control. A supplier is deemed to have optimized corrosion control, and is not required to complete the applicable corrosion control treatment steps identified in this Section, if the supplier satisfies one of the criteria specified in subsections (b)(1) through (b)(3). Any such system deemed to have optimized corrosion control under this subsection, and which has treatment in place, must continue to operate and maintain optimal corrosion control treatment and meet any requirements that the Agency determines are appropriate to ensure optimal corrosion control treatment is maintained.

1) Small- or medium-sized system meeting action levels. A small system or medium-sized system supplier is deemed to have optimized corrosion control if the system meets the lead and copper action levels during each of two consecutive six-month monitoring periods with monitoring conducted in accordance with Section 611.356.

2) SEP for equivalent activities to corrosion control. The Agency must, by a SEP ~~issued pursuant to Section 611.110~~, deem any supplier to have optimized corrosion control treatment if it determines that the supplier has conducted activities equivalent to the corrosion control steps applicable under this Section. In making this determination, the Agency must specify the water quality control parameters representing optimal corrosion control in accordance with Section 611.352(f). A water supplier that is deemed to have optimized corrosion control under this subsection (b)(2) must operate in compliance with the Agency-designated optimal water quality control parameters in accordance with Section 611.352(g) and must continue to conduct lead and copper tap and water quality parameter sampling in accordance with Sections 611.356(d)(3) and 611.357(d), respectively. A supplier must provide the Agency with the following information in order to support an Agency SEP determination under this subsection (b)(2):

A) The results of all test samples collected for each of the water quality parameters in Section 611.352(c)(3);

B) A report explaining the test methods the supplier used to evaluate the corrosion control treatments listed in Section 611.352(c)(1), the results of all tests conducted, and the basis for the supplier's selection of optimal corrosion control treatment;

C) A report explaining how the supplier has installed corrosion control and how the supplier maintains it to insure minimal lead and copper concentrations at consumer's taps; and

D) The results of tap water samples collected in accordance with Section 611.356 at least once every six months for one year after corrosion control has been installed.

3) Results less than practical quantitation level (PQL) for lead. Any supplier is deemed to have optimized corrosion control if it submits results of tap water monitoring conducted in accordance with Section 611.356 and source water monitoring conducted in accordance with Section 611.358 that demonstrate that for two consecutive six-month monitoring periods the difference between the 90th percentile tap water lead level, computed <u>under</u>~~pursuant to~~ Section 611.350(c)(3), and the highest source water lead concentration is less than the practical quantitation level for lead specified in Section 611.359(a)(1)(B)(i).

A) Those systems whose highest source water lead level is below the method detection limit (MDL) may also be deemed to have

optimized corrosion control under this subsection (b) if the 90th percentile tap water lead level is less than or equal to the PQL for lead for two consecutive six-month monitoring periods.

B) Any water system deemed to have optimized corrosion control in accordance with this subsection (b) must continue monitoring for lead and copper at the tap no less frequently than once every three calendar years using the reduced number of sites specified in Section 611.356(c) and collecting the samples at times and locations specified in Section 611.356(d)(4)(D).

C) Any water system deemed to have optimized corrosion control underpursuant to this subsection (b) must notify the Agency in writing underpursuant to Section 611.360(a)(3) of any upcoming long-term change in treatment or the addition of a new source, as described in that Section. The Agency must review and approve the addition of a new source or any long-term change in water treatment before the addition or long-term change is implemented by the water system.

D) A supplier is not deemed to have optimized corrosion control under this subsection (b), and must implement corrosion control treatment underpursuant to subsection (b)(3)(E), unless it meets the copper action level.

E) Any supplier triggered into corrosion control because it is no longer deemed to have optimized corrosion control under this subsection must implement corrosion control treatment in accordance with the deadlines in subsection (e). Any such large system supplier must adhere to the schedule specified in that subsection (e) for a medium-sized system supplier, with the time periods for completing each step being triggered by the date the supplier is no longer deemed to have optimized corrosion control under this subsection (b).

c) Suppliers not required to complete corrosion control steps for having met both action levels.

1) Any small system or medium-sized system supplier, otherwise required to complete the corrosion control steps due to its exceedance of the lead or copper action level, may cease completing the treatment steps after the supplier has fulfilled both of the following conditions:

A) It has met both the copper action level and the lead action level during each of two consecutive six-month monitoring periods conducted underpursuant to Section 611.356; and

B) The supplier has submitted the results for those two consecutive six-month monitoring periods to the Agency.

2) A supplier that has ceased completing the corrosion control steps underpursuant to subsection (c)(1) (or the Agency, if appropriate) must resume completion of the applicable treatment steps, beginning with the first treatment step that the supplier previously did not complete in its entirety, if the supplier thereafter exceeds the lead or copper action level during any monitoring period.

3) The Agency may, by SEP, require a supplier to repeat treatment steps previously completed by the supplier where it determines that this is necessary to properly implement the treatment requirements of this Section. Any such SEP must explain the basis for this decision.

4) The requirement for any small- or medium-sized system supplier to implement corrosion control treatment steps in accordance with subsection (e) (including systems deemed to have optimized corrosion control under subsection (b)(1)) is triggered whenever any small- or medium-sized system supplier exceeds the lead or copper action level.

d) Treatment steps for large systems. Except as provided in subsections (b)(2) and (b)(3), large system suppliers must have completed the following corrosion control treatment steps (described in the referenced portions of Sections 611.352, 611.356, and 611.357).

1) Step 1: Initial monitoring (Sections 611.356(d)(1) and 611.357(b)) during two consecutive six-month monitoring periods.

2) Step 2: Corrosion control studies (Section 611.352(c)).

3) Step 3: Agency approval of optimal corrosion control treatment (Section 611.352(d)) by a SEP issued pursuant to Section 611.110.

4) Step 4: Installing optimal corrosion control treatment (Section 611.352(e)).

5) Step 5: Completing follow-up sampling (Sections 611.356(d)(2) and 611.357(c)).

6) Step 6: Agency review of installation of treatment and approval of optimal water quality control parameters (Section 611.352(f)).

7) Step 7: Operating in compliance with the Agency-specified optimal water quality control parameters (Section 611.352(g)) and continue to conduct tap sampling (Sections 611.356(d)(3) and 611.357(d)).

e) Treatment steps and deadlines for small- and medium-sized system suppliers. Except as provided in subsection (b), small- and medium-sized system suppliers must complete the following corrosion control treatment steps (described in the referenced portions of Sections 611.352, 611.356, and 611.357) by the indicated time periods.

1) Step 1: The supplier must conduct initial tap sampling (Sections 611.356(d)(1) and 611.357(b)) until the supplier either exceeds the lead action level or the copper action level or it becomes eligible for reduced monitoring under Section 611.356(d)(4). A supplier exceeding the lead action level or the copper action level must recommend optimal corrosion control treatment (Section 611.352(a)) within six months after the end of the monitoring period during which it exceeds one of the action levels.

2) Step 2: Within 12 months after the end of the monitoring period during which a supplier exceeds the lead action level or the copper action level, the Agency may require the supplier to perform corrosion control studies (Section 611.352(b)). If the Agency does not require the supplier to perform such studies, the Agency must, by a SEP ~~issued pursuant to Section 611.110~~, specify optimal corrosion control treatment (Section 611.352(d)) within the appropriate of the following timeframes:

A) For medium-sized systems, within 18 months after the end of the monitoring period during which such supplier exceeds the lead action level or the copper action level; or

B) For small systems, within 24 months after the end of the monitoring period during which such supplier exceeds the lead action level or the copper action level.

3) Step 3: If the Agency requires a supplier to perform corrosion control studies under step 2 (subsection (e)(2)), the supplier must complete the studies (Section 611.352(c)) within 18 months after the Agency requires that such studies be conducted.

4) Step 4: If the supplier has performed corrosion control studies under step 2 (subsection (e)(2)), the Agency must, by a SEP ~~issued pursuant to Section 611.110~~, approve optimal corrosion control treatment (Section

611.352(d)) within six months after completion of step 3 (subsection (e)(3).

5) Step 5: The supplier must install optimal corrosion control treatment (Section 611.352(e)) within 24 months after the Agency approves that treatment.

6) Step 6: The supplier must complete follow-up sampling (Sections 611.356(d)(2) and 611.357(c)) within 36 months after the Agency approves optimal corrosion control treatment.

7) Step 7: The Agency must review the supplier's installation of treatment and, by a SEP ~~issued pursuant to Section 611.110~~, approve optimal water quality control parameters (Section 611.352(f)) within six months after completion of step 6 (subsection (e)(6)).

8) Step 8: The supplier must operate in compliance with the Agency-approved optimal water quality control parameters (Section 611.352(g)) and continue to conduct tap sampling (Sections 611.356(d)(3) and 611.357(d)).

BOARD NOTE: Derived from 40 CFR 141.81 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.352 Corrosion Control Treatment

Each supplier must complete the corrosion control treatment requirements described below that are applicable to such supplier under Section 611.351.

a) System recommendation regarding corrosion control treatment.

1) Based on the results of lead and copper tap monitoring and water quality parameter monitoring, small- and medium-sized system suppliers exceeding the lead action level or the copper action level must recommend to the Agency installation of one or more of the corrosion control treatments listed in subsection (c)(1) that the supplier believes constitutes optimal corrosion control for its system.

2) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, require the supplier to conduct additional water quality parameter monitoring in accordance with Section 611.357(b) to assist it in reviewing the supplier's recommendation.

b) Agency-required studies of corrosion control treatment. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, require any small- or medium-sized system supplier that exceeds the lead action level or the copper action level to perform corrosion control studies under subsection (c) to identify optimal corrosion control treatment for its system.

c) Performance of studies.

1) Any supplier performing corrosion control studies must evaluate the effectiveness of each of the following treatments, and, if appropriate, combinations of the following treatments, to identify the optimal corrosion control treatment for its system:

A) Alkalinity and pH adjustment;

B) Calcium hardness adjustment; and

C) The addition of a phosphate- or silicate-based corrosion inhibitor at a concentration sufficient to maintain an effective residual concentration in all test tap samples.

2) The supplier must evaluate each of the corrosion control treatments using pipe rig/loop tests; metal coupon tests; partial-system tests; or analyses based on documented analogous treatments in other systems of similar size, water chemistry, and distribution system configuration.

3) The supplier must measure the following water quality parameters in any tests conducted under this subsection (c) before and after evaluating the corrosion control treatments listed above:

A) Lead;

B) Copper;

C) pH;

D) Alkalinity;

E) Calcium;

F) Conductivity;

G) Orthophosphate (when an inhibitor containing a phosphate compound is used);

H) Silicate (when an inhibitor containing a silicate compound is used); and

I) Water temperature.

4) The supplier must identify all chemical or physical constraints that limit or prohibit the use of a particular corrosion control treatment, and document such constraints with at least one of the following:

A) Data and documentation showing that a particular corrosion control treatment has adversely affected other water treatment processes when used by another supplier with comparable water quality characteristics; or

B) Data and documentation demonstrating that the supplier has previously attempted to evaluate a particular corrosion control treatment, finding either that the treatment is ineffective or that it adversely affects other water quality treatment processes.

5) The supplier must evaluate the effect of the chemicals used for corrosion control treatment on other water quality treatment processes.

6) On the basis of an analysis of the data generated during each evaluation, the supplier must recommend to the Agency, in writing, that treatment option the corrosion control studies indicate constitutes optimal corrosion control treatment for its system. The supplier must provide a rationale for its recommendation, along with all supporting documentation specified in subsections (c)(1) through (c)(5).

d) Agency approval of treatment.

1) Based on consideration of available information including, where applicable, studies performed under subsection (c) and a supplier's recommended treatment alternative, the Agency must, by a SEP ~~issued pursuant to Section 611.110~~, either approve the corrosion control treatment option recommended by the supplier, or deny and require investigation and recommendation of alternative corrosion control treatments from among those listed in subsection (c)(1). When approving optimal treatment, the Agency must consider the effects that additional

corrosion control treatment will have on water quality parameters and on other water quality treatment processes.

2) The Agency must, in any SEP issued under subsection (d)(1), notify the supplier of the basis for this determination.

e) Installation of optimal corrosion control. Each supplier must properly install and operate, throughout its distribution system, that optimal corrosion control treatment approved by the Agency under~~pursuant to~~ subsection (d).

f) Agency review of treatment and specification of optimal water quality control parameters. The Agency must evaluate the results of all lead and copper tap samples and water quality parameter samples submitted by the supplier and determine whether it has properly installed and operated the optimal corrosion control treatment approved pursuant to subsection (d).

1) Upon reviewing the results of tap water and water quality parameter monitoring by the supplier, both before and after the installation of optimal corrosion control treatment, the Agency must, by a SEP ~~issued pursuant to Section 611.110~~, specify the following:

A) A minimum value or a range of values for pH measured at each entry point to the distribution system;

B) A minimum pH value, measured in all tap samples. Such value must be equal to or greater than 7.0, unless the Agency determines that meeting a pH level of 7.0 is not technologically feasible or is not necessary for the supplier to optimize corrosion control;

C) If a corrosion inhibitor is used, a minimum concentration or a range of concentrations for the inhibitor, measured at each entry point to the distribution system and in all tap samples, that the Agency determines is necessary to form a passivating film on the interior walls of the pipes of the distribution system;

D) If alkalinity is adjusted as part of optimal corrosion control treatment, a minimum concentration or a range of concentrations for alkalinity, measured at each entry point to the distribution system and in all tap samples;

E) If calcium carbonate stabilization is used as part of corrosion control, a minimum concentration or a range of concentrations for calcium, measured in all tap samples.

2) The values for the applicable water quality control parameters listed in subsection (f)(1) must be those that the Agency determines reflect optimal corrosion control treatment for the supplier.

3) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, approve values for additional water quality control parameters determined by the Agency to reflect optimal corrosion control for the supplier's system.

4) The Agency must, in issuing a SEP, explain these determinations to the supplier, along with the basis for its decisions.

g) Continued Operation and Monitoring. All suppliers optimizing corrosion control must continue to operate and maintain optimal corrosion control treatment, including maintaining water quality parameter values at or above minimum values or within ranges approved by the Agency under subsection (f), in accordance with this subsection (g) for all samples collected under Section 611.357(d) through (f). Compliance with the requirements of this subsection (g) must be determined every six months, as specified under Section 611.357(d). A water system is out of compliance with the requirements of this subsection for a six-month period if it has excursions for any Agency-specified parameter on more than nine days during the period. An excursion occurs whenever the daily value for one or more of the water quality parameters measured at a sampling location is below the minimum value or outside the range designated by the Agency. Daily values are calculated as provided in subsections (g)(1) through (g)(3). The Agency must delete results that it determines are obvious sampling errors from this calculation.

1) On days when more than one measurement for the water quality parameter is collected at the sampling location, the daily value must be the average of all results collected during the day regardless of whether the samples are collected through continuous monitoring, grab sampling, or a combination of both.

BOARD NOTE: Corresponding 40 CFR 141.82(g)(1) further provides as follows: If USEPA approves an alternative formula under 40 CFR 142.16 in the State's application for a program revision submitted pursuant to 40 CFR 142.12, the State's formula must be used to aggregate multiple measurements taken at a sampling point for the water quality parameter in lieu of the formula in this subsection (g).

2) On days when only one measurement for the water quality parameter is collected at the sampling location, the daily value must be the result of that measurement.

3) On days when no measurement is collected for the water quality parameter at the sampling location, the daily value must be the daily value calculated on the most recent day on which the water quality parameter was measured at the sample site.

h) Modification of Agency treatment decisions.

1) On its own initiative, or in response to a request by a supplier, the Agency may, by a SEP ~~issued pursuant to this subsection and Section 611.110~~, modify its determination of the optimal corrosion control treatment under subsection (d) or of the optimal water quality control parameters under subsection (f).

2) A request for modification must be in writing, explain why the modification is appropriate, and provide supporting documentation.

3) The Agency may modify its determination where it determines that such change is necessary to ensure that the supplier continues to optimize corrosion control treatment. A revised determination must set forth the new treatment requirements, explain the basis for the Agency's decision, and provide an implementation schedule for completing the treatment modifications.

4) Any interested person may submit information to the Agency bearing on whether the Agency should, within its discretion, issue a SEP to modify its determination under~~pursuant to~~ subsection (h)(1). An Agency determination not to act on a submission of such information by an interested person is not an Agency determination for the purposes of Sections 39 and 40 of the Act.

i) Treatment decisions by USEPA. Under~~pursuant to~~ the procedures in 40 CFR 142.19, the USEPA Regional Administrator has reserved the prerogative to review treatment determinations made by the Agency under subsections (d), (f), or (h) and issue federal treatment determinations consistent with the requirements of 40 CFR 141.82(d), (e), or (h), where the Regional Administrator finds that the following is true:

1) The Agency has failed to issue a treatment determination by the applicable deadlines contained in Section 611.351 (40 CFR 141.81);

2) The Agency has abused its discretion in a substantial number of cases or in cases affecting a substantial population; or

3) The technical aspects of the Agency's determination would be indefensible in an expected federal enforcement action taken against a supplier.

BOARD NOTE: Derived from 40 CFR 141.82 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.353 Source Water Treatment

Suppliers must complete the applicable source water monitoring and treatment requirements (described in the referenced portions of subsection (b), and in Sections 611.356 and 611.358) by the following deadlines.

a) Deadlines for completing source water treatment steps.

1) Step 1: A supplier exceeding the lead action level or the copper action level must complete lead and copper and source water monitoring (Section 611.358(b)) and make a treatment recommendation to the Agency (subsection (b)(1)) within 180 days after the end of the monitoring period during which the supplier exceeded the pertinent action level.

2) Step 2: The Agency must, by a SEP ~~issued pursuant to Section 611.110~~, make a determination regarding source water treatment (subsection (b)(2)) within six months after submission of monitoring results under step 1.

3) Step 3: If the Agency requires installation of source water treatment, the supplier must install that treatment (subsection (b)(3)) within 24 months after completion of step 2.

4) Step 4: The supplier must complete follow-up tap water monitoring (Section 611.356(d)(2)) and source water monitoring (Section 611.358(c)) within 36 months after completion of step 2.

5) Step 5: The Agency must, by a SEP ~~issued pursuant to Section 611.110~~, review the supplier's installation and operation of source water treatment and specify MPCs for lead and copper (subsection (b)(4)) within six months after completion of step 4.

6) Step 6: The supplier must operate in compliance with the Agency-specified lead and copper MPCs (subsection (b)(4)) and continue source water monitoring (Section 611.358(d)).

b) Description of Source Water Treatment Requirements.

1) System treatment recommendation. Any supplier that exceeds the lead action level or the copper action level must recommend in writing to the Agency the installation and operation of one of the source water treatments listed in subsection (b)(2). A supplier may recommend that no treatment be installed based on a demonstration that source water treatment is not necessary to minimize lead and copper levels at users' taps.

2) Agency determination regarding source water treatment.

   A) The Agency must complete an evaluation of the results of all source water samples submitted by the supplier to determine whether source water treatment is necessary to minimize lead or copper levels in water delivered to users' taps.

   B) If the Agency determines that treatment is needed, the Agency must, by a SEP ~~issued pursuant to Section 611.110~~, either require installation and operation of the source water treatment recommended by the supplier (if any) or require the installation and operation of another source water treatment from among the following:

      i) ion exchange;

      ii) reverse osmosis;

      iii) lime softening; or

      iv) coagulation/filtration.

   C) The Agency may request and the supplier must submit such additional information, on or before a certain date, as the Agency determines is necessary to aid in its review.

   D) The Agency must notify the supplier in writing of its determination and set forth the basis for its decision.

3) Installation of source water treatment. Each supplier must properly install and operate the source water treatment approved by the Agency under subsection (b)(2).

4) Agency review of source water treatment and specification of maximum permissible source water levels (MPCs).

A) The Agency must review the source water samples taken by the supplier both before and after the supplier installs source water treatment, and determine whether the supplier has properly installed and operated the approved source water treatment.

B) Based on its review, the Agency must, by a SEP ~~issued pursuant to Section 611.110~~, approve the lead and copper MPCs for finished water entering the supplier's distribution system. Such levels must reflect the contaminant removal capability of the treatment properly operated and maintained.

C) The Agency must explain the basis for its decision under subsection (b)(4)(B).

5) Continued operation and maintenance. Each supplier must maintain lead and copper levels below the MPCs approved by the Agency at each sampling point monitored in accordance with Section 611.358. The supplier is out of compliance with this subsection if the level of lead or copper at any sampling point is greater than the MPC approved by the Agency under~~pursuant to~~ subsection (b)(4)(B).

6) Modification of Agency treatment decisions.

A) On its own initiative, or in response to a request by a supplier, the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, modify its determination of the source water treatment under subsection (b)(2) of this Section, or the lead and copper MPCs under subsection (b)(4).

B) A request for modification by a supplier must be in writing, explain why the modification is appropriate, and provide supporting documentation.

C) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, modify its determination where it concludes that such change is necessary to ensure that the supplier continues to minimize lead and copper concentrations in source water.

D) A revised determination made under~~pursuant to~~ subsection (b)(6)(C) must set forth the new treatment requirements, explain the basis for the Agency's decision, and provide an implementation schedule for completing the treatment modifications.

E) Any interested person may submit information to the Agency, in writing, that bears on whether the Agency should, within its discretion, issue a SEP to modify its determination pursuant to subsection (h)(1). An Agency determination not to act on a submission of such information by an interested person is not an Agency determination for the purposes of Sections 39 and 40 of the Act.

7) Treatment decisions by USEPA. Under~~pursuant to~~ the procedures in 40 CFR 142.19, the USEPA Regional Administrator reserves the prerogative to review treatment determinations made by the Agency under subsections (b)(2), (b)(4), or (b)(6) and issue federal treatment determinations consistent with the requirements of 40 CFR 141.83(b)(2), (b)(4), and (b)(6), where the Administrator finds that the following is true:

A) the Agency has failed to issue a treatment determination by the applicable deadline contained in subsection (a);

B) the Agency has abused its discretion in a substantial number of cases or in cases affecting a substantial population; or

C) the technical aspects of the Agency's determination would be indefensible in an expected federal enforcement action taken against a supplier.

BOARD NOTE: Derived from 40 CFR 141.83 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.354 Lead Service Line Replacement

a) Suppliers required to replace lead service lines.

1) If the results from tap samples taken under~~pursuant to~~ Section 611.356(d)(2) exceed the lead action level after the supplier has installed corrosion control or source water treatment (whichever sampling occurs later), the supplier must recommence replacing lead service lines in accordance with the requirements of subsection (b).

2) If a supplier is in violation of Section 611.351 or Section 611.353 for failure to install source water or corrosion control treatment, the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, require the supplier to commence lead service line replacement under this Section after the date

by which the supplier was required to conduct monitoring under Section 611.356(d)(2) has passed.

b) Annual replacement of lead service lines.

1) Initiation of a lead service line replacement program.

A) A supplier that is required to commence lead service line replacement underpursuant to subsection (a) must annually replace at least seven percent of the initial number of lead service lines in its distribution system.

B) The initial number of lead service lines is the number of lead lines in place at the time the replacement program begins.

C) The supplier must identify the initial number of lead service lines in its distribution system, including an identification of the portions of the system owned by the supplier, based on a materials evaluation, including the evaluation required under Section 611.356(a) and relevant legal authorities (e.g., contracts, local ordinances) regarding the portion owned by the system.

D) The first year of lead service line replacement must begin on the first day following the end of the monitoring period in which the supplier exceeded the action level underpursuant to subsection (a).

E) If monitoring is required annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs.

F) If the Agency has established an alternate monitoring period by a SEP issued pursuant to Section 611.110, then the end of the monitoring period will be the last day of that period.

2) Resumption of a lead service line replacement program after cessation.

A) A supplier that is resuming a program after cessation of its lead service line replacement program, as allowed underpursuant to subsection (f), must update its inventory of lead service lines to include those sites that it had previously determined did not require replacement underpursuant to the sampling provision of subsection (c).

B) The supplier will then divide the updated number of remaining lead service lines by the number of remaining years in the program to determine the number of lines that must be replaced per year (seven percent lead service line replacement is based on a 15-year replacement program, so that, for example, a supplier resuming lead service line replacement after previously conducting two years of replacement would divide the updated inventory by 13).

C) For a supplier that has completed a 15-year lead service line replacement program, the Agency must, by a SEP ~~issued pursuant to Section 611.110~~, determine a schedule for replacing or retesting lines that were previously tested out under the completed replacement program, whenever the supplier has re-exceeded the action level.

c) Service lines not needing replacement. A supplier is not required to replace any individual lead service line for which the lead concentrations in all service line samples taken from that line under~~pursuant to~~ Section 611.356(b)(3) are less than or equal to 0.015 mg/ℓ.

d) A water supplier must replace that portion of the lead service line that it owns. In cases where the supplier does not own the entire lead service line, the supplier must notify the owner of the line, or the owner's authorized agent, that the supplier will replace the portion of the service line that it owns and must offer to replace the owner's portion of the line. A supplier is not required to bear the cost of replacing the privately-owned portion of the line, nor is it required to replace the privately-owned portion where the owner chooses not to pay the cost of replacing the privately-owned portion of the line, or where replacing the privately-owned portion would be precluded by State, local, or common law. A water supplier that does not replace the entire length of the service line also must complete the following tasks:

1) Notice Prior to Commencement of Work.

A) At least 45 days prior to commencing the partial replacement of a lead service line, the water supplier must provide notice to the residents of all buildings served by the line explaining that they may experience a temporary increase of lead levels in their drinking water, along with guidance on measures consumers can take to minimize their exposure to lead.

B) The Agency, by issuing an appropriate SEP, may allow the water supplier to provide notice under the previous sentence less than 45

days prior to commencing partial lead service line replacement where it determines that such replacement is in conjunction with emergency repairs.

C) In addition, the water supplier must inform the residents served by the line that the supplier will, at the supplier's expense, collect a sample from each partially-replaced lead service line that is representative of the water in the service line for analysis of lead content, as prescribed by Section 611.356(b)(3), within 72 hours after the completion of the partial replacement of the service line. The supplier must collect the sample and report the results of the analysis to the owner and the residents served by the line within three business days of receiving the results.

D) Mailed notices post-marked within three business days of receiving the results must be considered "on time."

2) The water supplier must provide the information required by subsection (d)(1) to the residents of individual dwellings by mail or by other methods approved by the Agency by a SEP ~~issued pursuant to Section 611.110~~. In instances where multi-family dwellings are served by the service line, the water supplier must have the option to post the information at a conspicuous location.

e) Agency determination of shorter replacement schedule.

1) The Agency must, by a SEP ~~issued pursuant to Section 611.110~~, require a supplier to replace lead service lines on a shorter schedule than that otherwise required by this Section if it determines, taking into account the number of lead service lines in the system, that such a shorter replacement schedule is feasible.

2) The Agency must notify the supplier of its finding under~~pursuant to~~ subsection (e)(1) within six months after the supplier is triggered into lead service line replacement based on monitoring, as referenced in subsection (a).

f) Cessation of service line replacement.

1) Any supplier may cease replacing lead service lines whenever it fulfills both of the following conditions:

A) First draw tap samples collected pursuant to Section 611.356(b)(2) meet the lead action level during each of two consecutive six-month monitoring periods; and

B) The supplier has submitted those results to the Agency.

2) If any of the supplier's first draw tap samples thereafter exceed the lead action level, the supplier must recommence replacing lead service lines under~~pursuant to~~ subsection (b)(2).

g) To demonstrate compliance with subsections (a) through (d), a supplier must report to the Agency the information specified in Section 611.360(e).

BOARD NOTE: Derived from 40 CFR 141.84 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.355 Public Education and Supplemental Monitoring

A supplier that exceeds the lead action level based on tap water samples collected in accordance with Section 611.356 must deliver the public education materials required by subsection (a) in accordance with the requirements of subsection (b). A supplier that exceeds the lead action level must sample the tap water of any customer who requests it in accordance with subsection (c). A supplier must deliver a consumer notice of lead tap water monitoring results to persons who are served by the supplier at each site that the supplier has tested, as specified in subsection (d).

a) Content of written public education materials.

1) Community water systems and non-transient non-community water systems. A CWS or NTNCWS supplier must include the following elements in printed materials (e.g., brochures and pamphlets) in the same order as listed in subsections (a)(1)(A) through (a)(1)(F). In addition, the supplier must include the language set forth in subsections (a)(1)(A), (a)(1)(B), and (a)(1)(F) in the materials, exactly as written, except for the text in brackets in these subsections, for which the supplier must include system-specific information. Any additional information presented by a supplier must be consistent with the information set forth in subsections (a)(1)(A) through (a)(1)(F), and the supplier must present the additional information in plain language that can be understood by the general public. The supplier must submit all written public education materials to the Agency.

A) IMPORTANT INFORMATION ABOUT LEAD IN YOUR DRINKING WATER. [INSERT NAME OF SUPPLIER] found

elevated levels of lead in drinking water in some homes/buildings. Lead can cause serious health problems, especially for pregnant women and young children. Please read this information closely to see what you can do to reduce lead in your drinking water.

BOARD NOTE: The supplier must use the verbatim text set forth in this subsection (a)(1)(A), with the exception that the supplier must insert its name in place of the bracketed text.

B) Health effects of lead. Lead can cause serious health problems if too much enters your body from drinking water or other sources. It can cause damage to the brain and kidneys, and can interfere with the production of red blood cells that carry oxygen to all parts of your body. The greatest risk of lead exposure is to infants, young children, and pregnant women. Scientists have linked the effects of lead on the brain with lowered IQ in children. Adults with kidney problems and high blood pressure can be affected by low levels of lead more than healthy adults. Lead is stored in the bones, and it can be released later in life. During pregnancy, the child receives lead from the mother's bones, which may affect brain development.

BOARD NOTE: The supplier must use the verbatim text set forth in this subsection (a)(1)(B).

C) Sources of Lead.

i) Explain what lead is.

ii) Explain possible sources of lead in drinking water and how lead enters drinking water. Include information on home and building plumbing materials and service lines that may contain lead.

iii) Discuss other important sources of lead exposure in addition to drinking water (e.g., paint).

BOARD NOTE: The supplier must use text that provides the information described in this subsection (a)(1)(C).

D) Discuss the steps the consumer can take to reduce his or her exposure to lead in drinking water.

i) Encourage running the water to flush out the lead.

ii) Explain concerns with using hot water from the tap and specifically caution against the use of hot water for preparing baby formula.

iii) Explain that boiling water does not reduce lead levels.

iv) Discuss other options consumers can take to reduce exposure to lead in drinking water, such as alternative sources or treatment of water.

v) Suggest that parents have their child's blood tested for lead.

BOARD NOTE: The supplier must use text that provides the information described in this subsection (a)(1)(D).

E) Explain why there are elevated levels of lead in the supplier's drinking water (if known) and what the supplier is doing to reduce the lead levels in homes and buildings in this area.

BOARD NOTE: The supplier must use text that provides the information described in this subsection (a)(1)(E).

F) For more information, call us at [INSERT THE SUPPLIER'S NUMBER] [(IF APPLICABLE), or visit our Web site at [INSERT THE SUPPLIER'S WEB SITE HERE]]. For more information on reducing lead exposure around your home/building and the health effects of lead, visit USEPA's Web site at *http://www.epa.gov/lead* or contact your health care provider.

BOARD NOTE: The supplier must use the verbatim text set forth in this subsection (a)(1)(F), with the exception that the supplier must insert its name in place of the first segment of bracketed text, and it must add the second segment of bracketed text and substitute its Web address for the internal bracketed text.

2) Community water systems. In addition to including the elements specified in subsection (a)(1), a CWS supplier must do both of the following:

A) It must tell consumers how to get their water tested; and

B) It must discuss lead in plumbing components and the difference between low-lead and lead-free components.

BOARD NOTE: At corresponding 40 CFR 141.85(a)(1) (2016), USEPA allowed the State to require prior approval of written public information materials. Rather than require prior Agency approval, the Board has chosen to allow the Agency to raise any deficiencies that it may perceive using its existing procedure for review of public education materials. The Agency has outlined its standard practice for review of public information materials as follows: The Agency provides a comprehensive public education packet to the supplier together with the notice that the supplier has exceeded the lead action level. That packet includes guidance and templates for the supplier to use in preparing and distributing its public education materials. The supplier must send a copy of the public education materials that it distributes to the Agency, and the Agency reviews the copy of the materials after their distribution to the public. The Agency directly communicates to the supplier any perceived defects in the materials. The Agency will request correction when it perceives minor defects in future distributions of the public education materials, or the Agency will request a redistribution of corrected public education materials when it perceives major defects in the materials already distributed.

b) Delivery of public education materials.

1) The public education materials of a supplier that serves a large proportion of non-English-speaking consumers must contain information in the appropriate languages regarding the importance of the notice, or it must contain a telephone number or address where a person served may contact the supplier to obtain a translated copy of the public education materials or to request assistance in the appropriate language.

2) A CWS supplier that exceeds the lead action level on the basis of tap water samples collected in accordance with Section 611.356 and which is not already conducting public education tasks under~~pursuant to~~ this Section must, within 60 days after the end of the monitoring period in which the exceedance occurred, complete the public education tasks according to the following requirements:

A) The CWS supplier must deliver printed materials that meet the content requirements of subsection (a) to all of its bill-paying customers.

B) Methods of delivery for a CWS supplier.

i) The CWS supplier must contact customers who are most at risk by delivering education materials that meet the content requirements of subsection (a) to local public health agencies, even if the agencies are not located within the

supplier's service area, along with an informational notice that encourages distribution to all of the agencies' potentially affected customers or the supplier's users. The supplier must contact the local public health agencies directly by phone or in person. The local public health agencies may provide a specific list of additional community-based organizations that serve the target populations, which may include organizations outside the service area of the supplier. If such lists are provided, the supplier must deliver education materials that meet the content requirements of subsection (a) to each of the organizations on the provided lists.

ii) The CWS supplier must contact customers who are most at risk by delivering materials that meet the content requirements of subsection (a) to the organizations listed in subsections (b)(2)(H)(i) through (b)(2)(H)(vi) that are located within the supplier's service area, along with an informational notice that encourages distribution to all the organization's potentially affected customers or supplier's users.

BOARD NOTE: The Board found it necessary to move the text of 40 CFR 141.85(b)(2)(ii)(B)(*1*) through (b)(2)(ii)(B)(*6*) (2007), as added at 72 Fed. Reg. 57782 (Oct. 10, 2007), to appear as subsection (b)(2)(H)(i) through subsection (b)(2)(H)(vi), in order to comport with Illinois Administrative Code codification requirements relating to allowed indent levels in rules.

iii) The CWS supplier must make a good faith effort to locate the organizations listed in subsections (b)(2)(I)(i) through (b)(2)(I)(iii) that are located within the service area and deliver materials that meet the content requirements of subsection (a) to them, along with an informational notice that encourages distribution to all potentially affected customers or users. The good faith effort to contact at-risk customers may include requesting a specific contact list of these organizations from the local public health agencies, even if the agencies are not located within the supplier's service area.

BOARD NOTE: The Board found it necessary to move the text of 40 CFR 141.85(b)(2)(ii)(C)(*1*) through

(b)(2)(ii)(C)(*3*) (2007), as added at 72 Fed. Reg. 57782 (Oct. 10, 2007), to appear as subsection (b)(2)(I)(i) through subsection (b)(2)(I)(iii), in order to comport with Illinois Administrative Code codification requirements relating to allowed indent levels in rules.

C) No less often than quarterly, the CWS supplier must provide information on or in each water bill as long as the system exceeds the action level for lead. The message on the water bill must include the following statement exactly as written, except for the text in brackets for which the supplier must include system-specific information:

> [INSERT NAME OF SUPPLIER] found high levels of lead in drinking water in some homes. Lead can cause serious health problems. For more information please call [INSERT NAME OF SUPPLIER] [or visit (INSERT SUPPLIER'S WEB SITE HERE)]. The message or delivery mechanism can be modified in consultation with the Illinois Environmental Protection Agency, Division of Public Water Supply; specifically, the Agency may allow a separate mailing of public education materials to customers if the water system cannot place the information on water bills.

D) The CWS supplier must post material meeting the content requirements of subsection (a) on the supplier's Web site if the CWS supplier serves a population greater than 100,000.

E) The CWS supplier must submit a press release to newspaper, television, and radio stations.

F) In addition to subsections (b)(2)(A) through (b)(2)(E), the CWS supplier must implement at least three activities from one or more of the categories listed below. The educational content and selection of these activities must be determined in consultation with the Agency.

i) Public Service Announcements.

ii) Paid advertisements.

iii) Public Area Information Displays.

iv) E-mails to customers.

v) Public Meetings.

vi) Household Deliveries.

vii) Targeted Individual Customer Contact.

viii) Direct material distribution to all multi-family homes and institutions.

ix) Other methods approved by the State.

G) For a CWS supplier that is required to conduct monitoring annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs, or, if the Agency has established an alternate monitoring period, by a SEP ~~issued pursuant to Section 611.110~~, the last day of that period.

H) Organizations that the CWS supplier must contact when required to do so under~~pursuant to~~ subsection (b)(2)(B)(ii).

i) Public and private schools or school boards.

ii) Women, Infants and Children (WIC) and Head Start programs.

iii) Public and private hospitals and medical clinics.

vi) Pediatricians.

v) Family planning clinics.

vi) Local welfare agencies.

BOARD NOTE: This subsection (b)(2)(H) corresponds with 40 CFR 141.85(b)(2)(ii)(B)(*1*) through (b)(2)(ii)(B)(*6*) (2016). The Board found it necessary to move the text of those federal provisions to comport with Illinois Administrative Code codification requirements relating to allowed indent levels in rules.

I) Organizations that the CWS supplier must contact when required to do so under~~pursuant to~~ subsection (b)(2)(B)(iii).

i) Licensed childcare centers.

ii) Public and private preschools.

iii) Obstetricians-gynecologists and midwives.

BOARD NOTE: This subsection (b)(2)(H) corresponds with 40 CFR 141.85(b)(2)(ii)(C)(*1*) through (b)(2)(ii)(C)(*3*) (2007), as added at 72 Fed. Reg. 57782 (Oct. 10, 2007). The Board found it necessary to move the text of those federal provisions to comport with Illinois Administrative Code codification requirements relating to allowed indent levels in rules.

3) As long as a CWS supplier exceeds the action level, it must repeat the activities described in subsection (b)(2), as described in subsections (b)(3)(A) through (b)(3)(D).

A) A CWS supplier must repeat the tasks contained in subsections (b)(2)(A), (b)(2)(B) and (b)(2)(D) every 12 months.

B) A CWS supplier must repeat tasks contained in subsection (b)(2)(C) with each billing cycle.

C) A CWS supplier serving a population greater than 100,000 must post and retain material on a publicly accessible Web site under~~pursuant to~~ subsection (b)(2)(D).

D) The CWS supplier must repeat the task in subsection (b)(2)(E) twice every 12 months on a schedule agreed upon with the Agency by a SEP ~~issued pursuant to Section 611.110~~. The Agency must, on a case-by-case basis, by a SEP ~~issued pursuant to Section 611.110~~, extend the time for the supplier to complete the public education tasks set forth in subsection (b)(2) beyond the 60-day limit if it determines that the extended time is needed for implementation purposes; however, the Agency must issue the SEP granting any extension prior to expiration of the 60-day deadline.

4) Within 60 days after the end of the monitoring period in which a NTNCWS supplier exceeds the lead action level (unless it already is repeating public education tasks under~~pursuant to~~ subsection (b)(5)), it must deliver the public education materials specified by subsection (a).

A) The public education materials must be delivered as follows:

i) The NTNCWS supplier must post informational posters on lead in drinking water in a public place or common area in each of the buildings served by the supplier; and

ii) The NTNCWS supplier must distribute informational pamphlets or brochures on lead in drinking water to each person served by the NTNCWS supplier. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, allow the system to utilize electronic transmission in lieu of or combined with printed materials as long as it achieves at least the same coverage.

B) For a NTNCWS supplier that is required to conduct monitoring annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs, or, if the Agency has established an alternate monitoring period, by a SEP ~~issued pursuant to Section 611.110~~, the last day of that period.

5) A NTNCWS supplier must repeat the tasks set forth in subsection (b)(4) at least once during each calendar year in which the supplier exceeds the lead action level. The Agency must, on a case-by-case basis, by a SEP ~~issued pursuant to Section 611.110~~, extend the time for the supplier to complete the public education tasks set forth in subsection (b)(2) beyond the 60-day limit if it determines that the extended time is needed for implementation purposes; however, the Agency must issue the SEP granting any extension prior to expiration of the 60-day deadline.

6) A supplier may discontinue delivery of public education materials after it has met the lead action level during the most recent six-month monitoring period conducted <u>under</u>~~pursuant to~~ Section 611.356. Such a supplier must begin public education anew in accordance with this Section if it subsequently exceeds the lead action level during any six-month monitoring period.

7) A CWS supplier may apply to the Agency, in writing, to use only the text specified in subsection (a)(1) in lieu of the text in subsections (a)(1) and (a)(2) and to perform the tasks listed in subsections (b)(4) and (b)(5) in lieu of the tasks in subsections (b)(2) and (b)(3) if the following are true:

A) The supplier is a facility, such as a prison or a hospital, where the population served is not capable of or is prevented from making improvements to plumbing or installing point of use treatment devices; and

B) The system provides water as part of the cost of services provided, and it does not separately charge for water consumption.

8) A CWS supplier that serves 3,300 or fewer people may limit certain aspects of its public education programs as follows:

A) With respect to the requirements of subsection (b)(2)(F), a supplier that serves 3,300 or fewer people must implement at least one of the activities listed in that subsection.

B) With respect to the requirements of subsection (b)(2)(B), a supplier that serves 3,300 or fewer people may limit the distribution of the public education materials required under that subsection to facilities and organizations that it serves which are most likely to be visited regularly by pregnant women and children.

C) With respect to the requirements of subsection (b)(2)(E), the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, waive this requirement for a supplier that serves 3,300 or fewer persons, as long as the supplier distributes notices to every household that it serves.

c) Supplemental monitoring and notification of results. A supplier that fails to meet the lead action level on the basis of tap samples collected in accordance with Section 611.356 must offer to sample the tap water of any customer who requests it. The supplier is not required to pay for collecting or analyzing the sample, nor is the supplier required to collect and analyze the sample itself.

d) Requirement for consumer notice of tap water monitoring results.

1) Consumer notice requirement. A supplier must provide a notice of the individual tap results from lead tap water monitoring carried out under the requirements of Section 611.356 to the persons served by the water system at the specific sampling site from which the sample was taken (e.g., the occupants of the residence where the tap was tested).

2) Timing of consumer notice. The supplier must provide the consumer notice as soon as practical, but no later than 30 days after it learns of the tap monitoring results.

3) Content of consumer notice. The consumer notice must include the results of lead tap water monitoring for the tap that was tested, an explanation of the health effects of lead, a list of steps that consumers can take to reduce

exposure to lead in drinking water, and contact information for the water utility. The notice must also provide the maximum contaminant level goal and the action level for lead and the definitions for these two terms from Section 611.883(c).

4) Delivery of consumer notice. The consumer notice must be provided to persons served at the tap that was tested, either by mail or by another method approved by the Agency, by a SEP ~~issued pursuant to Section 611.110~~. For example, upon approval by the Agency, a NTNCWS supplier could post the results on a bulletin board in the facility to allow users to review the information. The supplier must provide the notice to customers at sample taps tested, including consumers who do not receive water bills.

BOARD NOTE: Derived from 40 CFR 141.85 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.356 Tap Water Monitoring for Lead and Copper

a) Sampling site location.

1) Selecting a pool of targeted sampling sites.

A) By the applicable date for commencement of monitoring under subsection (d)(1), each supplier must complete a materials evaluation of its distribution system in order to identify a pool of targeted sampling sites that meets the requirements of this Section.

B) The pool of targeted sampling sites must be sufficiently large to ensure that the supplier can collect the number of lead and copper tap samples required by subsection (c).

C) The supplier must select the sites for collection of first draw samples from this pool of targeted sampling sites.

D) The supplier must not select as sampling sites any faucets that have point-of-use or point-of-entry treatment devices designed to remove or capable of removing inorganic contaminants.

2) Materials evaluation.

A) A supplier must use the information on lead, copper, and galvanized steel collected <u>under</u>~~pursuant to~~ 40 CFR 141.42(d)

(special monitoring for corrosivity characteristics) when conducting a materials evaluation.

B) When an evaluation of the information collected under~~pursuant to~~ 40 CFR 141.42(d) is insufficient to locate the requisite number of lead and copper sampling sites that meet the targeting criteria in subsection (a), the supplier must review the following sources of information in order to identify a sufficient number of sampling sites:

i) All plumbing codes, permits, and records in the files of the building departments that indicate the plumbing materials that are installed within publicly- and privately-owned structures connected to the distribution system;

ii) All inspections and records of the distribution system that indicate the material composition of the service connections which connect a structure to the distribution system;

iii) All existing water quality information, which includes the results of all prior analyses of the system or individual structures connected to the system, indicating locations that may be particularly susceptible to high lead or copper concentrations; and

iv) The supplier must seek to collect such information where possible in the course of its normal operations (e.g., checking service line materials when reading water meters or performing maintenance activities).

3) Tiers of sampling sites. Suppliers must categorize the sampling sites within their pool according to the following tiers:

A) CWS Tier 1 sampling sites. "CWS Tier 1 sampling sites" must include the following single-family structures:

i) Those that contain copper pipes with lead solder installed after 1982 or which contain lead pipes; or

ii) Those that are served by a lead service line.

BOARD NOTE: Subsection (a)(3)(A) was derived from segments of 40 CFR 141.86(a)(3) (2016). This allows the pool of CWS tier

1 sampling sites to consist exclusively of structures served by lead service lines.

B) CWS Tier 2 sampling sites. "CWS Tier 2 sampling sites" must include the following buildings, including multiple-family structures:

i) Those that contain copper pipes with lead solder installed after 1982 or contain lead pipes; or

ii) Those that are served by a lead service line.

BOARD NOTE: Subsection (a)(3)(B) was derived from segments of 40 CFR 141.86(a)(4) (2016). This allows the pool of CWS tier 2 sampling sites to consist exclusively of structures served by lead service lines.

C) CWS Tier 3 sampling sites. "CWS Tier 3 sampling sites" must include the following single-family structures: those that contain copper pipes with lead solder installed before 1983.

BOARD NOTE: Subsection (a)(3)(C) was derived from segments of 40 CFR 141.86(a)(5) (2016).

D) NTNCWS Tier 1 sampling sites. "NTNCWS Tier 1 sampling sites" must include the following buildings:

i) Those that contain copper pipes with lead solder installed after 1982 or which contain lead pipes; or

ii) Those that are served by a lead service line.

BOARD NOTE: Subsection (a)(3)(D) was derived from segments of 40 CFR 141.86(a)(6) (2016). This allows the pool of NTNCWS tier 1 sampling sites to consist exclusively of buildings served by lead service lines.

E) Alternative NTNCWS sampling sites. "Alternative NTNCWS sampling sites" must include the following buildings: those that contain copper pipes with lead solder installed before 1983.

BOARD NOTE: Subsection (a)(3)(E) was derived from segments of 40 CFR 141.86(a)(7) (2016).

4) Selection of sampling sites. Suppliers must select sampling sites for their sampling pool as follows:

A) CWS Suppliers. CWS suppliers must use CWS tier 1 sampling sites, except that the supplier may include CWS tier 2 or CWS tier 3 sampling sites in its sampling pool as follows:

i) If multiple-family residences comprise at least 20 percent of the structures served by a supplier, the supplier may use CWS tier 2 sampling sites in its sampling pool; or

BOARD NOTE: Subsection (a)(4)(A)(i) was derived from a segment of 40 CFR 141.86(a)(3)(ii) (2016).

ii) If the CWS supplier has an insufficient number of CWS tier 1 sampling sites on its distribution system, the supplier may use CWS tier 2 sampling sites in its sampling pool; or

BOARD NOTE: Subsection (a)(4)(A)(ii) was derived from a segment of 40 CFR 141.86(a)(4) (2016).

iii) If the CWS supplier has an insufficient number of CWS tier 1 and CWS tier 2 sampling sites on its distribution system, the supplier may complete its sampling pool with CWS tier 3 sampling sites.

BOARD NOTE: Subsection (a)(4)(A)(iii) was derived from a segment of 40 CFR 141.86(a)(5) (2016).

iv) If the CWS supplier has an insufficient number of CWS tier 1 sampling sites, CWS tier 2 sampling sites, and CWS tier 3 sampling sites, the supplier must use those CWS tier 1 sampling sites, CWS tier 2 sampling sites, and CWS tier 3 sampling sites that it has and complete its sampling pool with representative sites throughout its distribution system for the balance of its sampling sites. For the purpose of this subsection (a)(4)(A)(iv), a representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.

BOARD NOTE: Subsection (a)(4)(A)(iv) was derived from segments of 40 CFR 141.86(a)(5) (2016).

B) NTNCWS suppliers.

i) An NTNCWS supplier must select NTNCWS tier 1 sampling sites for its sampling pool.

BOARD NOTE: Subsection (a)(4)(B)(i) was derived from segments of 40 CFR 141.86(a)(6) (2016).

ii) If the NTNCWS supplier has an insufficient number of NTNCWS tier 1 sampling sites, the supplier may complete its sampling pool with alternative NTNCWS sampling sites.

BOARD NOTE: Subsection (a)(4)(B)(ii) was derived from segments of 40 CFR 141.86(a)(7) (2016).

iii) If the NTNCWS supplier has an insufficient number of NTNCWS tier 1 sampling sites and NTNCWS alternative sampling sites, the supplier must use representative sites throughout its distribution system. For the purpose of this subsection (a)(4)(B)(ii), a representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.

BOARD NOTE: Subsection (a)(4)(B)(iii) was derived from segments of 40 CFR 141.86(a)(7) (2016).

C) Suppliers with lead service lines. Any supplier whose distribution system contains lead service lines must draw samples during each six-month monitoring period from sampling sites as follows:

i) 50 percent of the samples from sampling sites that contain lead pipes or from sampling sites that have copper pipes with lead solder; and

ii) 50 percent of those samples from sites served by a lead service line.

iii) A supplier that cannot identify a sufficient number of sampling sites served by a lead service line must collect first-draw samples from all of the sites identified as being served by such lines.

BOARD NOTE: Subsection (a)(4)(C) was derived from segments of 40 CFR 141.86(a)(8) (2016). This allows the pool of sampling sites to consist exclusively of structures or buildings served by lead service lines.

b) Sample collection methods.

1) All tap samples for lead and copper collected in accordance with this Subpart G, with the exception of lead service line samples collected under Section 611.354(c) and samples collected under subsection (b)(5), must be first-draw samples.

2) First-draw tap samples.

A) Each first-draw tap sample for lead and copper must be one liter in volume and have stood motionless in the plumbing system of each sampling site for at least six hours.

B) First-draw samples from residential housing must be collected from the cold water kitchen tap or bathroom sink tap.

C) First-draw samples from a non-residential building must be one liter in volume and must be collected at an interior tap from which water is typically drawn for consumption.

D) Non-first-draw samples collected in lieu of first-draw samples under~~pursuant to~~ subsection (b)(5) must be one liter in volume and must be collected at an interior tap from which water is typically drawn for consumption.

E) First-draw samples may be collected by the supplier or the supplier may allow residents to collect first-draw samples after instructing the residents of the sampling procedures specified in this subsection (b).

i) To avoid problems of residents handling nitric acid, acidification of first-draw samples may be done up to 14 days after the sample is collected.

ii) After acidification to resolubilize the metals, the sample must stand in the original container for the time specified in the approved USEPA method before the sample can be analyzed.

F) If a supplier allows residents to perform sampling under subsection (b)(2)(D), the supplier may not challenge the accuracy of sampling results based on alleged errors in sample collection.

3) Service line samples.

A) Each service line sample must be one liter in volume and have stood motionless in the lead service line for at least six hours.

B) Lead service line samples must be collected in one of the following three ways:

i) At the tap after flushing that volume of water calculated as being between the tap and the lead service line based on the interior diameter and length of the pipe between the tap and the lead service line;

ii) Tapping directly into the lead service line; or

iii) If the sampling site is a single-family structure, allowing the water to run until there is a significant change in temperature that would be indicative of water that has been standing in the lead service line.

4) Follow-up first-draw tap samples.

A) A supplier must collect each follow-up first-draw tap sample from the same sampling site from which it collected the previous samples.

B) If, for any reason, the supplier cannot gain entry to a sampling site in order to collect a follow-up tap sample, the supplier may collect the follow-up tap sample from another sampling site in its sampling pool, as long as the new site meets the same targeting criteria and is within reasonable proximity of the original site.

5) Substitute non-first-draw samples.

A) A NTNCWS supplier or a CWS supplier that meets the criteria of Sections 611.355(b)(7)(A) and (b)(7)(B), that does not have enough taps that can supply first-draw samples, as defined in Section 611.102, may apply to the Agency in writing to substitute non-first-draw samples by a SEP ~~granted under Section 611.110~~.

B) A supplier approved to substitute non-first-draw samples must collect as many first-draw samples from appropriate taps as possible and identify sampling times and locations that would likely result in the longest standing time for the remaining sites.

C) The Agency may grant a SEP that waives the requirement for prior Agency approval of non-first-draw sampling sites selected by the system.

c) Number of samples.

1) Suppliers must collect at least one sample from the number of sites listed in the first column of Table D ~~of this Part~~ (labelled "standard monitoring") during each six-month monitoring period specified in subsection (d).

2) A supplier conducting reduced monitoring under~~pursuant to~~ subsection (d)(4) must collect one sample from the number of sites specified in the second column of Table D ~~of this Part~~ (labelled "reduced monitoring") during each reduced monitoring period specified in subsection (d)(4). Such reduced monitoring sites must be representative of the sites required for standard monitoring. A supplier whose system has fewer than five drinking water taps that can be used for human consumption and which can meet the sampling site criteria of subsection (a) to reach the required number of sampling sites listed in this subsection (c) must collect multiple samples from individual taps. To accomplish this, the supplier must collect at least one sample from each tap, then it must collect additional samples from those same taps on different days during the monitoring period, in order to collect a total number of samples that meets the required number of sampling sites. Alternatively, the Agency must, by a SEP ~~issued pursuant to Section 611.110~~, allow a supplier whose system has fewer than five drinking water taps to collect a number of samples that is fewer than the number of sites specified in this subsection (c) if it determines that 100 percent of all taps that can be used for human consumption are sampled and that the reduced number of samples will produce the same results as would the collection of multiple samples from some taps. Any Agency approval of a reduction of the minimum number of samples must be based on a request from the supplier or on on-site verification by the Agency. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, specify sampling locations when a system is conducting reduced monitoring.

d) Timing of monitoring.

1) Six-Month Sampling Periods. Six-month sampling periods begin on January 1 and July 1 of each year.

A) All large system suppliers must monitor during each consecutive six-month period, except as provided in subsection (d)(4)(B).

B) All small- and medium-sized system suppliers must monitor during each consecutive six-month monitoring period until the following is true:

i) The supplier exceeds the lead action level or the copper action level and is therefore required to implement the corrosion control treatment requirements under Section 611.351, in which case the supplier must continue monitoring in accordance with subsection (d)(2); or

ii) The supplier meets the lead action level and the copper action level during each of two consecutive six-month monitoring periods, in which case the supplier may reduce monitoring in accordance with subsection (d)(4).

2) Monitoring after installation of corrosion control and source water treatment.

A) Any large system supplier that installs optimal corrosion control treatment underpursuant to Section 611.351(d)(4) must monitor during two consecutive six-month monitoring periods.

B) Any small- or medium-sized system supplier that installs optimal corrosion control treatment underpursuant to Section 611.351(e)(5) must monitor during two consecutive six-month monitoring periods before 36 months after the Agency approves optimal corrosion control treatment, as specified in Section 611.351(e)(6).

C) Any supplier that installs source water treatment underpursuant to Section 611.353(a)(3) must monitor during two consecutive six-month monitoring periods before 36 months after completion of step 2, as specified in Section 611.353(a)(4).

3) Monitoring after the Agency specification of water quality parameter values for optimal corrosion control. After the Agency specifies the values for water quality control parameters underpursuant to Section 611.352(f), the supplier must monitor during each subsequent six-month monitoring period, with the first six-month monitoring period to begin on the date the Agency specifies the optimal values.

4) Reduced monitoring.

A) Reduction to annual for small- and medium-sized system suppliers meeting the lead and copper action levels. A small- or medium-sized system supplier that meets the lead and copper action levels

during each of two consecutive six-month monitoring periods may reduce the number of samples in accordance with subsection (c), and reduce the frequency of sampling to once per year. A small- or medium-sized system supplier that collects fewer than five samples as specified in subsection (c) and which meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce its frequency of sampling to once per year. In no case can the supplier reduce the number of samples required below the minimum of one sample per available tap. This reduced sampling may only begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.

B) SEP allowing reduction to annual for suppliers maintaining water quality control parameters.

i) Any supplier that meets the lead action level and which maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Agency under Section 611.352(f) during each of two consecutive six-month monitoring periods may reduce the frequency of monitoring to once per year and the number of lead and copper samples to that specified by subsection (c) if it receives written approval from the Agency in the form of a SEP ~~issued pursuant to Section 611.110~~. This reduced sampling may only begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.

ii) The Agency must review monitoring, treatment, and other relevant information submitted by the water system in accordance with Section 611.360, and must notify the system in writing by a SEP ~~issued pursuant to Sections 611.110~~ when it determines the system is eligible to reduce its monitoring frequency to once every three years <u>under</u>~~pursuant to~~ this subsection (d)(4).

iii) The Agency must review, and where appropriate, revise its determination under subsection (d)(4)(B)(i) when the supplier submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available to the Agency.

C) Reduction to triennial for small- and medium-sized system suppliers.

i) Small- and medium-sized system suppliers meeting lead and copper action levels. A small- or medium-sized system supplier that meets the lead action level and which meets the lead and copper action levels during three consecutive years of monitoring may reduce the frequency of monitoring for lead and copper from annually to once every three years.

ii) SEP for suppliers meeting optimal corrosion control treatment. Any supplier that maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Agency under Section 611.352(f) during three consecutive years of monitoring may reduce its monitoring frequency from annual to once every three years if it receives written approval from the Agency in the form of a SEP ~~issued pursuant to Section 611.110~~. Samples collected once every three years must be collected no later than every third calendar year.

iii) The Agency must review, and where appropriate, revise its determination under subsection (d)(4)(C)(ii) when the supplier submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available to the Agency.

D) Sampling at a reduced frequency. A supplier that reduces the number and frequency of sampling must collect these samples from representative sites included in the pool of targeted sampling sites identified in subsection (a), preferentially selecting those sampling sites from the highest tier first. Suppliers sampling annually or less frequently must conduct the lead and copper tap sampling during the months of June, July, August, or September, unless the Agency has approved a different sampling period in accordance with subsection (d)(4)(D)(i).

i) The Agency may grant a SEP ~~pursuant to Section 611.110~~ that approves a different period for conducting the lead and copper tap sampling for systems collecting a reduced number of samples. Such a period must be no longer than four consecutive months and must represent a time of

normal operation where the highest levels of lead are most likely to occur. For a NTNCWS supplier that does not operate during the months of June through September and for which the period of normal operation where the highest levels of lead are most likely to occur is not known, the Agency must designate a period that represents a time of normal operation for the system. This reduced sampling may only begin during the period approved or designated by the Agency in the calendar year immediately following the end of the second consecutive six-month monitoring period for systems initiating annual monitoring and during the three-year period following the end of the third consecutive calendar year of annual monitoring for a supplier initiating triennial monitoring.

ii) A supplier monitoring annually that has been collecting samples during the months of June through September and which receives Agency approval to alter its sample collection period under subsection (d)(4)(D)(i) must collect its next round of samples during a time period that ends no later than 21 months after the previous round of sampling. A supplier monitoring once every three years that has been collecting samples during the months of June through September and which receives Agency approval to alter the sampling collection period as provided in subsection (d)(4)(D)(i) must collect its next round of samples during a time period that ends no later than 45 months after the previous round of sampling. Subsequent rounds of sampling must be collected annually or once every three years, as required by this Section. A small system supplier with a waiver granted underpursuant to subsection (g) that has been collecting samples during the months of June through September and which receives Agency approval to alter its sample collection period under subsection (d)(4)(D)(i) must collect its next round of samples before the end of the nine-year compliance cycle (as that term is defined in Section 611.101).

E) Any water system that demonstrates for two consecutive six-month monitoring periods that the tap water lead level computed under Section 611.350(c)(3) is less than or equal to 0.005 mg/ℓ and that the tap water copper level computed under Section 611.350(c)(3) is less than or equal to 0.65 mg/ℓ may reduce the number of samples

in accordance with subsection (c) and reduce the frequency of sampling to once every three calendar years.

F) Resumption of standard monitoring.

i) Small- or medium-sized suppliers exceeding lead or copper action level. A small- or medium-sized system supplier subject to reduced monitoring that exceeds the lead action level or the copper action level must resume sampling in accordance subsection (d)(3) and collect the number of samples specified for standard monitoring under subsection (c). Such a supplier must also conduct water quality parameter monitoring in accordance with Section 611.357 (b), (c), or (d) (as appropriate) during the six-month monitoring period in which it exceeded the action level. Any such supplier may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in subsection (c) after it has completed two subsequent consecutive six-month rounds of monitoring that meet the criteria of subsection (d)(4)(A). Any such supplier may resume monitoring once every three years for lead and copper at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either subsection (d)(4)(C) or (d)(4)(E).

ii) Suppliers failing to operate within water quality control parameters. Any supplier subject to reduced monitoring frequency that fails to meet the lead action level during any four-month monitoring period or that fails to operate within the range of values for the water quality control parameters specified under~~pursuant to~~ Section 611.352(f) for more than nine days in any six-month period specified in Section 611.357(d) must conduct tap water sampling for lead and copper at the frequency specified in subsection (d)(3), must collect the number of samples specified for standard monitoring under subsection (c), and must resume monitoring for water quality parameters within the distribution system in accordance with Section 611.357(d). This standard tap water sampling must begin no later than the six-month period beginning January 1 of the calendar year following the lead action level exceedance or water quality parameter excursion. A supplier may resume reduced monitoring for lead and copper at the tap and for

water quality parameters within the distribution system only if it fulfills the conditions set forth in subsection (d)(4)(H).

BOARD NOTE: The Board moved the material from the last sentence of 40 CFR 141.86(d)(4)(vi)(B) and 40 CFR 141.86(d)(4)(vi)(B)(*1*) through (d)(4)(vi)(B)(*3*) (2007) to subsections (d)(4)(H) and (d)(4)(H)(i) through (d)(4)(H)(iii), since Illinois Administrative Code codification requirements allow subsections only to four indent levels.

G) Any water supplier subject to a reduced monitoring frequency under subsection (d)(4) must notify the Agency in writing in accordance with Section 611.360(a)(3) of any upcoming long-term change in treatment or addition of a new source as described in that Section. The Agency must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the supplier. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, require the system to resume sampling in accordance with subsection (d)(3) and collect the number of samples specified for standard monitoring under subsection (c) or take other appropriate steps such as increased water quality parameter monitoring or re-evaluation of its corrosion control treatment given the potentially different water quality considerations.

H) A supplier required under subsection (d)(4)(F) to resume monitoring in accordance with Section 611.357(d) may resume reduced monitoring for lead and copper at the tap and for water quality parameters within the distribution system under the following conditions:

i) The supplier may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in subsection (c) after it has completed two subsequent six-month rounds of monitoring that meet the criteria of subsection (d)(4)(B) and the supplier has received written approval from the Agency by a SEP ~~pursuant to Section 611.110~~ that it is appropriate to resume reduced monitoring on an annual frequency. This sampling must begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.

ii) The supplier may resume monitoring for lead and copper once every three years at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either subsection (d)(4)(C) or (d)(4)(E) and the system has received a SEP ~~under Section 611.110~~ from the Agency that it is appropriate to resume monitoring once every three years.

iii) The supplier may reduce the number of water quality parameter tap water samples required in accordance with Section 611.357(e)(1) and the frequency with which it collects such samples in accordance with Section 611.357(e)(2). Such a system may not resume monitoring once every three years for water quality parameters at the tap until it demonstrates, in accordance with the requirements of Section 611.357(e)(2), that it has re-qualified for monitoring once every three years.

BOARD NOTE: Subsections (d)(4)(H) and (d)(4)(H)(i) through (d)(4)(H)(iii) are derived from the last sentence of 40 CFR 141.86(d)(4)(vi)(B) and 40 CFR 141.86(d)(4)(vi)(B)(*1*) through (d)(4)(vi)(B)(*3*) (2016), since Illinois Administrative Code codification requirements allow only four indent levels of subsections.

e) Additional monitoring. The results of any monitoring conducted in addition to the minimum requirements of this Section must be considered by the supplier and the Agency in making any determinations (i.e., calculating the 90th percentile lead action level or the copper level) under this Subpart G.

f) Invalidation of lead or copper tap water samples. A sample invalidated under this subsection does not count toward determining lead or copper 90th percentile levels under Section 611.350(c)(3) or toward meeting the minimum monitoring requirements of subsection (c).

1) The Agency must invalidate a lead or copper tap water sample if it determines that one of the following conditions exists:

A) The laboratory establishes that improper sample analysis caused erroneous results;

B) The sample was taken from a site that did not meet the site selection criteria of this Section;

C) The sample container was damaged in transit; or

D) There is substantial reason to believe that the sample was subject to tampering.

2) The supplier must report the results of all samples to the Agency and all supporting documentation for samples the supplier believes should be invalidated.

3) To invalidate a sample under subsection (f)(1), the decision and the rationale for the decision must be documented in writing. The Agency may not invalidate a sample solely on the grounds that a follow-up sample result is higher or lower than that of the original sample.

4) The water supplier must collect replacement samples for any samples invalidated under this Section if, after the invalidation of one or more samples, the supplier has too few samples to meet the minimum requirements of subsection (c). Any such replacement samples must be taken as soon as possible, but no later than 20 days after the date the Agency invalidates the sample or by the end of the applicable monitoring period, whichever occurs later. Replacement samples taken after the end of the applicable monitoring period must not also be used to meet the monitoring requirements of a subsequent monitoring period. The replacement samples must be taken at the same locations as the invalidated samples or, if that is not possible, at locations other than those already used for sampling during the monitoring period.

g) Monitoring waivers for small system suppliers. Any small system supplier that meets the criteria of this subsection (g) may apply to the Agency to reduce the frequency of monitoring for lead and copper under this Section to once every nine years (i.e., a "full waiver") if it meets all of the materials criteria specified in subsection (g)(1) and all of the monitoring criteria specified in subsection (g)(2). Any small system supplier that meets the criteria in subsections (g)(1) and (g)(2) only for lead, or only for copper, may apply to the State for a waiver to reduce the frequency of tap water monitoring to once every nine years for that contaminant only (i.e., a "partial waiver").

1) Materials criteria. The supplier must demonstrate that its distribution system and service lines and all drinking water supply plumbing, including plumbing conveying drinking water within all residences and buildings connected to the system, are free of lead-containing materials or copper-containing materials, as those terms are defined in this subsection (g)(1), as follows:

A) Lead. To qualify for a full waiver, or a waiver of the tap water monitoring requirements for lead (i.e., a "lead waiver"), the water

supplier must provide certification and supporting documentation to the Agency that the system is free of all lead-containing materials, as follows:

i) It contains no plastic pipes that contain lead plasticizers, or plastic service lines that contain lead plasticizers; and

ii) It is free of lead service lines, lead pipes, lead soldered pipe joints, and leaded brass or bronze alloy fittings and fixtures, unless such fittings and fixtures meet the specifications of NSF Standard 61, section 9, incorporated by reference in Section 611.102.

BOARD NOTE: Corresponding 40 CFR 141.86(g)(1)(i)(B) specifies "any standard established pursuant to 42 USC 300g-6(e) (SDWA section 1417(e))." USEPA has stated that the NSF standard is that standard. See 62 Fed. Reg. 44684 (Aug. 22, 1997).

B) Copper. To qualify for a full waiver, or a waiver of the tap water monitoring requirements for copper (i.e., a "copper waiver"), the water supplier must provide certification and supporting documentation to the Agency that the system contains no copper pipes or copper service lines.

2) Monitoring criteria for waiver issuance. The supplier must have completed at least one six-month round of standard tap water monitoring for lead and copper at sites approved by the Agency and from the number of sites required by subsection (c) and demonstrate that the 90th percentile levels for any and all rounds of monitoring conducted since the system became free of all lead-containing or copper-containing materials, as appropriate, meet the following criteria:

A) Lead levels. To qualify for a full waiver, or a lead waiver, the supplier must demonstrate that the 90th percentile lead level does not exceed 0.005 mg/ℓ.

B) Copper levels. To qualify for a full waiver, or a copper waiver, the supplier must demonstrate that the 90th percentile copper level does not exceed 0.65 mg/ℓ.

3) State approval of waiver application. The Agency must notify the supplier of its waiver determination by a SEP ~~issued pursuant to Section 611.110~~, in writing, setting forth the basis of its decision and any condition of the waiver. As a condition of the waiver, the Agency may require the supplier

to perform specific activities (e.g., limited monitoring, periodic outreach to customers to remind them to avoid installation of materials that might void the waiver) to avoid the risk of lead or copper concentration of concern in tap water. The small system supplier must continue monitoring for lead and copper at the tap as required by subsections (d)(1) through (d)(4), as appropriate, until it receives written notification from the Agency that the waiver has been approved.

4) Monitoring frequency for suppliers with waivers.

A) A supplier with a full waiver must conduct tap water monitoring for lead and copper in accordance with subsection (d)(4)(D) at the reduced number of sampling sites identified in subsection (c) at least once every nine years and provide the materials certification specified in subsection (g)(1) for both lead and copper to the Agency along with the monitoring results. Samples collected every nine years must be collected no later than every ninth calendar year.

B) A supplier with a partial waiver must conduct tap water monitoring for the waived contaminant in accordance with subsection (d)(4)(D) at the reduced number of sampling sites specified in subsection (c) at least once every nine years and provide the materials certification specified in subsection (g)(1) pertaining to the waived contaminant along with the monitoring results. Such a supplier also must continue to monitor for the non-waived contaminant in accordance with requirements of subsections (d)(1) through (d)(4), as appropriate.

C) Any supplier with a full or partial waiver must notify the Agency in writing in accordance with Section 611.360(a)(3) of any upcoming long-term change in treatment or addition of a new source, as described in that Section. The Agency must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the supplier. The Agency has the authority to require the supplier to add or modify waiver conditions (e.g., require recertification that the supplier's system is free of lead-containing or copper-containing materials, require additional rounds of monitoring), if it deems such modifications are necessary to address treatment or source water changes at the system.

D) If a supplier with a full or partial waiver becomes aware that it is no longer free of lead-containing or copper-containing materials,

as appropriate (e.g., as a result of new construction or repairs), the supplier must notify the Agency in writing no later than 60 days after becoming aware of such a change.

5) Continued eligibility. If the supplier continues to satisfy the requirements of subsection (g)(4), the waiver will be renewed automatically, unless any of the conditions listed in subsections (g)(5)(A) through (g)(5)(C) occur. A supplier whose waiver has been revoked may re-apply for a waiver at such time as it again meets the appropriate materials and monitoring criteria of subsections (g)(1) and (g)(2).

A) A supplier with a full waiver or a lead waiver no longer satisfies the materials criteria of subsection (g)(1)(A) or has a 90th percentile lead level greater than 0.005 mg/ℓ.

B) A supplier with a full waiver or a copper waiver no longer satisfies the materials criteria of subsection (g)(1)(B) or has a 90th percentile copper level greater than 0.65 mg/ℓ.

C) The State notifies the supplier, in writing, that the waiver has been revoked, setting forth the basis of its decision.

6) Requirements following waiver revocation. A supplier whose full or partial waiver has been revoked by the Agency is subject to the corrosion control treatment and lead and copper tap water monitoring requirements, as follows:

A) If the supplier exceeds the lead or copper action level, the supplier must implement corrosion control treatment in accordance with the deadlines specified in Section 611.351(e), and any other applicable requirements of this Subpart G.

B) If the supplier meets both the lead and the copper action level, the supplier must monitor for lead and copper at the tap no less frequently than once every three years using the reduced number of sampling sites specified in subsection (c).

7) Pre-existing waivers. Small system supplier waivers approved by the Agency in writing prior to April 11, 2000 must remain in effect under the following conditions:

A) If the supplier has demonstrated that it is both free of lead-containing and copper-containing materials, as required by subsection (g)(1) and that its 90th percentile lead levels and 90th percentile copper levels meet the criteria of subsection (g)(2), the

waiver remains in effect so long as the supplier continues to meet the waiver eligibility criteria of subsection (g)(5). The first round of tap water monitoring conducted underpursuant to subsection (g)(4) must be completed no later than nine years after the last time the supplier monitored for lead and copper at the tap.

B) If the supplier has met the materials criteria of subsection (g)(1) but has not met the monitoring criteria of subsection (g)(2), the supplier must conduct a round of monitoring for lead and copper at the tap demonstrating that it met the criteria of subsection (g)(2). Thereafter, the waiver must remain in effect as long as the supplier meets the continued eligibility criteria of subsection (g)(5). The first round of tap water monitoring conducted underpursuant to subsection (g)(4) must be completed no later than nine years after the round of monitoring conducted underpursuant to subsection (g)(2).

BOARD NOTE: Derived from 40 CFR 141.86 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.358 Monitoring for Lead and Copper in Source Water

a) Sample location, collection methods, and number of samples.

1) A supplier that fails to meet the lead action level or the copper action level on the basis of tap samples collected in accordance with Section 611.356 must collect lead and copper source water samples in accordance with the following requirements regarding sample location, number of samples, and collection methods:

A) A groundwater supplier must take a minimum of one sample at every entry point to the distribution system that is representative of each well after treatment (hereafter called a sampling point). The supplier must take one sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

B) A surface water supplier must take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point that is representative of each source after treatment (hereafter called a sampling point). The system must take each sample at the same

sampling point unless conditions make another sampling point more representative of each source or treatment plant.
BOARD NOTE: For the purposes of this subsection (a)(1)(B), surface water systems include systems with a combination of surface and ground sources.

C) If a supplier draws water from more than one source and the sources are combined before distribution, the supplier must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water is representative of all sources being used).

D) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, reduce the total number of samples that must be analyzed by allowing the use of compositing. Compositing of samples must be done by certified laboratory personnel. Composite samples from a maximum of five samples are allowed, provided that if the lead concentration in the composite sample is greater than or equal to 0.001 mg/ℓ or the copper concentration is greater than or equal to 0.160 mg/ℓ, then the supplier must do either of the following:

i) The supplier must take and analyze a follow-up sample within 14 days at each sampling point included in the composite; or

ii) If duplicates of or sufficient quantities from the original samples from each sampling point used in the composite are available, the supplier may use these instead of resampling.

2) SEP requiring an additional sample.

A) When the Agency determines that the results of sampling indicate an exceedance of the lead or copper MPC established under Section 611.353(b)(4), it must, by a SEP ~~issued pursuant to Section 611.110~~, require the supplier to collect one additional sample as soon as possible after the initial sample at the same sampling point, but no later than two weeks after the supplier took the initial sample.

B) If a supplier takes an Agency-required confirmation sample for lead or copper, the supplier must average the results obtained from the initial sample with the results obtained from the confirmation

sample in determining compliance with the Agency-specified lead and copper MPCs.

i) Any analytical result below the MDL must be considered as zero for the purposes of averaging.

ii) Any value above the MDL but below the PQL must either be considered as the measured value or be considered one-half the PQL.

b) Monitoring frequency after system exceeds tap water action level. A supplier that exceeds the lead action level or the copper action level in tap sampling must collect one source water sample from each entry point to the distribution system no later than six months after the end of the monitoring period during which the lead or copper action level was exceeded. For monitoring periods that are annual or less frequent, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs, or if the Agency has established an alternate monitoring period by a SEP ~~issued pursuant to Section 611.110~~, the last day of that period.

c) Monitoring frequency after installation of source water treatment. A supplier that installs source water treatment under~~pursuant to~~ Section 611.353(a)(3) must collect an additional source water sample from each entry point to the distribution system during each of two consecutive six-month monitoring periods on or before 36 months after completion of step 2, as specified in Section 611.353(a)(4).

d) Monitoring frequency after the Agency has specified the lead and copper MPCs or has determined that source water treatment is not needed.

1) A supplier must monitor at the frequency specified by subsection (d)(1)(A) or (d)(1)(B) where the Agency has specified the MPCs under~~pursuant to~~ Section 611.353(b)(4) or has determined that the supplier is not required to install source water treatment pursuant to Section 611.353(b)(2).

A) GWS suppliers.

i) A GWS supplier required to sample by subsection (d)(1) must collect samples once during the three-year compliance period (as that term is defined in Section 611.101) during which the Agency makes its determination under~~pursuant to~~ Section 611.353(b)(4) or 611.353(b)(2).

ii) A GWS supplier required to sample by subsection (d)(1) must collect samples once during each subsequent compliance period.

iii) Triennial samples must be collected every third calendar year.

B) A SWS or mixed system supplier must collect samples once during each calendar year, the first annual monitoring period to begin during the year in which the Agency makes its determination under~~pursuant to~~ Section 611.353(b)(4) or 611.353(b)(2).

2) A supplier is not required to conduct source water sampling for lead or copper if the supplier meets the action level for the specific contaminant in all tap water samples collected during the entire source water sampling period applicable under subsection (d)(1)(A) or (d)(1)(B).

e) Reduced monitoring frequency.

1) A GWS supplier may reduce the monitoring frequency for lead and copper in source water to once during each nine-year compliance cycle (as that term is defined in Section 611.101), provided that the samples are collected no later than every ninth calendar year, and only if the supplier meets one of the following criteria:

A) The supplier demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the State in Section 611.353(b)(4) during at least three consecutive compliance periods under subsection (d)(1); or

B) The Agency has determined, by a SEP ~~issued pursuant to Section 611.110~~, that source water treatment is not needed and the system demonstrates that, during at least three consecutive compliance periods in which sampling was conducted under subsection (d)(1), the concentration of lead in source water was less than or equal to 0.005 mg/ℓ and the concentration of copper in source water was less than or equal to 0.65 mg/ℓ.

2) A SWS or mixed system supplier may reduce the monitoring frequency in subsection (d)(1) to once during each nine-year compliance cycle (as that term is defined in Section 611.101), provided that the samples are

collected no later than every ninth calendar year, and only if the supplier meets one of the following criteria:

A) The supplier demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the Agency under Section 611.353(b)(4) for at least three consecutive years; or

B) The Agency has determined, by a SEP ~~issued pursuant to Section 611.110~~, that source water treatment is not needed and the supplier demonstrates that, during at least three consecutive years, the concentration of lead in source water was less than or equal to 0.005 mg/ℓ and the concentration of copper in source water was less than or equal to 0.65 mg/ℓ.

3) A supplier that uses a new source of water is not eligible for reduced monitoring for lead or copper until it demonstrates by samples collected from the new source during three consecutive monitoring periods, of the appropriate duration provided by subsection (d)(1), that lead or copper concentrations are below the MPC as specified by the Agency underpursuant to Section 611.353(a)(4).

BOARD NOTE: Derived from 40 CFR 141.88 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.359 Analytical Methods

Analyses for lead, copper, pH, conductivity, calcium, alkalinity, orthophosphate, silica, and temperature must be conducted using the methods set forth in Section 611.611(a).

a) Analyses for lead and copper performed for the purposes of compliance with this Subpart G must only be conducted by a certified laboratory in one of the categories listed in Section 611.490(a). To obtain certification to conduct analyses for lead and copper, laboratories must do the following:

1) Analyze performance evaluation samples that include lead and copper provided by USEPA Environmental Monitoring and Support Laboratory or equivalent samples provided by the Agency;

2) Achieve quantitative acceptance limits as follows:

A) For lead: ±30 percent of the actual amount in the performance evaluation sample when the actual amount is greater than or equal to 0.005 mg/ℓ (the PQL for lead is 0.005 mg/ℓ);

B) For copper: ±10 percent of the actual amount in the performance evaluation sample when the actual amount is greater than or equal to 0.050 mg/ℓ (the PQL for copper is 0.050 mg/ℓ);

3) Achieve the method detection limit (MDL) for lead (0.001 mg/ℓ, as defined in Section 611.350(a)) according to the procedures in 35 Ill. Adm. Code 186 and appendix B to 40 CFR 136: "Definition and Procedure for the Determination of the Method Detection Limit—Revision 1.11", incorporated by reference in Section 611.102(c). This need only be accomplished if the laboratory will be processing source water composite samples under Section 611.358(a)(1)(D); and

4) Be currently certified to perform analyses to the specifications described in subsection (a)(1).

BOARD NOTE: Subsection (a) is derived from 40 CFR 141.89(a) and (a)(1) (2016).

b) The Agency must, by a SEP ~~issued pursuant to Section 611.110~~, allow a supplier to use previously collected monitoring data for the purposes of monitoring under this Subpart G if the data were collected and analyzed in accordance with the requirements of this Subpart G.

BOARD NOTE: Subsection (b) is derived from 40 CFR 141.89(a)(2) (2016).

c) Reporting lead and copper levels.

1) All lead and copper levels greater than or equal to the lead and copper PQL (Pb ≥ 0.005 mg/ℓ and Cu ≥ 0.050 mg/ℓ) must be reported as measured.

2) All lead and copper levels measured less than the PQL and greater than the MDL (0.005 mg/ℓ > Pb > MDL and 0.050 mg/ℓ > Cu > MDL) must be either reported as measured or as one-half the PQL set forth in subsection (a) (i.e., reported as 0.0025 mg/ℓ for lead or 0.025 mg/ℓ for copper).

3) All lead and copper levels below the lead and copper MDL (MDL > Pb) must be reported as zero.

BOARD NOTE: Subsection (c) is derived from 40 CFR 141.89(a)(3) and (a)(4) (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.360 Reporting

A supplier must report all of the following information to the Agency in accordance with this Section.

a) Reporting for tap, lead, and copper, and water quality parameter monitoring.

1) Except as provided in subsection (a)(1)(H), a supplier must report the following information for all samples specified in Section 611.356 and for all water quality parameter samples specified in Section 611.357 within ten days of the end of each applicable sampling period specified in Sections 611.356 and 611.357 (i.e., every six months, annually, every three years, or every nine years). For a monitoring period with a duration less than six months, the end of the monitoring period is the last date on which samples can be collected during that period, as specified in Sections 611.356 and 611.357.

A) The results of all tap samples for lead and copper, including the location of each site and the criteria under Section 611.356(a)(3) through (a)(7) under which the site was selected for the supplier's sampling pool;

B) Documentation for each tap water lead or copper sample for which the water supplier requests invalidation under~~pursuant to~~ Section 611.356(f)(2);

C) This subsection (a)(1)(C) corresponds with 40 CFR 141.90(a)(1)(iii), a provision that USEPA removed and marked "reserved." This statement preserves structural parity with the federal rules;

D) The 90th percentile lead and copper concentrations measured from among all lead and copper tap samples collected during each sampling period (calculated in accordance with Section 611.350(c)(3)), unless the Agency calculates the system's 90th percentile lead and copper levels under subsection (h);

E) With the exception of initial tap sampling conducted under~~pursuant to~~ Section 611.356(d)(1), the supplier must designate any site that was not sampled during previous sampling periods, and include an explanation of why sampling sites have changed;

F) The results of all tap samples for pH, and where applicable, alkalinity, calcium, conductivity, temperature, and orthophosphate or silica collected underpursuant to Section 611.357(b) through (e);

G) The results of all samples collected at entry points for applicable water quality parameters underpursuant to Section 611.357(b) through (e); and

H) A water supplier must report the results of all water quality parameter samples collected under Section 611.357(c) through (f) during each six-month monitoring period specified in Section 611.357(d) within the first 10 days following the end of the monitoring period, unless the Agency has specified, by a SEP issued pursuant to Section 611.110, a more frequent reporting requirement.

2) For a NTNCWS supplier, or a CWS supplier meeting the criteria of Sections 611.355(b)(7)(A) and (b)(7)(B), that does not have enough taps which can provide first-draw samples, the supplier must do either of the following:

A) Provide written documentation to the Agency that identifies standing times and locations for enough non-first-draw samples to make up its sampling pool under Section 611.356(b)(5), unless the Agency has waived prior Agency approval of non-first-draw sampling sites selected by the supplier pursuant to Section 611.356(b)(5); or

B) If the Agency has waived prior approval of non-first-draw sampling sites selected by the supplier, identify, in writing, each site that did not meet the six-hour minimum standing time and the length of standing time for that particular substitute sample collected underpursuant to Section 611.356(b)(5) and include this information with the lead and copper tap sample results required to be submitted underpursuant to subsection (a)(1)(A).

3) At a time specified by the Agency, by a SEP issued pursuant to Section 611.110, or if no specific time is designated by the Agency, then as early as possible prior to the addition of a new source or any change in water treatment, a water supplier deemed to have optimized corrosion control under Section 611.351(b)(3), a water supplier subject to reduced monitoring underpursuant to Section 611.356(d)(4), or a water supplier subject to a monitoring waiver underpursuant to Section 611.356(g), must

submit written documentation to the Agency describing the change or addition.

4) Any small system supplier applying for a monitoring waiver under Section 611.356(g), or subject to a waiver granted underpursuant to Section 611.356(g)(3), must provide the following information to the Agency in writing by the specified deadline:

A) By the start of the first applicable monitoring period in Section 611.356(d), any small water system supplier applying for a monitoring waiver must provide the documentation required to demonstrate that it meets the waiver criteria of Sections 611.356(g)(1) and (g)(2).

B) No later than nine years after the monitoring previously conducted underpursuant to Section 611.356(g)(2) or Section 611.356(g)(4)(A), each small system supplier desiring to maintain its monitoring waiver must provide the information required by Sections 611.356(g)(4)(A) and (g)(4)(B).

C) No later than 60 days after it becomes aware that it is no longer free of lead-containing or copper-containing material, as appropriate, each small system supplier with a monitoring waiver must provide written notification to the Agency, setting forth the circumstances resulting in the lead-containing or copper-containing materials being introduced into the system and what corrective action, if any, the supplier plans to remove these materials.

D) Any small system supplier with a waiver granted prior to April 11, 2000 and that had not previously met the requirements of Section 611.356(g)(2) must have provided the information required by that Section.

5) Each GWS supplier that limits water quality parameter monitoring to a subset of entry points under Section 611.357(c)(3) must provide, by the commencement of such monitoring, written correspondence to the Agency that identifies the selected entry points and includes information sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

b) Reporting for source water monitoring.

1) A supplier must report the sampling results for all source water samples collected in accordance with Section 611.358 within ten days of the end of

each source water sampling period (i.e., annually, per compliance period, per compliance cycle) specified in Section 611.358.

2) With the exception of the first round of source water sampling conducted underpursuant to Section 611.358(b), a supplier must specify any site that was not sampled during previous sampling periods, and include an explanation of why the sampling point has changed.

c) Reporting for corrosion control treatment. By the applicable dates under Section 611.351, a supplier must report the following information:

1) For a supplier demonstrating that it has already optimized corrosion control, the information required by Section 611.352(b)(2) or (b)(3).

2) For a supplier required to optimize corrosion control, its recommendation regarding optimal corrosion control treatment underpursuant to Section 611.352(a).

3) For a supplier required to evaluate the effectiveness of corrosion control treatments underpursuant to Section 611.352(c), the information required by Section 611.352(c).

4) For a supplier required to install optimal corrosion control approved by the Agency underpursuant to Section 611.352(d), a copy of the Agency permit letter, which acts as certification that the supplier has completed installing the permitted treatment.

d) Reporting for source water treatment. On or before the applicable dates in Section 611.353, a supplier must provide the following information to the Agency:

1) If required by Section 611.353(b)(1), its recommendation regarding source water treatment; or

2) For suppliers required to install source water treatment underpursuant to Section 611.353(b)(2), a copy of the Agency permit letter, which acts as certification that the supplier has completed installing the treatment approved by the Agency within 24 months after the Agency approved the treatment.

e) Reporting for lead service line replacement. A supplier must report the following information to the Agency to demonstrate compliance with the requirements of Section 611.354:

1) No later than 12 months after the end of a monitoring period in which a supplier exceeds the lead action level in sampling referred to in Section 611.354(a), the supplier must submit each of the following to the Agency in writing:

   A) The material evaluation conducted as required by Section 611.356(a);

   B) Identify the initial number of lead service lines in its distribution system at the time the supplier exceeds the lead action level; and

   C) Provide the Agency with the supplier's schedule for annually replacing at least seven percent of the initial number of lead service lines in its distribution system.

2) No later than 12 months after the end of a monitoring period in which a supplier exceeds the lead action level in sampling referred to in Section 611.354(a), and every 12 months thereafter, the supplier must demonstrate to the Agency in writing that the supplier has done either of the following:

   A) That the supplier has replaced, in the previous 12 months, at least seven percent of the initial number of lead service lines in its distribution system (or any greater number of lines specified by the Agency under~~pursuant to~~ Section 611.354(e)); or

   B) That the supplier has conducted sampling that demonstrates that the lead concentration in all service line samples from individual lines, taken under~~pursuant to~~ Section 611.356(b)(3), is less than or equal to 0.015 mg/ℓ. This demonstration requires that the total number of lines that the supplier has replaced, combined with the total number that meet the criteria of Section 611.354(c), must equal at least seven percent of the initial number of lead lines identified pursuant to subsection (e)(1) (or the percentage specified by the Agency under~~pursuant to~~ Section 611.354(e)).

3) The annual letter submitted to the Agency under~~pursuant to~~ subsection (e)(2) must contain the following information:

   A) The number of lead service lines originally scheduled to be replaced during the previous year of the supplier's replacement schedule;

   B) The number and location of each lead service line actually replaced during the previous year of the supplier's replacement schedule; and

C) If measured, the water lead concentration from each lead service line sampled underpursuant to Section 611.356(b)(3) and the location of each lead service line sampled, the sampling method used, and the date of sampling.

4) Any supplier that collects lead service line samples following partial lead service line replacement required by Section 611.354 must report the results to the Agency within the first ten days after the month following the month in which the supplier receives the laboratory results, or as specified by the Agency. The Agency may, by a SEP issued pursuant to Section 611.110, eliminate this requirement to report these monitoring results. A supplier must also report any additional information as specified by the Agency, and in a time and manner prescribed by the Agency, to verify that all partial lead service line replacement activities have taken place.

f) Reporting for public education program.

1) Any water supplier that is subject to the public education requirements in Section 611.355 must, within ten days after the end of each period in which the supplier is required to perform public education in accordance with Section 611.355(b), send written documentation to the Agency that contains the following:

A) A demonstration that the supplier has delivered the public education materials that meet the content requirements in Sections 611.355(a) and the delivery requirements in Section 611.355(b); and

B) A list of all the newspapers, radio stations, television stations, and facilities and organizations to which the supplier delivered public education materials during the period in which the supplier was required to perform public education tasks.

2) Unless required by the Agency, by a SEP issued pursuant to Section 611.110, a supplier that previously has submitted the information required by subsection (f)(1)(B) need not resubmit the information required by subsection (f)(1)(B), as long as there have been no changes in the distribution list and the supplier certifies that the public education materials were distributed to the same list submitted previously.

3) No later than three months following the end of the monitoring period, each supplier must mail a sample copy of the consumer notification of tap results to the Agency, along with a certification that the notification has

been distributed in a manner consistent with the requirements of Section 611.355(d).

g) Reporting of additional monitoring data. Any supplier that collects sampling data in addition to that required by this Subpart G must report the results of that sampling to the Agency within the first ten days following the end of the applicable sampling periods specified by Sections 611.356 through 611.358 during which the samples are collected.

h) Reporting of 90th percentile lead and copper concentrations where the Agency calculates a system's 90th percentile concentrations. A water supplier is not required to report the 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples collected during each monitoring period, as required by subsection (a)(1)(D) if the following is true:

1) The Agency has previously notified the water supplier that it will calculate the water system's 90th percentile lead and copper concentrations, based on the lead and copper tap results submitted underpursuant to subsection (h)(2)(A), and has specified a date before the end of the applicable monitoring period by which the supplier must provide the results of lead and copper tap water samples;

2) The supplier has provided the following information to the Agency by the date specified in subsection (h)(1):

A) The results of all tap samples for lead and copper including the location of each site and the criteria under Section 611.356(a)(3), (a)(4), (a)(5), (a)(6), or (a)(7) under which the site was selected for the system's sampling pool, underpursuant to subsection (a)(1)(A); and

B) An identification of sampling sites utilized during the current monitoring period that were not sampled during previous monitoring periods, and an explanation why sampling sites have changed; and

3) The Agency has provided the results of the 90th percentile lead and copper calculations, in writing, to the water supplier before the end of the monitoring period.

BOARD NOTE: Derived from 40 CFR 141.90 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART I: DISINFECTANT RESIDUALS, DISINFECTION BYPRODUCTS, AND DISINFECTION BYPRODUCT PRECURSORS

Section 611.381 Analytical Requirements

a) A supplier must use only the analytical methods specified in this Section, each of which is incorporated by reference in Section 611.102, or alternative methods approved by the Agency under~~pursuant to~~ Section 611.480 to demonstrate compliance with the requirements of this Subpart I and with the requirements of Subparts W and Y.

b) Disinfection byproducts (DBPs).

1) A supplier must measure disinfection byproducts (DBPs) by the appropriate of the following methods:

A) TTHM:

i) By purge and trap, gas chromatography, electrolytic conductivity detector, and photoionization detector: USEPA Organic Methods, Method 502.2 (rev. 2.1). If TTHMs are the only analytes being measured in the sample, then a photoionization detector is not required.

ii) By purge and trap, gas chromatography-mass spectrometer: USEPA Organic Methods, Method 524.2 (rev. 4.1).

iii) By liquid-liquid extraction, gas chromatography, electron capture detector: USEPA Organic Methods, Method 551.1 (rev. 1.0).

iv) By purge and trap, gas chromatography-mass spectrometry: USEPA OGWDW Methods, Method 524.3 (rev. 1.0) and 524.4.

BOARD NOTE: USEPA added USEPA OGWDW Methods, Method 524.3 (rev. 1.0) as an approved alternative method on August 3, 2009 (at 74 Fed. Reg. 38348). USEPA added USEPA OGWDW Methods, Method 524.4 as approved alternative methods on May 31, 2013 (at 78 Fed. Reg. 32558).

B) HAA5:

i) By liquid-liquid extraction (diazomethane), gas chromatography, electron capture detector: Standard Methods, 19th, 20th, 21st, or 22nd ed., Method 6251 B.

ii) By solid phase extractor (acidic methanol), gas chromatography, electron capture detector: USEPA Organic Methods, Method 552.1 (rev. 1.0).

iii) By liquid-liquid extraction (acidic methanol), gas chromatography, electron capture detector: USEPA Organic Methods, Method 552.2 (rev. 1.0) or USEPA OGWDW Methods, Method 552.3 (rev. 1.0).

iv) By ion chromatography, electrospray ionization, tandem mass spectrometry: USEPA OGWDW Methods, Method 557.

v) Two-dimensional ion chromatography (IC) with suppressed conductivity detection: Thermo-Fisher Method 557.1.

BOARD NOTE: USEPA added Standard Methods, 21st ed., Method 6251 B as an approved alternative method on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added USEPA OGWDW Methods, Method 557 as an approved alternative method on November 10, 2009 (at 74 Fed. Reg. 57908). USEPA added Standard Methods, 22nd ed., Method 6251 B as an approved alternative method on May 31, 2013 (at 78 Fed. Reg. 32558). USEPA added Standard Methods Online, Method 6251 B-07 as an approved alternative method on June 19, 2014 (at 79 Fed. Reg. 35081). USEPA added Thermo-Fisher Method 557.1 as an approved alternative method on July 27, 2017 (at 82 Fed. Reg. 34861). Because Standard Methods, 22nd ed., Method 6251 B is the same version as Standard Methods Online, Method 6251 B-07, the Board has not listed the Standard Methods Online versions separately.

C) Bromate:

i) By ion chromatography: USEPA Organic and Inorganic Methods, Method 300.1 (rev. 1.0) or ASTM Method D6581-00.

ii) By ion chromatography and post-column reaction: USEPA OGWDW Methods, Method 317.0 (rev. 2.0) or 326.0 (rev. 1.0).

iii) By inductively coupled plasma-mass spectrometer: USEPA Organic and Inorganic Methods, Method 321.8 (rev. 1.0).

iv) By two-dimensional ion chromatography: USEPA OGWDW Methods, Method 302.0.

v) By ion chromatography, electrospray ionization, tandem mass spectrometry: USEPA OGWDW Methods, Method 557.

vi) By chemically suppressed chromatography: ASTM Method D6581-08 A.

vii) By electrolytically suppressed chromatography: ASTM Method D6581-08 B.

BOARD NOTE: Ion chromatography and post column reaction or inductively coupled plasma-mass spectrometry must be used for monitoring of bromate for purposes of demonstrating eligibility of reduced monitoring, as prescribed in Section 611.382(b)(3)(B). For inductively coupled plasma-mass spectrometry, samples must be preserved at the time of sampling with 50 mg ethylenediamine (EDA) per liter of sample, and the samples must be analyzed within 28 days.

BOARD NOTE: USEPA added USEPA OGWDW Methods, Methods 302.0 and 557 and ASTM Methods D6581-08 A and B as approved alternative methods on November 10, 2009 (at 74 Fed. Reg. 57908).

D) Chlorite:

i) By amperometric titration for daily monitoring <u>under</u>~~pursuant to~~ Section 611.382(b)(2)(A)(i): Standard Methods, 19th, 21st, or 22nd ed., Method 4500-ClO_2 E.

ii) By amperometric sensor for daily monitoring <u>under</u>~~pursuant to~~ Section 611.382(b)(2)(A)(i): ChlordioX Plus Test.

iii) By spectrophotometry: USEPA OGWDW Methods, Method 327.0 (rev. 1.1).

iv) By ion chromatography: USEPA Environmental Inorganic Methods, Method 300.0 (rev. 2.1); USEPA Organic and Inorganic Methods, Method 300.1 (rev. 1.0); USEPA OGWDW Methods, Method 317.0 (rev. 2.0), or 326.0 (rev. 1.0); or ASTM Method D6581-00.

v) By chemically suppressed chromatography: ASTM Method D6581-08 A.

vi) By electrolytically suppressed chromatography: ASTM Method D6581-08 B.

BOARD NOTE: USEPA added Standard Methods, 21st ed., Method 4500-ClO_2 E as an approved alternative method on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added ASTM Methods D6581-08 A and B as approved alternative methods on November 10, 2009 (at 74 Fed. Reg. 57908). USEPA added Standard Methods, 22nd ed., Method 4500-ClO_2 E as an approved alternative method on June 21, 2013 (at 78 Fed. Reg. 37463). USEPA added ChlordioX Plus Test as an approved alternative method on June 19, 2014 (at 79 Fed. Reg. 35081).

BOARD NOTE: Amperometric titration or spectrophotometry may be used for routine daily monitoring of chlorite at the entrance to the distribution system, as prescribed in Section 611.382(b)(2)(A)(i). Ion chromatography must be used for routine monthly monitoring of chlorite and additional monitoring of chlorite in the distribution system, as prescribed in Section 611.382(b)(2)(A)(ii) and (b)(2)(B).

2) Analyses under this Section for DBPs must be conducted by a certified laboratory in one of the categories listed in Section 611.490(a) except as specified under subsection (b)(3). To receive certification to conduct analyses for the DBP contaminants listed in Sections 611.312 and 611.381 and Subparts W and Y, the laboratory must fulfill the requirements of subsections (b)(2)(A), (b)(2)(C), and (b)(2)(D).

A) The laboratory must analyze performance evaluation (PE) samples that are acceptable to USEPA or the Agency at least once during each consecutive 12-month period by each method for which the laboratory desires certification.

B) This subsection corresponds with 40 CFR 141.131(b)(2)(ii), which has expired by its own terms. This statement maintains structural consistency with the corresponding federal rule.

C) The laboratory must achieve quantitative results on the PE sample analyses that are within the acceptance limits set forth in subsections (b)(2)(C)(i) through (b)(2)(B)(xi), subject to the conditions of subsections (b)(2)(C)(xii) and (b)(2)(C)(xiii):

i) Chloroform (a THM): ±20% of true value;

ii) Bromodichloromethane (a THM): ±20% of true value;

iii) Dibromochloromethane (a THM): ±20% of true value;

iv) Bromoform (a THM): ±20% of true value;

v) Monochloroacetic Acid (an HAA5): ±40% of true value;

vi) Dichloroacetic Acid (an HAA5): ±40% of true value;

vii) Trichloroacetic Acid (an HAA5): ±40% of true value;

viii) Monobromoacetic Acid (an HAA5): ±40% of true value;

ix) Dibromoacetic Acid (an HAA5): ±40% of true value;

x) Chlorite: ±30% of true value; and

xi) Bromate: ±30% of true value.

xii) The laboratory must meet all four of the individual THM acceptance limits set forth in subsections (b)(2)(B)(i) through (b)(2)(B)(iv) in order to successfully pass a PE sample for TTHM.

xiii) The laboratory must meet the acceptance limits for four out of the five HAA5 compounds set forth in subsections (b)(2)(B)(v) through (b)(2)(B)(ix) in order to successfully pass a PE sample for HAA5.

D) The laboratory must report quantitative data for concentrations at least as low as the minimum reporting levels (MRLs) listed in subsections (b)(2)(D)(i) through (b)(2)(D)(xi), subject to the limitations of subsections (b)(2)(D)(xii) and (b)(2)(D)(xiii), for all

DBP samples analyzed for compliance with Sections 611.312 and 611.385 and Subparts W and Y:

i) Chloroform (a THM): 0.0010 mg/ℓ;

ii) Bromodichloromethane (a THM): 0.0010 mg/ℓ;

iii) Dibromochloromethane (a THM): 0.0010 mg/ℓ;

iv) Bromoform (a THM): 0.0010 mg/ℓ;

v) Monochloroacetic Acid (an HAA5): 0.0020 mg/ℓ;

vi) Dichloroacetic Acid (an HAA5): 0.0010 mg/ℓ;

vii) Trichloroacetic Acid (an HAA5): 0.0010 mg/ℓ;

viii) Monobromoacetic Acid (an HAA5): 0.0010 mg/ℓ;

ix) Dibromoacetic Acid (an HAA5): 0.0010 mg/ℓ;

x) Chlorite: 0.020 mg/ℓ, applicable to monitoring as required by Section 611.382(b)(2)(A)(ii) and (b)(2)(B); and

xi) Bromate: 0.0050, or 0.0010 mg/ℓ if the laboratory uses USEPA OGWDW Methods, Method 317.0 or 326.0 or USEPA Organic and Inorganic Methods, Method 321.8.

xii) The calibration curve must encompass the regulatory MRL concentration. Data may be reported for concentrations lower than the regulatory MRL as long as the precision and accuracy criteria are met by analyzing an MRL check standard at the lowest reporting limit chosen by the laboratory. The laboratory must verify the accuracy of the calibration curve at the MRL concentration by analyzing an MRL check standard with a concentration less than or equal to 110% of the MRL with each batch of samples. The measured concentration for the MRL check standard must be ±50% of the expected value, if any field sample in the batch has a concentration less than five times the regulatory MRL. Method requirements to analyze higher concentration check standards and meet tighter acceptance criteria for them must be met in addition to the MRL check standard requirement.

xiii) When adding the individual trihalomethane or haloacetic acid concentrations, for the compounds listed in subsections (b)(2)(D)(v) through (b)(2)(D)(ix), to calculate the TTHM or HAA5 concentrations, respectively, a zero is used for any analytical result that is less than the MRL concentration for that DBP, unless otherwise specified by the Agency.

3) A party approved by USEPA or the Agency must measure daily chlorite samples at the entrance to the distribution system.

c) Disinfectant residuals.

1) A supplier must measure residual disinfectant concentrations for free chlorine, combined chlorine (chloramines), and chlorine dioxide by the appropriate of the methods listed in subsections (c)(1)(A) through (c)(1)(D), subject to the provisions of subsection (c)(1)(E):

A) Free Chlorine:

i) Amperometric titration: Standard Methods, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl D, or ASTM Method D1253-86, D1253-96, D1253-03, D1253-08, or D1253-14;

ii) DPD ferrous titration: Standard Methods, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl F;

iii) DPD colorimetric: Standard Methods, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl G or Hach Method 10260;

iv) Syringaldazine (FACTS): Standard Methods, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl H;

v) Test strips: ITS Method D99-003 if approved by the Agency underpursuant to subsection (c)(2);

vi) Amperometric sensor: Palintest ChloroSense;

vii) On-line chlorine analyzer: USEPA OGWDW Methods, Method 334.0; or

viii) Indenophenol colorimetric: Hach Method 10241.

BOARD NOTE: USEPA added Standard Methods, 21st ed., Methods 4500-Cl D, F, G, and H as approved alternative methods

on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added ASTM Method D1253-08, USEPA OGWDW Methods, Method 334.0, and Palintest ChloroSense as approved alternative methods on November 10, 2009 (at 74 Fed. Reg. 57908). USEPA added Standard Methods, 22nd ed., Methods 4500-Cl D, F, G, and H as approved alternative methods on June 21, 2013 (at 78 Fed. Reg. 37463). USEPA added Hach Method 10260 as an approved alternative method on June 19, 2014 (at 79 Fed. Reg. 35081). USEPA added ASTM Method D1253-14 and Hach Method 10241 as approved alternative methods on July 19, 2016 (at 81 Fed. Reg. 46839).

B) Combined Chlorine:

i) Amperometric titration: Standard Methods, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl D, or ASTM Method D1253-86, D1253-96, D1253-03, D1253-08, or D1253-14;

ii) DPD ferrous titration: Standard Methods, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl F; or

iii) DPD colorimetric: Standard Methods, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl G or Hach Method 10260.

BOARD NOTE: USEPA added Standard Methods, Methods 4500-Cl D, F, and G as approved alternative methods on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added ASTM Method D1253-08 as an approved alternative method on November 10, 2009 (at 74 Fed. Reg. 57908). USEPA added Standard Methods, 22nd ed., Methods 4500-Cl D, F, and G as approved alternative methods on June 21, 2013 (at 78 Fed. Reg. 37463). USEPA added Hach Method 10260 as an approved alternative method on June 19, 2014 (at 79 Fed. Reg. 35081). USEPA added ASTM Method D1253-14 as an approved alternative method on July 19, 2016 (at 81 Fed. Reg. 46839).

C) Total Chlorine:

i) Amperometric titration: Standard Methods, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl D, or ASTM Method D1253-86, D1253-96, D1253-03, D1253-08, or D1253-14;

ii) Low-level amperometric titration: Standard Methods, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl E;

iii) DPD ferrous titration: Standard Methods, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl F;

iv) DPD colorimetric: Standard Methods, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl G or Hach Method 10260;

v) Iodometric electrode: Standard Methods, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl I;

vi) Amperometric sensor: Palintest ChloroSense; or

vii) On-line chlorine analyzer: USEPA OGWDW Methods, Method 334.0.

BOARD NOTE: USEPA added Standard Methods, Methods 4500-Cl D, E, F, G, and I as approved alternative methods on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added ASTM Method D1253-08, USEPA OGWDW Methods, Method 334.0, and Palintest ChloroSense as approved alternative methods on November 10, 2009 (at 74 Fed. Reg. 57908). USEPA added Standard Methods, 22nd ed., Methods 4500-Cl D, E, F, G, and I as approved alternative methods on June 21, 2013 (at 78 Fed. Reg. 37463). USEPA added Hach Method 10260 as an approved alternative method on June 19, 2014 (at 79 Fed. Reg. 35081). USEPA added ASTM Method D1253-14 as an approved alternative method on July 19, 2016 (at 81 Fed. Reg. 46839).

D) Chlorine Dioxide:

i) DPD: Standard Methods, 19th, 20th, or 21st ed., Method 4500-ClO_2 D;

ii) Amperometric Method II: Standard Methods, 19th, 20th, 21st, or 22nd ed., Method 4500-ClO_2 E;

iii) Amperometric sensor: ChlordioX Plus Test; or

iv) Lissamine Green spectrophotometric: USEPA OGWDW Method 327.0 (rev. 1.1).

BOARD NOTE: USEPA added Standard Methods, 21st ed., Methods 4500-ClO_2 D and E as approved alternative methods on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added Standard Methods, 22nd ed., Method 4500-ClO_2 E as an approved alternative method on June 21, 2013 (at 78 Fed. Reg. 37463).

USEPA added ChlordioX Plus Test as an approved alternative method on June 19, 2014 (at 79 Fed. Reg. 35081).

E) The methods listed are approved for measuring the specified disinfectant residual. The supplier may measure free chlorine or total chlorine for demonstrating compliance with the chlorine MRDL and combined chlorine, or total chlorine may be measured for demonstrating compliance with the chloramine MRDL.

2) Alternative methods available only upon specific approval by the Agency.

A) Test strips: ITS Method D99-003.

BOARD NOTE: USEPA added ITS Method D99-003 as an approved alternative method on June 3, 2008 (at 73 Fed. Reg. 31616), contingent upon specific state approval. The Board has opted to provide that the Agency can grant such approvals on a case-by-case basis using the SEP mechanism.

B) If approved by the Agency, by an SEP ~~issued pursuant to Section 611.110~~, a supplier may also measure residual disinfectant concentrations for chlorine, chloramines, and chlorine dioxide by using DPD colorimetric test kits.

3) A party approved by USEPA or the Agency must measure residual disinfectant concentration.

d) A supplier required to analyze parameters not included in subsections (b) and (c) must use the methods listed below. A party approved by USEPA or the Agency must measure the following parameters:

1) Alkalinity. All methods allowed in Section 611.611(a)(21) for measuring alkalinity.

2) Bromide:

A) USEPA Inorganic Methods, Method 300.0 (rev. 2.1);

B) USEPA Organic and Inorganic Methods, Method 300.1 (rev. 1.0);

C) USEPA OGWDW Methods, Method 317.0 (rev. 2.0) or Method 326.0 (rev. 1.0); or

D) ASTM Method D6581-00.

3) Total Organic Carbon (TOC), by any of the methods listed in subsection (d)(3)(A)(i), (d)(3)(A)(ii), (d)(3)(A)(iii), or (d)(3)(B), subject to the limitations of subsection (d)(3)(C):

A) High-temperature combustion:

i) Standard Methods, 19th (Supplement), 20th, 21st, or 22nd ed., Method 5310 B; or

ii) USEPA NERL Method 415.3 (rev. 1.1) or USEPA NERL Method 415.3 (rev. 1.2).

B) Persulfate-ultraviolet or heated-persulfate oxidation:

i) Standard Methods, 19th (Supplement), 20th, 21st, or 22nd ed., Method 5310 C; or

ii) USEPA NERL Method 415.3 (rev. 1.1) or USEPA NERL Method 415.3 (rev. 1.2); or

iii) Hach Method 10267.

C) Wet oxidation method:

i) Standard Methods, 19th (Supplement), 20th, 21st, or 22nd ed., Method 5310 D; or

ii) USEPA NERL Method 415.3 (rev. 1.1) or USEPA NERL Method 415.3 (rev. 1.2).

D) Ozone oxidation: Hach Method 10261.

E) Inorganic carbon must be removed from the samples prior to analysis. TOC samples may not be filtered prior to analysis. TOC samples must be acidified at the time of sample collection to achieve pH less than or equal to 2 with minimal addition of the acid specified in the method or by the instrument manufacturer. Acidified TOC samples must be analyzed within 28 days.

BOARD NOTE: USEPA added Standard Methods, 21st ed., Methods 5310 B, C, and D as approved alternative methods on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added USEPA NERL Method 415.3 (rev. 1.2) as an approved alternative method on November 10, 2009 (at 74 Fed. Reg. 57908). USEPA added Standard Methods, 22nd ed., Methods 5310 B, C, and D as approved alternative methods on June 21, 2013 (at 78 Fed. Reg.

37463). USEPA added Hach Method 10267 as an approved alternative method on July 19, 2016 (at 81 Fed. Reg. 46839).

4) Specific Ultraviolet Absorbance (SUVA). SUVA is equal to the UV absorption at 254 nm (UV_{254}) (measured in m^{-1}) divided by the dissolved organic carbon (DOC) concentration (measured as mg/ℓ). In order to determine SUVA, it is necessary to separately measure UV_{254} and DOC. When determining SUVA, a supplier must use the methods stipulated in subsection (d)(4)(A) to measure DOC and the method stipulated in subsection (d)(4)(B) to measure UV_{254}. SUVA must be determined on water prior to the addition of disinfectants/oxidants by the supplier. DOC and UV_{254} samples used to determine a SUVA value must be taken at the same time and at the same location.

A) Dissolved Organic Carbon (DOC). Prior to analysis, DOC samples must be filtered through the 0.45 μm pore-diameter filter as soon as practical after sampling, not to exceed 48 hours. After filtration, DOC samples must be acidified to achieve pH less than or equal to 2 with minimal addition of the acid specified in the method or by the instrument manufacturer. Acidified DOC samples must be analyzed within 28 days after sample collection. Inorganic carbon must be removed from the samples prior to analysis. Water passed through the filter prior to filtration of the sample must serve as the filtered blank. This filtered blank must be analyzed using procedures identical to those used for analysis of the samples and must meet the following standards: DOC less than 0.5 mg/ℓ.

i) High-Temperature Combustion Method: Standard Methods, 19th (Supplement), 20th, 21st, or 22nd ed., Method 5310 B or USEPA NERL Methods 415.3 (rev. 1.1) or 415.3 (rev. 1.2).

ii) Persulfate-Ultraviolet or Heated-Persulfate Oxidation Method, Standard Methods, 19th (Supplement), 20th, 21st, or 22nd ed., Method 5310 C or USEPA NERL Methods 415.3 (rev. 1.1) or 415.3 (rev. 1.2).

iii) Wet-Oxidation Method: Standard Methods, 19th (Supplement), 20th, 21st, or 22nd ed., Method 5310 D or USEPA NERL Methods 415.3 (rev. 1.1) or 415.3 (rev. 1.2).

BOARD NOTE: USEPA added Standard Methods, Methods 5310 B, C, and D as approved alternative methods on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added USEPA NERL Method 415.3

(rev. 1.2) as an approved alternative method on November 10, 2009 (at 74 Fed. Reg. 57908). USEPA added Standard Methods, 22nd ed., Methods 5310 B, C, and D as approved alternative methods on June 21, 2013 (at 78 Fed. Reg. 37463).

B) Ultraviolet Absorption at 254 nm (UV_{254}) by spectrometry: Standard Methods, 19th, 20th, 21st, or 22nd ed., Method 5910 B or USEPA NERL Method 415.3 (rev. 1.1) or 415.3 (rev. 1.2). UV absorption must be measured at 253.7 nm (may be rounded off to 254 nm). Prior to analysis, UV_{254} samples must be filtered through a 0.45 μm pore-diameter filter. The pH of UV_{254} samples may not be adjusted. Samples must be analyzed as soon as practical after sampling, not to exceed 48 hours; and

BOARD NOTE: USEPA added Standard Methods, 21st ed., Method 5910 B as an approved alternative method on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added USEPA NERL Method 415.3 (rev. 1.2) as an approved alternative method on November 10, 2009 (at 74 Fed. Reg. 57908). USEPA added Standard Methods, 22nd ed., Method 5910 B as an approved alternative method on June 21, 2013 (at 78 Fed. Reg. 37463). USEPA added Standard Methods Online, Method 5910 B-11 as an approved alternative method on June 19, 2014 (at 79 Fed. Reg. 35081). Because Standard Methods, 22nd ed., Methods 5910 B is the same version as Standard Methods Online, Method 5910 B-11, the Board has not listed the Standard Methods Online versions separately.

5) pH. All methods allowed in Section 611.611(a)(17) for measuring pH.

6) Magnesium. All methods allowed in Section 611.611(a) for measuring magnesium.

BOARD NOTE: Derived from 40 CFR 141.131 and appendix A to 40 CFR 141 (2017).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART K: GENERAL MONITORING AND ANALYTICAL REQUIREMENTS

Section 611.480 Alternative Analytical Techniques

The Agency must approve, by a SEP ~~issued pursuant to Section 611.110~~, an alternative analytical technique if it determines that USEPA has approved the method as an alternative method by adding it to 40 CFR 141 and the Board has not incorporated the federal approval into

this Part 611. The Agency must not approve an alternative analytical technique without the concurrence of USEPA. The use of the alternative analytical technique must not decrease the frequency of monitoring required by this Part.

BOARD NOTE: Derived from 40 CFR 141.27 (2007).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.491 Laboratory Testing Equipment (Repealed)

~~a)~~ ~~Each CWS supplier must have adequate laboratory equipment and capability to perform operational tests (except bacteriological) appropriate to the parameters to be tested and the type of treatment employed. Such equipment must be in good operating condition, and the operator on duty must be familiar with the procedure for performing the tests.~~

~~b)~~ ~~Nothing in this Subpart K may be construed to prevent a CWS supplier from running control laboratory tests in an uncertified laboratory. These results are not to be included in the required monitoring results.~~

~~BOARD NOTE: This is an additional State requirement~~.

(Source: Repealed at 42 Ill. Reg. _____, effective _____)

Section 611.500 Consecutive PWSs

When a PWS supplies water to one or more other PWSs, the Agency must modify the monitoring requirements imposed by this Part to the extent that the interconnection of the PWSs justifies treating them as a single PWS for monitoring purposes. Any modified monitoring must be conducted underpursuant to a schedule specified by a SEP ~~issued pursuant to Section 611.110~~. The Agency must not approve such modified monitoring without the concurrence of USEPA.

BOARD NOTE: Derived from 40 CFR 141.29 (2002).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART L: MICROBIOLOGICAL MONITORING AND ANALYTICAL REQUIREMENTS

Section 611.531 Analytical Requirements

The analytical methods specified in this Section, or alternative methods approved by the Agency underpursuant to Section 611.480, must be used to demonstrate compliance with the requirements of only 611.Subpart B. Measurements for pH, temperature, turbidity, and RDCs

must be conducted under the supervision of a certified operator. Measurements for total coliforms, fecal coliforms and HPC must be conducted by a certified laboratory in one of the categories listed in Section 611.490(a). The following procedures must be performed by the following methods, incorporated by reference in Section 611.102:

a) A supplier must conduct analyses as follows:

1) The supplier must conduct analyses for pH and temperature in accordance with one of the methods listed at Section 611.611; and

2) The supplier must conduct analyses for total coliforms, fecal coliforms, heterotrophic bacteria, and turbidity in accordance with one of the following methods, and by using analytical test procedures contained in USEPA Technical Notes, incorporated by reference in Section 611.102, as follows:

A) Total Coliforms.

BOARD NOTE: The time from sample collection to initiation of analysis for source (raw) water samples required by Section 611.532 and Subpart B only must not exceed eight hours. The supplier is encouraged but not required to hold samples below 10° C during transit.

i) Total coliform fermentation technique: Standard Methods, 18th, 19th, 20th, 21st, or 22nd ed., Method 9221 A, B, and C.

BOARD NOTE: Lactose broth, as commercially available, may be used in lieu of lauryl tryptose broth if the supplier conducts at least 25 parallel tests between this medium and lauryl tryptose broth using the water normally tested and this comparison demonstrates that the false-positive rate and false-negative rate for total coliforms, using lactose broth, is less than 10 percent. If inverted tubes are used to detect gas production, the media should cover these tubes at least one-half to two-thirds after the sample is added. No requirement exists to run the completed phase on 10 percent of all total coliform-positive confirmed tubes.

ii) Total coliform membrane filter technique: Standard Methods, 18th, 19th, 20th, 21st, or 22nd ed., Method 9222 A, B, and C.

iii) ONPG-MUG test (also known as the Colilert® Test):

Standard Methods, 18th, 19th, 20th, or 21st ed., Method 9223 or Standard Methods, 21st or 22nd ed., Method 9223 B.

BOARD NOTE: USEPA added Standard Methods, 21st ed., Methods 9221 A, B, and C; 9222 A, B, and C; and 9223 as approved alternative methods on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added Standard Methods, 22nd ed., Methods 9221 A, B, and C and 9223 B as approved alternative methods on June 21, 2013 (at 78 Fed. Reg. 37463). USEPA added Standard Methods Online, Methods 9221 A, B, and C-06 and 9223 B-04 as approved alternative methods on June 19, 2014 (at 79 Fed. Reg. 35081). USEPA listed Standard Methods Online, Method 9223 B-97 in note 1 to the table in 40 CFR 141.25(a). This is identical to Standard Methods 21st ed., Method 9223 B. The Board lists both Standard Methods, Methods 9223 and 9223 B. Because Standard Methods, 22nd ed., Methods 9221 A, B, and C and 9223 B are the same versions as Standard Methods Online, Methods 9221 A, B, and C-06 and 9223 B-04, the Board has not listed the Standard Methods Online versions separately.

B) Fecal Coliforms.

BOARD NOTE: The time from sample collection to initiation of analysis for source (raw) water samples required by Section 611.532 and Subpart B only must not exceed eight hours. The supplier is encouraged but not required to hold samples below 10° C during transit.

i) Fecal coliform procedure: Standard Methods, 18th, 19th, 20th, 21st, or 22nd ed., Method 9221 E.

BOARD NOTE: A-1 broth may be held up to seven days in a tightly closed screwcap tube at 4° C (39° F).

ii) Fecal Coliform Membrane Filter Procedure: Standard Methods, 18th, 19th, 20th, 21st, or 22nd ed., Method 9222 D.

BOARD NOTE: USEPA added Standard Methods, 21st ed., Methods 9221 E and 9222 D as approved alternative methods on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added Standard Methods, 22nd ed., Methods 9221 E and 9222 D as approved alternative methods on June 21, 2013 (at 78 Fed. Reg. 37463).

USEPA added Standard Methods Online, Methods 9221 E-06 and 9222 D-06 as approved alternative methods on June 19, 2014 (at 79 Fed. Reg. 35081). Because Standard Methods, 22nd ed., Methods 9221 E and 9222 D are the same versions as Standard Methods Online, Methods 9221 E-06 and 9222 D-06, the Board has not listed the Standard Methods Online versions separately.

C) Heterotrophic bacteria.

i) Pour plate method: Standard Methods, 18th, 19th, 20th, 21st, or 22nd ed., Method 9215 B.

BOARD NOTE: The time from sample collection to initiation of analysis must not exceed eight hours. The supplier is encouraged but not required to hold samples below 10° C during transit.

ii) SimPlate method.

BOARD NOTE: USEPA added Standard Methods, 21st ed., Method 9215 B as an approved alternative method on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added Standard Methods, 22nd ed., Method 9215 B as an approved alternative method on June 21, 2013 (at 78 Fed. Reg. 37463). USEPA added Standard Methods Online, Method 9215 B-04 as an approved alternative method on June 19, 2014 (at 79 Fed. Reg. 35081). Because Standard Methods, 22nd ed., Method 9215 B is the same version as Standard Methods Online, Method 9215 B-04, the Board has not listed the Standard Methods Online versions separately.

D) Turbidity.

BOARD NOTE: Styrene divinyl benzene beads (*e.g.*, AMCO-AEPA–1 or equivalent) and stabilized formazin (*e.g.*, Hach StablCal™ or equivalent) are acceptable substitutes for formazin.

i) Nephelometric method: Standard Methods, 18th, 19th, 20th, 21st, or 22nd ed., Method 2130 B.

ii) Nephelometric method: USEPA Environmental Inorganic Methods, Method 180.1 (rev. 2.0).

iii) GLI Method 2.

iv) Hach FilterTrak Method 10133.

v) Laser nephelometry (on-line): Mitchell Method M5271, rev. 1.1 and Mitchell Method M5331, rev. 1.2.

vi) Laser nephelomtry (on-line): Lovibond PTV 6000.

vii) LED nephelometry (on-line): Mitchell Method M5331, rev. 1.1 and Mitchell Method M5331, rev. 1.2.

viii) LED nephelometry (on-line): AMI Turbiwell Method.

ix) LED nephelomtry (on-line): Lovibond PTV 1000 or Lovibond PTV 2000.

x) LED nephelometry (portable): Orion Method AQ4500.

xi) 360° Nephelometry: Hach Method 10258.

BOARD NOTE: USEPA added Standard Methods, 21st ed., Method 9130 B as an approved alternative method on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added Mitchell Method M5271 and Orion Method AQ4500 as approved alternative methods on August 3, 2009 (at 74 Fed. Reg. 38348). USEPA added AMI Turbiwell Method as an approved alternative method on November 10, 2009 (at 74 Fed. Reg. 57908). USEPA added Standard Methods, 22nd ed., Method 2130 B as an approved alternative method on June 21, 2013 (at 78 Fed. Reg. 37463). USEPA added Hach Method 10258 and Mitchell Method M5331, rev. 1.2 as approved alternative methods on July 19, 2016 (at 81 Fed. Reg. 46839). USEPA added Lovibond PTV 100, Lovibond PTV 2000, and Lovibond PTV 6000 as approved alternative methods on July 27, 2017 (at 82 Fed. Reg. 34861).

b) A supplier must measure residual disinfectant concentrations with one of the following analytical methods:

1) Free chlorine.

A) Amperometric Titration.

i) Standard Methods, 18th, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl D.

ii) ASTM Method D1253-03, D1253-08, or D1253-14.

B) DPD Ferrous Titrimetric: Standard Methods, 18th, 19th, 20th,

21st, or 22nd ed., Method 4500-Cl F.

C) DPD Colimetric:

i) Standard Methods, 18th, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl G; or

ii) Hach Method 10260.

D) Syringaldazine (FACTS): Standard Methods, 18th, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl H.

E) On-line chlorine analyzer: USEPA OGWDW Methods, Method 334.0.

F) Amperometric sensor: Palintest ChloroSense.

G) Indophenol colorimetric: Hach Method 10241.

BOARD NOTE: USEPA added Standard Methods, 21st ed., Methods 4500-Cl D, F, G, and H; Method 4500-ClO_2 C and E as approved alternative methods on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added ASTM Method D1253-08, USEPA OGWDW Methods, Method 334.0, and Palintest ChloroSense as approved alternative methods on November 10, 2009 (at 74 Fed. Reg. 57908). USEPA added Standard Methods, 22nd ed., Methods 4500-Cl B, F, G, and H as approved alternative methods on June 21, 2013 (at 78 Fed. Reg. 37463). USEPA added Hach Method 10260 as an approved alternative method on June 19, 2014 (at 79 Fed. Reg. 35081). USEPA added ASTM Method D1253-14 and Hach Method 10241 as approved alternative methods on July 19, 2016 (at 81 Fed. Reg. 46839).

2) Total chlorine.

A) Amperometric Titration:

i) Standard Methods, 18th, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl D.

ii) ASTM Method D1253-03, D1253-08, or D1253-14.

B) Amperometric Titration (low level measurement): Standard Methods, 18th, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl E.

C) DPD Ferrous Titrimetric: Standard Methods, 18th, 19th, 20th,

21st, or 22nd ed., Method 4500-Cl F.

D) DPD Colimetric:

i) Standard Methods, 18th, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl G; or

ii) Hach Method 10260.

E) Iodometric Electrode: Standard Methods, 18th, 19th, 20th, 21st, or 22nd ed., Method 4500-Cl I.

F) On-line chlorine analyzer: USEPA OGWDW Methods, Method 334.0.

G) Amperometric sensor: Palintest ChloroSense.

BOARD NOTE: USEPA added Standard Methods, 21st ed., Methods 4500-Cl D, E, F, G, and I as approved alternative methods on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added ASTM Method D1253-08, USEPA OGWDW Methods, Method 334.0, and Palintest ChloroSense as approved alternative methods on November 10, 2009 (at 74 Fed. Reg. 57908). USEPA added Standard Methods, 22nd ed., Methods 4500-Cl D, E, F, G, and I as approved alternative methods on June 21, 2013 (at 78 Fed. Reg. 37463). USEPA added Hach Method 10260 as an approved alternative method on June 19, 2014 (at 79 Fed. Reg. 35081). USEPA added ASTM Method D1253-14 as an approved alternative method on July 19, 2016 (at 81 Fed. Reg. 46839).

3) Chlorine dioxide.

A) Amperometric Titration:

i) Standard Methods, 18th, 19th, 20th, 21st, or 22nd ed., Method 4500-ClO_2 C or E; or

ii) ChlordioX Plus Test.

B) DPD Method: Standard Methods, 18th, 19th, or 20th ed., Method 4500-ClO_2 D.

C) Spectrophotometric: USEPA OGWDW Methods, Method 327.0 (rev. 1.1).

BOARD NOTE: USEPA added Standard Methods, 21st ed., Method

4500-ClO_2 C, D, and E and Method 4500-O_3 B as approved alternative methods on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added Standard Methods, 22nd ed., Methods 4500-ClO_2 C and E as approved alternative methods on May 31, 2013 (at 78 Fed. Reg. 32558). USEPA added ChlordioX Plus Test as an approved alternative method on June 19, 2014 (at 79 Fed. Reg. 35081).

4) Ozone: Indigo Method: Standard Methods, 18th, 19th, 20th, 21st, or 22nd ed., Method 4500-O_3 B.

BOARD NOTE: USEPA added Standard Methods, 21st ed., Method 4500-O_3 B as an approved alternative method on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added Standard Methods, 22nd ed., Method 4500-O_3 B as an approved alternative method on May 31, 2013 (at 78 Fed. Reg. 32558).

5) Alternative test methods: The Agency may grant a SEP pursuant to Section 611.110 that allows a supplier to use alternative chlorine test methods as follows:

A) DPD colorimetric test kits: Residual disinfectant concentrations for free chlorine and combined chlorine may also be measured by using DPD colorimetric test kits.

B) Continuous monitoring for free and total chlorine: Free and total chlorine residuals may be measured continuously by adapting a specified chlorine residual method for use with a continuous monitoring instrument, provided the chemistry, accuracy, and precision remain the same. Instruments used for continuous monitoring must be calibrated with a grab sample measurement at least every five days or as otherwise provided by the Agency.

BOARD NOTE: Suppliers may use a five-tube test or a 10-tube test.

BOARD NOTE: Derived from 40 CFR 141.74(a) and appendix A to subpart C of 40 CFR 141 (2017).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.532 Unfiltered PWSs

A supplier that uses a surface water source and does not provide filtration treatment must monitor, unless the Agency has determined, under~~pursuant to~~ Section 611.211, that filtration is required. If the Agency determines that filtration is required, it must specify alternative

monitoring requirements, as appropriate, until filtration is in place. A supplier that uses a groundwater source under the direct influence of surface water and which does not provide filtration treatment must monitor within six months after the Agency has determined, underpursuant to Section 611.212, that the groundwater source is under the direct influence of surface water unless the Agency has determined that filtration is required, in which case the Agency must specify alternative monitoring requirements, as appropriate, until filtration is in place.

a) Fecal coliform or total coliform density measurements as required by Section 611.231(a) must be performed on representative source water samples immediately prior to the first or only point of disinfectant application. The supplier must sample for fecal or total coliforms at the minimum frequency specified in Table B of this Part each week the supplier serves water to the public. Also, one fecal or total coliform density measurement must be made every day the supplier serves water to the public and the turbidity of the source water exceeds 1 NTU (these samples count towards the weekly coliform sampling requirement) unless the Agency determines that the supplier, for logistical reasons outside the supplier's control cannot have the sample analyzed within 30 hours after collection.

b) Turbidity measurements as required by Section 611.231(b) must be performed on representative grab samples of source water immediately prior to the first or only point of disinfectant application every four hours (or more frequently) that the supplier serves water to the public. A supplier may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by a SEP issued pursuant to Section 611.110.

c) The total inactivation ratio for each day that the supplier is in operation must be determined based on the $CT_{99.9}$ values in Appendix B, as appropriate. The parameters necessary to determine the total inactivation ratio must be monitored as follows:

1) The temperature of the disinfected water must be measured at least once per day at each RDC sampling point.

2) If the supplier uses chlorine, the pH of the disinfected water must be measured at least once per day at each chlorine RDC sampling point.

3) The disinfectant contact times ("T") must be determined for each day during peak hourly flow.

4) The RDCs ("C") of the water before or at the first customer must be measured each day during peak hourly flow.

5) If a supplier uses a disinfectant other than chlorine, the supplier may monitor by other methods approved under~~pursuant to~~ Section 611.241(a)(1) and (a)(2).

d) The total inactivation ratio must be calculated as follows:

1) If the supplier uses only one point of disinfectant application, the supplier may determine the total inactivation ratio based on either of the following two methods:

A) One inactivation ratio ($Ai = CT_{calc}/CT_{99.9}$) is determined before or at the first customer during peak hourly flow and, if the Ai is greater than 1.0, the 99.9 percent Giardia lamblia inactivation requirement has been achieved; or

B) Successive Ai values, representing sequential inactivation ratios, are determined between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the following method must be used to calculate the total inactivation ratio:

i) Determine the following, for each sequence:

$$Ai = CT_{calc}/CT_{99.9}$$

ii) Add the Ai values together, as follows:

$$B = \sum(Ai)$$

iii) If B is greater than 1.0, the 99.9 percent Giardia lamblia inactivation requirement has been achieved.

2) If the supplier uses more than one point of disinfectant application before or at the first customer, the supplier must determine the CT value of each disinfection sequence immediately prior to the next point of disinfectant application during peak hourly flow. The Ai value of each sequence and B must be calculated using the method in subsection (d)(1)(B) to determine if the supplier is in compliance with Section 611.241.

3) Although not required, the total percent inactivation (PI) for a supplier with one or more points of RDC monitoring may be calculated as follows:

$$PI = 100 - \frac{100}{10^{3B}}$$

e) The RDC of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every four hours may be conducted in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment, and suppliers serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies prescribed in Table C ~~of this Part~~. If at any time the RDC falls below 0.2 mg/ℓ in a system using grab sampling in lieu of continuous monitoring, the supplier must take a grab sample every four hours until the RDC is equal to or greater than 0.2 mg/ℓ.

f) Points of measurement.

1) The RDC must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in Sections 611.1054 through 611.1058. The Agency must allow a supplier that uses both a surface water source or a groundwater source under direct influence of surface water, and a groundwater source to take disinfectant residual samples at points other than the total coliform sampling points if the Agency determines, by a SEP ~~issued pursuant to Section 611.110~~, that such points are more representative of treated (disinfected) water quality within the distribution system. HPC may be measured in lieu of RDC.

2) If the Agency determines, pursuant to Section 611.213, that a supplier has no means for having a sample analyzed for HPC, measured as specified in subsection (a), the requirements of subsection (f)(1) do not apply to that supplier.

BOARD NOTE: Derived from 40 CFR 141.74(b) (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.533 Filtered PWSs

A supplier that uses a surface water source or a groundwater source under the influence of surface water and provides filtration treatment must monitor in accordance with this Section.

a) Turbidity measurements as required by Section 611.250 must be performed on representative samples of the PWS's filtered water every four hours (or more frequently) that the supplier serves water to the public. A supplier may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by a SEP ~~issued pursuant to Section 611.110~~. For any suppliers using slow sand filtration or filtration treatment other than conventional treatment,

direct filtration, or diatomaceous earth filtration, the Agency mustshall, by special exception permit condition, reduce the sampling frequency to once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance. For suppliers serving 500 or fewer persons, the Agency mustshall, by a SEP issued pursuant to Section 611.110, reduce the turbidity sampling frequency to once per day, regardless of the type of filtration treatment used, if the Agency determines that less frequent monitoring is sufficient to indicate effective filtration performance.

b) RDC entering distribution system.

1) Suppliers serving more than 3300 persons. The RDC of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that, if there is a failure in the continuous monitoring equipment, grab sampling every four hours may be conducted in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment.

2) Suppliers serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed in Table C. If at any time the RDC falls below 0.2 mg/ℓ in a system using grab sampling in lieu of continuous monitoring, the supplier must take a grab sample every four hours until RDC is equal to or greater than 0.2 mg/ℓ.

c) Points of measurement.

1) The RDC must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in Sections 611.1054 through 611.1058. The Agency must allow a supplier that uses both a surface water source, or a groundwater source under direct influence of surface water, and a groundwater source to take RDC samples at points other than the total coliform sampling points if the Agency determines that such points are more representative of treated (disinfected) water quality within the distribution system. HPC, measured as specified in Section 611.531(a), may be measured in lieu of RDC.

2) Subsection (c)(1) does not apply if the Agency determines, underpursuant to Section 611.213(c), that a system has no means for having a sample analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified by Section 611.531(a) and that the supplier is providing adequate disinfection in the distribution system.

BOARD NOTE: Derived from 40 CFR 141.74(c) (2014).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART M: TURBIDITY MONITORING AND ANALYTICAL REQUIREMENTS

Section 611.602 Asbestos Monitoring Frequency

The frequency of monitoring conducted to determine compliance with the MCL for asbestos in Section 611.301 is as follows:

a) Unless the Agency has determined under subsection (c) that the PWS is not vulnerable, each CWS and NTNCWS supplier must monitor for asbestos during the first compliance period of each compliance cycle.

b) CWS suppliers may apply to the Agency, by way of an application for a SEP ~~under Section 611.110~~, for a determination that the CWS is not vulnerable based on consideration of the criteria listed in subsection (c).

c) The Agency must determine that the CWS is "not vulnerable" if the CWS is not vulnerable to contamination either from asbestos in its source water, from corrosion of asbestos-cement pipe, or from both, based on a consideration of the following factors:

    1) Potential asbestos contamination of the water source; and

    2) The use of asbestos-cement pipe for finished water distribution and the corrosive nature of the water.

d) A SEP based on a determination that a CWS is not vulnerable to asbestos contamination expires at the end of the compliance cycle for which it was issued.

e) A supplier of a PWS vulnerable to asbestos contamination due solely to corrosion of asbestos-cement pipe must take one sample at a tap served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.

f) A supplier of a PWS vulnerable to asbestos contamination due solely to source water must monitor in accordance with Section 611.601.

g) A supplier of a PWS vulnerable to asbestos contamination due both to its source water supply and corrosion of asbestos-cement pipe must take one sample at a tap served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.

h) A supplier that exceeds the MCL, as determined in Section 611.609, must monitor quarterly beginning in the next quarter after the violation occurred.

i) Reduction of quarterly monitoring.

1) The Agency must issue a SEP ~~pursuant to Section 611.110~~ that reduces the monitoring frequency to that specified by subsection (a) if it determines that the sampling point is reliably and consistently below the MCL.

2) The request must, at a minimum, include the following information:

A) For a GWS: two quarterly samples.

B) For an SWS or mixed system: four quarterly samples.

3) In issuing a SEP, the Agency must specify the level of the contaminant upon which the "reliably and consistently" determination was based. All SEPs that allow less frequent monitoring based on an Agency "reliably and consistently" determination must include a condition requiring the supplier to resume quarterly monitoring under~~pursuant to~~ subsection (h) if it violates the MCL specified by Section 611.609.

j) This subsection (j) corresponds with 40 CFR 141.23(b)(10), which pertains to a compliance period long since expired. This statement maintains structural consistency with the federal regulations.

BOARD NOTE: Derived from 40 CFR 141.23(b) (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.603 Inorganic Monitoring Frequency

The frequency of monitoring conducted to determine compliance with the revised MCLs in Section 611.301 for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, and thallium is as follows:

a) Suppliers must take samples at each sampling point, beginning in the initial compliance period, as follows:

1) For a GWS supplier: at least one sample during each compliance period;

2) For an SWS or a mixed system supplier: at least one sample each year.

BOARD NOTE: Derived from 40 CFR 141.23(c)(1) (2016).

b) SEP Application.

1) The supplier may apply to the Agency for a SEP that allows reduction from the monitoring frequencies specified in subsection (a) under~~pursuant to~~ subsections (d) through (f) and 35 Ill. Adm. Code 602.200~~Section 611.110~~.

2) The supplier may apply to the Agency for a SEP that relieves it of the requirement for monitoring cyanide under~~pursuant to~~ subsections (d) through (f) and 35 Ill. Adm. Code 602.200~~Section 611.110~~ if it can demonstrate that its system is not vulnerable due to a lack of any industrial source of cyanide.

BOARD NOTE: Derived from 40 CFR 141.23(c)(2) and (c)(6) (2016).

c) SEP Procedures. The Agency must review the request under~~pursuant to~~ the SEP procedures of 35 Ill. Adm. Code 602.200~~Section 611.110~~ based on consideration of the factors in subsection (e).

BOARD NOTE: Derived from 40 CFR 141.23(c)(6) (2016).

d) Standard for SEP reduction in monitoring. The Agency must grant a SEP that allows a reduction in the monitoring frequency if the supplier demonstrates that all previous analytical results were less than the MCL, provided the supplier meets the following minimum data requirements:

1) For GWS suppliers: a minimum of three rounds of monitoring.

2) For an SWS or mixed system supplier: annual monitoring for at least three years.

3) At least one sample must have been taken since January 1, 1990.

4) A supplier that uses a new water source is not eligible for a SEP until it completes three rounds of monitoring from the new source.

BOARD NOTE: Derived from 40 CFR 141.23(c)(4) (2016).

e) Standard for SEP monitoring conditions. As a condition of any SEP, the Agency must require that the supplier take a minimum of one sample during the term of

the SEP. In determining the appropriate reduced monitoring frequency, the Agency must consider the following:

1) Reported concentrations from all previous monitoring;

2) The degree of variation in reported concentrations; and

3) Other factors that may affect contaminant concentrations, such as changes in groundwater pumping rates, changes in the CWS's configuration, the CWS's operating procedures, or changes in stream flows or characteristics.

BOARD NOTE: Derived from 40 CFR 141.23(c)(3) and (c)(5) (2016).

f) SEP Conditions and Revision.

1) A SEP will expire at the end of the compliance cycle for which it was issued.

BOARD NOTE: Derived from 40 CFR 141.23(c)(3) (2016).

2) In issuing a SEP, the Agency must specify the level of the contaminant upon which the "reliably and consistently" determination was based. A SEP must provide that the Agency will review and, where appropriate, revise its determination of the appropriate monitoring frequency when the supplier submits new monitoring data or when other data relevant to the supplier's appropriate monitoring frequency become available.

BOARD NOTE: Derived from 40 CFR 141.23(c)(6) (2016).

g) A supplier that exceeds the MCL as determined in Section 611.609, must monitor quarterly for that contaminant, beginning in the next quarter after the violation occurred.

BOARD NOTE: Derived from 40 CFR 141.23(c)(7) (2016).

h) Reduction of quarterly monitoring.

1) The Agency must grant a SEP ~~pursuant to Section 611.110~~ that reduces the monitoring frequency to that specified by subsection (a) if it determines that the sampling point is reliably and consistently below the MCL.

2) A request for a SEP must include the following minimal information:

A) For a GWS: two quarterly samples.

B) For an SWS or mixed system supplier: four quarterly samples.

3) In issuing the SEP, the Agency must specify the level of the contaminant upon which the "reliably and consistently" determination was based. Any SEP that allows less frequent monitoring based on an Agency "reliably and consistently" determination must include a condition requiring the supplier to resume quarterly monitoring for any contaminant underpursuant to subsection (g) if it violates the MCL specified by Section 611.609 for that contaminant.

BOARD NOTE: Derived from 40 CFR 141.23(c)(8) (2016).

i) A new system supplier or a supplier whose system uses a new source of water must demonstrate compliance with the MCL within a period of time specified by a permit issued the Agency. The supplier must also comply with the initial sampling frequencies specified by the Agency to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies must be conducted in accordance with the requirements in this Section.

BOARD NOTE: Derived from 40 CFR 141.23(c)(9) (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.604 Nitrate Monitoring

Each supplier must monitor to determine compliance with the MCL for nitrate in Section 611.301.

a) Suppliers must monitor at the following frequencies:

1) CWSs and NTNCWSs.

A) GWSs: annually;

B) SWSs and mixed systems: quarterly.

BOARD NOTE: Derived from 40 CFR 141.23(d)(1) (2016).

2) Transient non-CWSs: annually.

BOARD NOTE: Derived from 40 CFR 141.23(d)(4) (2016).

b) Quarterly monitoring for GWSs.

1) A CWS or NTNCWS supplier that is a GWS must initiate quarterly monitoring in the quarter following any one sample that has a nitrate concentration equal to or greater than 50 percent of the MCL.

2) The Agency must grant a SEP ~~pursuant to Section 611.110~~ that reduces the monitoring frequency to annual after the supplier has completed quarterly sampling for at least four quarters if it determines that the sampling point is reliably and consistently below the MCL.

A) The request must include the following minimal information: the results from four consecutive quarterly samples.

B) In issuing the SEP, the Agency must specify the level of the contaminant upon which the "reliably and consistently" determination was based. All SEPs that allow less frequent monitoring based on an Agency "reliably and consistently" determination must include a condition requiring the supplier to resume quarterly monitoring pursuant to subsection (b)(1) if it violates the MCL specified by Section 611.301 for nitrate.

BOARD NOTE: Derived from 40 CFR 141.23(d)(2) (2016).

c) Reduction of monitoring frequency for SWSs and mixed systems.

1) The Agency must grant a SEP ~~pursuant to Section 611.110~~ that allows a CWS or NTNCWS supplier that is a SWS or mixed system to reduce its monitoring frequency to annually if it determines that all analytical results from four consecutive quarters are less than 50 percent of the MCL.

2) As a condition of the SEP, the Agency must require the supplier to initiate quarterly monitoring, beginning the next quarter, if any one sample is greater than or equal to 50 percent of the MCL.

BOARD NOTE: Derived from 40 CFR 141.23(d)(3) (2016).

d) This subsection corresponds with 40 CFR 141.23(d)(4), which the Board has codified at subsection (a)(2). This statement maintains structural consistency with USEPA rules.

e) After completion of four consecutive quarters of monitoring, each CWS or NTNCWS supplier monitoring annually must take samples during the quarters that resulted in the highest analytical result.

BOARD NOTE: Derived from 40 CFR 141.23(d)(5) (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.605 Nitrite Monitoring

Each supplier must monitor to determine compliance with the MCL for nitrite in Section 611.301.

a) This subsection (a) corresponds with 40 CFR 141.23(e)(1), which was applicable only until a date now past. This statement maintains consistency with USEPA rules.

b) This subsection corresponds with 40 CFR 141.23(e)(2), a provision by which USEPA refers to state requirements that do not exist in Illinois. This statement maintains structural consistency with USEPA rules.

c) Monitoring frequency.

1) Quarterly monitoring.

A) A supplier that has any one sample in which the concentration is equal to or greater than 50 percent of the MCL must initiate quarterly monitoring during the next quarter.

B) A supplier required to begin quarterly monitoring under~~pursuant to~~ subsection (c)(1)(A) must continue on a quarterly basis for a minimum of one year following any one sample exceeding the 50 percent of the MCL, after which the supplier may discontinue quarterly monitoring pursuant to subsection (c)(2).

2) The Agency must grant a SEP ~~pursuant to Section 611.110~~ that allows a supplier to reduce its monitoring frequency to annually if it determines that the sampling point is reliably and consistently below the MCL.

A) A request for a SEP must include the following minimal information: the results from four quarterly samples.

B) In issuing the SEP, the Agency must specify the level of the contaminant upon which the "reliably and consistently"

determination was based. All SEPs that allow less frequent monitoring based on an Agency "reliably and consistently" determination must include a condition requiring the supplier to resume quarterly monitoring for nitrite underpursuant to subsection (c)(1) if it equals or exceeds 50 percent of the MCL specified by Section 611.301 for nitrite.

d) A supplier that is monitoring annually must take samples during the quarters that previously resulted in the highest analytical result.

BOARD NOTE: Derived from 40 CFR 141.23(e) (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.612 Monitoring Requirements for Old Inorganic MCLs

a) Analyses for the purpose of determining compliance with the old inorganic MCLs of Section 611.300 are required as follows:

1) Analyses for all CWSs utilizing surface water sources must be repeated at yearly intervals.

2) Analyses for all CWSs utilizing only groundwater sources must be repeated at three-year intervals.

3) This subsection (a)(3) corresponds with 40 CFR 141.23(1)(3), which requires monitoring for the repealed old MCL for nitrate at a frequency specified by the state. The Board has followed the USEPA lead and repealed that old MCL. This statement maintains structural consistency with USEPA rules.

4) This subsection (a)(4) corresponds with 40 CFR 141.23(1)(4), which authorizes the state to determine compliance and initiate enforcement action. This statement maintains structural consistency with USEPA rules.

b) If the result of an analysis made under subsection (a) indicates that the level of any contaminant listed in Section 611.300 exceeds the old MCL, the supplier must report to the Agency within seven days and initiate three additional analyses at the same sampling point within one month.

c) When the average of four analyses made underpursuant to subsection (b), rounded to the same number of significant figures as the old MCL for the substance in question, exceeds the old MCL, the supplier must notify the Agency and give

notice to the public underpursuant to Subpart V. Monitoring after public notification must be at a frequency designated by the Agency by a SEP issued pursuant to Section 611.110 and must continue until the old MCL has not been exceeded in two successive samples or until a different monitoring schedule becomes effective as a condition to a variance, an adjusted standard, a site specific rule, an enforcement action, or another SEP issued pursuant to Section 611.110.

d) This subsection (d) corresponds with 40 CFR 141.23(o), which pertains to monitoring for the repealed old MCL for nitrate. This statement maintains structural consistency with USEPA rules.

e) This subsection (e) corresponds with 40 CFR 141.23(p), which pertains to the use of existing data up until a date long since expired. This statement maintains structural consistency with USEPA rules.

f) Analyses conducted to determine compliance with the old MCLs of Section 611.300 must be made in accordance with the following methods, incorporated by reference in Section 611.102, or alternative methods approved by the Agency underpursuant to Section 611.480.

1) Fluoride: The methods specified in Section 611.611(c) must apply for the purposes of this Section.

2) Iron.

A) Standard Methods.

i) Method 3111 B, 18th, 19th, 21st, or 22nd ed.;

ii) Method 3113 B, 18th, 19th, 21st, or 22nd ed.; or

iii) Method 3120 B, 18th, 19th, 20th, 21st, or 22nd ed.

B) Standard Methods Online, Method 3113 B-04.

C) USEPA Environmental Metals Methods.

i) Method 200.7 (rev. 4.4); or

ii) Method 200.9 (rev. 2.2).

D) Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES): USEPA NERL Method 200.5.

BOARD NOTE: USEPA added USEPA NERL Method 200.5 as an approved alternative method on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added Standard Methods, 21st ed.; Methods 3111 B, 3113 B, and 3120 B and USEPA NERL Method 200.5 as approved alternative methods on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added Standard Methods Online, Method 3113 B-04 as an approved alternative method on June 24, 2011 (at 76 Fed. Reg. 37014). USEPA added Standard Methods, 22nd ed., Methods 3111 D, 3113 B, and 3120 B as approved alternative methods on June 21, 2013 (at 78 Fed. Reg. 37463). USEPA added Standard Methods Online, Method 3113 B-10 as an approved alternative method on June 19, 2014 (at 79 Fed. Reg. 35081). Because Standard Methods, 22nd ed., Method 3113 B is the same version as Standard Methods Online, Method 3113 B-10, the Board has not listed the Standard Methods Online versions separately.

3) Manganese.

A) Standard Methods.

i) Method 3111 B, 18th, 19th, 21st, or 22nd ed.;

ii) Method 3113 B, 18th, 19th, 21st, or 22nd ed.; or

iii) Method 3120 B, 18th, 19th, 20th, 21st, or 22nd ed.

B) Standard Methods Online, Method 3113 B-04.

C) USEPA Environmental Metals Methods.

i) Method 200.7 (rev. 4.4);

ii) Method 200.8 (rev. 5.3); or

iii) Method 200.9 (rev. 2.2).

D) Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES): USEPA NERL Method 200.5.

BOARD NOTE: USEPA added Standard Methods, 21st ed.; Methods 3111 B, 3113 B, and 3120 B and USEPA NERL Method 200.5 as approved alternative methods on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added Standard Methods Online, Method 3113 B-04 as an approved alternative method on June 24, 2011 (at 76 Fed. Reg. 37014). USEPA added Standard Methods, 22nd ed., Methods 3111 D, 3113 B, and 3120 B as approved alternative methods on June 21, 2013 (at 78 Fed. Reg.

37463). USEPA added Standard Methods Online, Method 3113 B-10 as an approved alternative method on June 19, 2014 (at 79 Fed. Reg. 35081). Because Standard Methods, 22nd ed., Method 3113 B is the same version as Standard Methods Online, Method 3113 B-10, the Board has not listed the Standard Methods Online versions separately.

4) Zinc.

A) Standard Methods.

i) Method 3111 B, 18th, 19th, 21st, or 22nd ed.; or

ii) Method 3120 B, 18th, 19th, 20th, 21st, or 22nd ed.

B) USEPA Environmental Metals Methods.

i) Method 200.7 (rev. 4.4); or

ii) Method 200.8 (rev. 5.3).

C) Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES): USEPA NERL Method 200.5.

BOARD NOTE: USEPA added Standard Methods, 21st ed.; Methods 3111 B and 3120 B and USEPA NERL Method 200.5 as approved alternative methods on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added Standard Methods, 22nd ed., Methods 3111 B and 3120 B as approved alternative methods on June 21, 2013 (at 78 Fed. Reg. 37463).

BOARD NOTE: The provisions of subsections (a) through (e) derive from 40 CFR 141.23(l) through (p) (2016). Subsections (f)(2) through (f)(4) relate exclusively to additional State requirements. The Board retained subsection (f) to set forth methods for the inorganic contaminants for which there is a State-only MCL. The methods specified are those set forth in 40 CFR 143.4(b) and appendix A to subpart C of 40 CFR 141 (2016), for secondary MCLs.

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART O: ORGANIC MONITORING AND ANALYTICAL REQUIREMENTS

Section 611.646 Phase I, Phase II, and Phase V Volatile Organic Contaminants

Monitoring of the Phase I, Phase II, and Phase V VOCs for the purpose of determining compliance with the MCL must be conducted as follows:

a) Definitions. As used in this Section the following have the given meanings:

"Detect" and "detection" mean that the contaminant of interest is present at a level greater than or equal to the "detection limit".

"Detection limit" means 0.0005 mg/ℓ.

BOARD NOTE: Derived from 40 CFR 141.24(f)(7), (f)(11), (f)(14)(i), and (f)(20) (2016). This is a "trigger level" for Phase I, Phase II, and Phase V VOCs inasmuch as it prompts further action. The use of the term "detect" in this Section is not intended to include any analytical capability of quantifying lower levels of any contaminant, or the "method detection limit". Note, however, that certain language at the end of federal paragraph (f)(20) is capable of meaning that the "method detection limit" is used to derive the "detection limit". The Board has chosen to disregard that language at the end of paragraph (f)(20) in favor of the more direct language of paragraphs (f)(7) and (f)(11).

"Method detection limit", as used in subsections (q) and (t) means the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.
BOARD NOTE: Derived from appendix B to 40 CFR 136 (2016). The method detection limit is determined by the procedure set forth in appendix B to 40 CFR 136, incorporated by reference in Section 611.102(c). See subsection (t).

b) Required sampling. Each supplier must take a minimum of one sample at each sampling point at the times required in subsection (u).

c) Sampling points.

1) Sampling points for a GWS. Unless otherwise provided by a SEP granted by the Agency ~~pursuant to Section 611.110~~, a GWS supplier must take at least one sample from each of the following points: each entry point that is representative of each well after treatment.

2) Sampling points for an SWS or mixed system supplier. Unless otherwise provided by a SEP granted by the Agency ~~pursuant to Section 611.110~~, an SWS or mixed system supplier must sample from each of the following points:

A) Each entry point after treatment; or

B) Points in the distribution system that are representative of each source.

3) The supplier must take each sample at the same sampling point unless the Agency has granted a SEP ~~pursuant to Section 611.110~~ that designates another location as more representative of each source, treatment plant, or within the distribution system.

4) If a system draws water from more than one source, and the sources are combined before distribution, the supplier must sample at an entry point during periods of normal operating conditions when water is representative of all sources being used.

BOARD NOTE: Subsections (b) and (c) derived from 40 CFR 141.24(f)(1) through (f)(3) (2016).

d) Each CWS and NTNCWS supplier must take four consecutive quarterly samples for each of the Phase I VOCs, excluding vinyl chloride, and Phase II VOCs during each compliance period, beginning in the compliance period starting in the initial compliance period.

e) This subsection (e) corresponds with 40 CFR 141.24(f)(5), which no longer has operative effect. This statement maintains structural consistency with the federal regulations.

f) GWS reduction to triennial monitoring frequency. After a minimum of three years of annual sampling, GWS suppliers that have not previously detected any of the Phase I VOCs, including vinyl chloride; Phase II VOCs; or Phase V VOCs must take one sample during each three-year compliance period.

g) A CWS or NTNCWS supplier that has completed the initial round of monitoring required by subsection (d) and which did not detect any of the Phase I VOCs, including vinyl chloride; Phase II VOCs; and Phase V VOCs may apply to the Agency for a SEP ~~pursuant to Section 611.110~~ that releases it from the requirements of subsection (e) or (f). A supplier that serves fewer than 3300 service connections may apply to the Agency for a SEP that releases it from the requirements of subsection (d) as to 1,2,4-trichlorobenzene.

BOARD NOTE: Derived from 40 CFR 141.24(f)(7) and (f)(10) (2016), and the discussion at 57 Fed. Reg. 31825 (July 17, 1992). Provisions concerning the term of the waiver appear in subsections (i) and (j). The definition of "detect," parenthetically added to the federal counterpart paragraph, is in subsection (a).

h) Vulnerability assessment. The Agency must consider the factors of Section 611.110(a)~~611.110(e)~~ in granting a SEP from the requirements of subsection (d), (e), or (f) sought pursuant to subsection (g).

i) A SEP issued to a GWS under~~pursuant to~~ subsection (g) is for a maximum of six years, except that a SEP as to the subsection (d) monitoring for 1,2,4-trichloro-benzene must apply only to the initial round of monitoring. As a condition of a SEP, except as to a SEP from the initial round of subsection (d) monitoring for 1,2,4-trichlorobenzene, the supplier shall, within 30 months after the beginning of the period for which the waiver was issued, reconfirm its vulnerability assessment required by subsection (h) and submitted pursuant to subsection (g), by taking one sample at each sampling point and reapplying for a SEP under~~pursuant to~~ subsection (g). Based on this application, the Agency must do either of the following:

1) If it determines that the PWS meets the standard of Section 611.610(e), issue a SEP that reconfirms the prior SEP for the remaining three-year compliance period of the six-year maximum term; or

2) Issue a new SEP requiring the supplier to sample annually.

BOARD NOTE: Subsection (i) does not apply to an SWS or mixed system supplier.

j) Special considerations for a SEP for an SWS or mixed-system supplier.

1) The Agency must determine that an SWS is not vulnerable before issuing a SEP ~~pursuant to Section 611.110~~ to an SWS supplier. A SEP issued to an SWS or mixed system supplier pursuant to subsection (g) is for a maximum of one compliance period; and

2) The Agency may require, as a condition to a SEP issued to an SWS or mixed supplier, that the supplier take such samples for Phase I, Phase II, and Phase V VOCs at such a frequency as the Agency determines are necessary, based on the vulnerability assessment.

BOARD NOTE: There is a great degree of similarity between 40 CFR 141.24(f)(7) (2016), the provision applicable to GWSs, and 40 CFR 141.24(f)(10) (2016), the provision for SWSs. The Board has consolidated the common requirements of both paragraphs into subsection (g). Subsection (j) represents the elements unique to an SWSs or mixed system, and subsection (i) relates to a GWS supplier. Although 40 CFR 141.24(f)(7) and (f)(10) are silent as to a mixed system supplier, the Board has included a mixed system supplier with an SWS supplier because this best follows the federal scheme for all other contaminants.

k) If one of the Phase I VOCs, excluding vinyl chloride; a Phase II VOC; or a Phase V VOC is detected in any sample, then the following must occur:

1) The supplier must monitor quarterly for that contaminant at each sampling point that resulted in a detection.

2) Annual monitoring.

   A) The Agency must grant a SEP ~~pursuant to Section 611.110~~ that allows a supplier to reduce the monitoring frequency to annual at a sampling point if it determines that the sampling point is reliably and consistently below the MCL.

   B) A request for a SEP must include the following minimal information:

      i) For a GWS, two quarterly samples.

      ii) For an SWS or mixed system supplier, four quarterly samples.

   C) In issuing a SEP, the Agency must specify the level of the contaminant upon which the "reliably and consistently" determination was based. Any SEP that allows less frequent monitoring based on an Agency "reliably and consistently" determination must include a condition requiring the supplier to resume quarterly monitoring under~~pursuant to~~ subsection (k)(1) ~~of this Section~~ if it violates the MCL specified by Section 611.311.

3) Suppliers that monitor annually must monitor during the quarters that previously yielded the highest analytical result.

4) Suppliers that do not detect a contaminant at a sampling point in three consecutive annual samples may apply to the Agency for a SEP ~~pursuant to Section 611.110~~ that allows it to discontinue monitoring for that contaminant at that point, as specified in subsection (g).

5) A GWS supplier that has detected one or more of the two-carbon contaminants listed in subsection (k)(5)(A) must monitor quarterly for vinyl chloride as described in subsection (k)(5)(B), subject to the limitation of subsection (k)(5)(C).

   A) "Two-carbon contaminants" (Phase I or II VOC) are the following:

      1,2-Dichloroethane (Phase I)
      1,1-Dichloroethylene (Phase I)
      cis-1,2-Dichloroethylene (Phase II)
      trans-1,2-Dichloroethylene (Phase II)

Tetrachloroethylene (Phase II)
1,1,1-Trichloroethylene (Phase I)
Trichloroethylene (Phase I)

B) The supplier must sample quarterly for vinyl chloride at each sampling point at which it detected one or more of the two-carbon contaminants listed in subsection (k)(5)(A).

C) The Agency must grant a SEP ~~pursuant to Section 611.110~~ that allows the supplier to reduce the monitoring frequency for vinyl chloride at any sampling point to once in each three-year compliance period if it determines that the supplier has not detected vinyl chloride in the first sample required by subsection (k)(5)(B).

l) Quarterly monitoring following MCL violations.

1) Suppliers that violate an MCL for one of the Phase I VOCs, including vinyl chloride; Phase II VOCs; or Phase V VOCs, as determined by subsection (o), must monitor quarterly for that contaminant, at the sampling point where the violation occurred, beginning the next quarter after the violation.

2) Annual monitoring.

A) The Agency must grant a SEP ~~pursuant to Section 611.110~~ that allows a supplier to reduce the monitoring frequency to annually if it determines that the sampling point is reliably and consistently below the MCL.

B) A request for a SEP must include the following minimal information: four quarterly samples.

C) In issuing a SEP, the Agency must specify the level of the contaminant upon which the "reliably and consistently" determination was based. Any SEP that allows less frequent monitoring based on an Agency "reliably and consistently" determination must include a condition requiring the supplier to resume quarterly monitoring under~~pursuant to~~ subsection (l)(1) if it violates the MCL specified by Section 611.311.

D) The supplier must monitor during the quarters that previously yielded the highest analytical result.

m) Confirmation samples. The Agency may issue a SEP ~~pursuant to Section 610.110~~ to require a supplier to use a confirmation sample for results that it finds dubious for whatever reason. The Agency must state its reasons for issuing the SEP if the SEP is Agency-initiated.

1) If a supplier detects any of the Phase I, Phase II, or Phase V VOCs in a sample, the supplier must take a confirmation sample as soon as possible, but no later than 14 days after the supplier receives notice of the detection.

2) Averaging is as specified in subsection (o).

3) The Agency must delete the original or confirmation sample if it determines that a sampling error occurred, in which case the confirmation sample will replace the original or confirmation sample.

n) This subsection (n) corresponds with 40 CFR 141.24(f)(14), an optional USEPA provision relating to compositing of samples that USEPA does not require for state programs. This statement maintains structural consistency with USEPA rules.

o) Compliance with the MCLs for the Phase I, Phase II, and Phase V VOCs must be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.

1) For a supplier that monitors more than once per year, compliance with the MCL is determined by a running annual average at each sampling point.

2) A supplier that monitors annually or less frequently whose sample result exceeds the MCL must begin quarterly sampling. The system will not be considered in violation of the MCL until it has completed one year of quarterly sampling.

3) If any sample result will cause the running annual average to exceed the MCL at any sampling point, the supplier is out of compliance with the MCL immediately.

4) If a supplier fails to collect the required number of samples, compliance will be based on the total number of samples collected.

5) If a sample result is less than the detection limit, zero will be used to calculate the annual average.

p) This subsection (p) corresponds with 40 CFR 141.24(f)(16), which USEPA removed and reserved. This statement maintains structural consistency with the federal regulations.

q) Analysis under this Section must only be conducted by a laboratory in one of the categories listed in Section 611.490(a) that has been certified according to the following conditions:

1) To receive certification to conduct analyses for the Phase I VOCs, excluding vinyl chloride; Phase II VOCs; and Phase V VOCs, the laboratory must do the following:

A) It must analyze performance evaluation (PE) samples that include these substances provided by the Agency underpursuant to 35 Ill. Adm. Code 186.170;

B) It must achieve the quantitative acceptance limits under subsections (q)(1)(C) and (q)(1)(D) for at least 80 percent of the regulated organic contaminants in the PE sample;

C) It must achieve quantitative results on the analyses performed under subsection (q)(1)(A) that are within ± 20 percent of the actual amount of the substances in the PE sample when the actual amount is greater than or equal to 0.010 mg/ℓ;

D) It must achieve quantitative results on the analyses performed under subsection (q)(1)(A) that are within ± 40 percent of the actual amount of the substances in the PE sample when the actual amount is less than 0.010 mg/ℓ; and

E) It must achieve a method detection limit of 0.0005 mg/ℓ, according to the procedures in appendix B to 40 CFR 136, incorporated by reference in Section 611.102.

2) To receive certification to conduct analyses for vinyl chloride the laboratory must do the following:

A) It must analyze PE samples provided by the Agency underpursuant to 35 Ill. Adm. Code 186.170;

B) It must achieve quantitative results on the analyses performed under subsection (q)(2)(A) that are within ± 40 percent of the actual amount of vinyl chloride in the PE sample;

C) It must achieve a method detection limit of 0.0005 mg/ℓ, according to the procedures in appendix B to 40 CFR 136, incorporated by reference in Section 611.102; and

D) It must obtain certification underpursuant to subsection (q)(1) for Phase I VOCs, excluding vinyl chloride; Phase II VOCs; and Phase V VOCs.

r) This subsection (r) corresponds with 40 CFR 141.24(f)(18), an obsolete provision that relates to the initial compliance period from 1993 through 1995. This statement maintains consistency with the federal regulations.

s) The Agency mustshall, by a SEP issued pursuant to Section 611.110, increase the number of sampling points or the frequency of monitoring if it determines that it is necessary to detect variations within the PWS.

t) Each laboratory certified for the analysis of Phase I, Phase II, or Phase V VOCs underpursuant to subsection (q)(1) or (q)(2) mustshall do the following:

1) Determine the method detection limit (MDL), as defined in appendix B to 40 CFR 136, incorporated by reference in Section 611.102, at which it is capable of detecting the Phase I, Phase II, and Phase V VOCs; and,

2) Achieve an MDL for each Phase I, Phase II, and Phase V VOC that is less than or equal to 0.0005 mg/ℓ.

u) Each supplier must monitor, within each compliance period, at the time designated by the Agency by SEP pursuant to Section 611.110.

v) A new system supplier or a supplier that uses a new source of water must demonstrate compliance with the MCL within a period of time specified by a permit issued by the Agency. The supplier must also comply with the initial sampling frequencies specified by the Agency to ensure the supplier can demonstrate compliance with the MCL. Routine and increased monitoring frequencies must be conducted in accordance with the requirements in this Section.

BOARD NOTE: Derived from 40 CFR 141.24(f) (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.648 Phase II, Phase IIB, and Phase V Synthetic Organic Contaminants

Analysis of the Phase II, Phase IIB, and Phase V SOCs for the purposes of determining compliance with the MCL must be conducted as follows:

a) Definitions. As used in this Section, the following terms will have the following meanings:

"Detect" or "detection" means that the contaminant of interest is present at a level greater than or equal to the "detection limit."

"Detection limit" means the level of the contaminant of interest that is specified in subsection (r).

BOARD NOTE: This is a "trigger level" for Phase II, Phase IIB, and Phase V SOCs inasmuch as it prompts further action. The use of the term "detect" or "detection" in this Section is not intended to include any analytical capability of quantifying lower levels of any contaminant, or the "method detection limit."

b) Required sampling. Each supplier must take a minimum of one sample at each sampling point at the times required in subsection (q).

BOARD NOTE: See the Board note appended to Section 611.311(c) for information relating to implementation of requirements relating to aldicarb, aldicarb sulfone, and aldicarb sulfoxide.

c) Sampling points.

1) Sampling points for GWSs. Unless otherwise provided by SEP, a GWS supplier must take at least one sample from each of the following points: each entry point that is representative of each well after treatment.

2) Sampling points for an SWS or mixed system supplier. Unless otherwise provided by SEP, an SWS or mixed system supplier must sample from each of the following points:

A) Each entry point after treatment; or

B) Points in the distribution system that are representative of each source.

3) The supplier must take each sample at the same sampling point unless the Agency has granted a SEP that designates another location as more representative of each source, treatment plant, or within the distribution system.

4) If a system draws water from more than one source, and the sources are combined before distribution, the supplier must sample at an entry point during periods of normal operating conditions when water is representative of all sources being used.

BOARD NOTE: Subsections (b) and (c) derived from 40 CFR 141.24(h)(1) through (h)(3) (2013).

d) Monitoring frequency.

1) Each CWS and NTNCWS supplier must take four consecutive quarterly samples for each of the Phase II, Phase IIB, and Phase V SOCs during each compliance period, beginning in the three-year compliance period starting in the initial compliance period.

2) Suppliers serving more than 3,300 persons that do not detect a contaminant in the initial compliance period must take a minimum of two quarterly samples in one year of each subsequent three-year compliance period.

3) Suppliers serving fewer than or equal to 3,300 persons that do not detect a contaminant in the initial compliance period must take a minimum of one sample during each subsequent three-year compliance period.

e) Reduction to annual monitoring frequency. A CWS or NTNCWS supplier may apply to the Agency for a SEP that releases it from the requirements of subsection (d). A SEP from the requirement of subsection (d) must last for only a single three-year compliance period.

f) Vulnerability assessment. The Agency must grant a SEP from the requirements of subsection (d) based on consideration of the factors set forth at Section 611.110(a)~~611.110(e)~~.

g) If one of the Phase II, Phase IIB, or Phase V SOCs is detected in any sample, then the following must occur:

1) The supplier must monitor quarterly for the contaminant at each sampling point that resulted in a detection.

2) Annual monitoring.

A) A supplier may request that the Agency grant a SEP under~~pursuan~~Section 610.110 that reduces the monitoring frequency to annual.

B) A request for a SEP must include the following minimal information:

i) For a GWS, two quarterly samples.

ii) For an SWS or mixed system supplier, four quarterly samples.

C) The Agency must grant a SEP that allows annual monitoring at a sampling point if it determines that the sampling point is reliably and consistently below the MCL.

D) In issuing the SEP, the Agency must specify the level of the contaminant upon which the "reliably and consistently" determination was based. Any SEP that allows less frequent monitoring based on an Agency "reliably and consistently" determination must include a condition requiring the supplier to resume quarterly monitoring under~~pursuan~~subsection (g)(1) if it detects any Phase II SOC.

3) Suppliers that monitor annually must monitor during the quarters that previously yielded the highest analytical result.

4) Suppliers that have three consecutive annual samples with no detection of a contaminant at a sampling point may apply to the Agency for a SEP with respect to that point, as specified in subsections (e) and (f).

5) Monitoring for related contaminants.

A) If monitoring results in detection of one or more of the related contaminants listed in subsection (g)(5)(B), subsequent monitoring must analyze for all the related compounds in the respective group.

B) Related contaminants.

i) First group.

aldicarb
aldicarb sulfone
aldicarb sulfoxide

BOARD NOTE: See the Board note appended to Section 611.311(c) for information relating to implementation of requirements relating to aldicarb, aldicarb sulfone, and aldicarb sulfoxide.

ii) Second group.

heptachlor
heptachlor epoxide.

h) Quarterly monitoring following MCL violations.

1) Suppliers that violate an MCL for one of the Phase II, Phase IIB, or Phase V SOCs, as determined by subsection (k), must monitor quarterly for that contaminant at the sampling point where the violation occurred, beginning the next quarter after the violation.

2) Annual monitoring.

A) A supplier may request that the Agency grant a SEP ~~pursuant to Section 611.110~~ that reduces the monitoring frequency to annual.

B) A request for a SEP must include, at a minimum, the results from four quarterly samples.

C) The Agency must grant a SEP that allows annual monitoring at a sampling point if it determines that the sampling point is reliably and consistently below the MCL.

D) In issuing the SEP, the Agency must specify the level of the contaminant upon which the "reliably and consistently" determination was based. Any SEP that allows less frequent monitoring based on an Agency "reliably and consistently" determination must include a condition requiring the supplier to resume quarterly monitoring <u>under</u>~~pursuant to~~ subsection (h)(1) if it detects any Phase II SOC.

E) The supplier must monitor during the quarters that previously yielded the highest analytical result.

i) Confirmation samples.

1) If any of the Phase II, Phase IIB, or Phase V SOCs are detected in a sample, the supplier must take a confirmation sample as soon as possible, but no later than 14 days after the supplier receives notice of the detection.

2) Averaging is as specified in subsection (k).

3) The Agency must delete the original or confirmation sample if it determines that a sampling error occurred, in which case the confirmation sample will replace the original or confirmation sample.

j) This subsection (j) corresponds with 40 CFR 141.24(h)(10), an optional USEPA provision relating to compositing of samples that USEPA does not require for state programs. This statement maintains structural consistency with USEPA rules.

k) Compliance with the MCLs for the Phase II, Phase IIB, and Phase V SOCs must be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of an MCL, the supplier is in violation of the MCL.

1) For a supplier that monitors more than once per year, compliance with the MCL is determined by a running annual average at each sampling point.

2) A supplier that monitors annually or less frequently whose sample result exceeds the regulatory detection level as defined by subsection (r) must begin quarterly sampling. The system will not be considered in violation of the MCL until it has completed one year of quarterly sampling.

3) If any sample result will cause the running annual average to exceed the MCL at any sampling point, the supplier is out of compliance with the MCL immediately.

4) If a supplier fails to collect the required number of samples, compliance will be based on the total number of samples collected.

5) If a sample result is less than the detection limit, zero will be used to calculate the annual average.

l) This subsection (l) corresponds with 40 CFR 141.24(h)(12), which USEPA removed and reserved. This statement maintains structural consistency with the federal regulations.

m) Analysis for PCBs must be conducted as follows using the methods in Section 611.645:

1) Each supplier that monitors for PCBs must analyze each sample using either USEPA Organic Methods, Method 505 or Method 508.

2) If PCBs are detected in any sample analyzed using USEPA Organic Methods, Method 505 or 508, the supplier must reanalyze the sample using Method 508A to quantitate the individual Aroclors (as decachlorobiphenyl).

3) Compliance with the PCB MCL must be determined based upon the quantitative results of analyses using USEPA Organic Methods, Method 508A.

n) This subsection (n) corresponds with 40 CFR 141.24(h)(14), an obsolete provision that relates to the initial compliance period from 1993 through 1995. This statement maintains consistency with the federal regulations.

o) The Agency must issue a SEP that increases the number of sampling points or the frequency of monitoring if it determines that this is necessary to detect variations within the PWS due to such factors as fluctuations in contaminant concentration due to seasonal use or changes in the water source.

BOARD NOTE: At 40 CFR 141.24(h)(15), USEPA uses the stated factors as non-limiting examples of circumstances that make additional monitoring necessary.

p) This subsection (p) corresponds with 40 CFR 141.24(h)(16), a USEPA provision relating to reserving enforcement authority to the State that would serve no useful function as part of the State's rules. This statement maintains structural consistency with USEPA rules.

q) Each supplier must monitor, within each compliance period, at the time designated by the Agency by SEP ~~pursuant to Section 611.110~~.

r) "Detection" means greater than or equal to the following concentrations for each contaminant:

1) for PCBs (Aroclors), the following:

Aroclor	Detection Limit (mg/ℓ)
1016	0.00008
1221	0.02
1232	0.0005
1242	0.0003
1248	0.0001
1254	0.0001
1260	0.0002

2) for other Phase II, Phase IIB, and Phase V SOCs, the following:

Contaminant	Detection Limit (mg/ℓ)
Alachlor	0.0002

Aldicarb	0.0005
Aldicarb sulfoxide	0.0005
Aldicarb sulfone	0.0008
Atrazine	0.0001
Benzo(a)pyrene	0.00002
Carbofuran	0.0009
Chlordane	0.0002
2,4-D	0.0001
Dalapon	0.001
1,2-Dibromo-3-chloropropane (DBCP)	0.00002
Di(2-ethylhexyl)adipate	0.0006
Di(2ethylhexyl)phthalate	0.0006
Dinoseb	0.0002
Diquat	0.0004
Endothall	0.009
Endrin	0.00001
Ethylene dibromide (EDB)	0.00001
Glyphosate	0.006
Heptachlor	0.00004
Heptachlor epoxide	0.00002
Hexachlorobenzene	0.0001
Hexachlorocyclopentadiene	0.0001
Lindane	0.00002

Methoxychlor	0.0001
Oxamyl	0.002
Picloram	0.0001
Polychlorinated biphenyls (PCBs) (as decachlorobiphenyl)	0.0001
Pentachlorophenol	0.00004
Simazine	0.00007
Toxaphene	0.001
2,3,7,8-TCDD (dioxin)	0.000000005
2,4,5-TP (silvex)	0.0002

BOARD NOTE: See the Board note appended to Section 611.311(c) for information relating to implementation of requirements relating to aldicarb, aldicarb sulfone, and aldicarb sulfoxide.

s) Laboratory certification.

1) Analyses under this Section must only be conducted by a laboratory in one of the categories listed in Section 611.490(a) that has been certified according to the conditions of subsection (s)(2).

2) To receive certification to conduct analyses for the Phase II, Phase IIB, and Phase V SOCs, the laboratory must do the following:

A) Analyze PE samples provided by the Agency under~~pursuant to~~ 35 Ill. Adm. Code 183.125(c) that include these substances; and

B) Achieve quantitative results on the analyses performed under subsection (s)(2)(A) that are within the following acceptance limits:

SOC	Acceptance Limits
Alachlor	± 45%
Aldicarb	2 standard deviations

Aldicarb sulfone	2 standard deviations
Aldicarb sulfoxide	2 standard deviations
Atrazine	± 45%
Benzo(a)pyrene	2 standard deviations
Carbofuran	± 45%
Chlordane	± 45%
Dalapon	2 standard deviations
Di(2-ethylhexyl)adipate	2 standard deviations
Di(2-ethylhexyl)phthalate	2 standard deviations
Dinoseb	2 standard deviations
Diquat	2 standard deviations
Endothall	2 standard deviations
Endrin	± 30%
Glyphosate	2 standard deviations
Dibromochloropropane (DBCP)	± 40%
Ethylene dibromide (EDB)	± 40%
Heptachlor	± 45%
Heptachlor epoxide	± 45%
Hexachlorobenzene	2 standard deviations
Hexachlorocyclopentadiene	2 standard deviations
Lindane	± 45%
Methoxychlor	± 45%
Oxamyl	2 standard deviations

PCBs (as decachlorobiphenyl)	0-200%
Pentachlorophenol	± 50%
Picloram	2 standard deviations
Simazine	2 standard deviations
Toxaphene	± 45%
2,4-D	± 50%
2,3,7,8-TCDD (dioxin)	2 standard deviations
2,4,5-TP (silvex)	± 50%

BOARD NOTE: See the Board note appended to Section 611.311(c) for information relating to implementation of requirements relating to aldicarb, aldicarb sulfone, and aldicarb sulfoxide.

t) A new system supplier or a supplier that uses a new source of water must demonstrate compliance with the MCL within a period of time specified by a permit issued by the Agency. The supplier must also comply with the initial sampling frequencies specified by the Agency to ensure the supplier can demonstrate compliance with the MCL. Routine and increased monitoring frequencies must be conducted in accordance with the requirements in this Section.

BOARD NOTE: Derived from 40 CFR 141.24(h) (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART Q: RADIOLOGICAL MONITORING AND ANALYTICAL REQUIREMENTS

Section 611.731 Gross Alpha

Monitoring requirements for gross alpha particle activity, radium-226, radium-228, and uranium are as follows:

a) A community water system (CWS) supplier must conduct initial monitoring to determine compliance with Section 611.330(b), (c), and (e). For the purposes of monitoring for gross alpha particle activity, radium-226, radium-228, uranium, and beta particle and photon radioactivity in drinking water, "detection limit" is defined as in Section 611.720(c).

1) Applicability and sampling location for an existing CWS supplier. An existing CWS supplier using groundwater, surface water, or both groundwater and surface water (for the purpose of this Section hereafter referred to as a supplier) must sample at every entry point to the distribution system that is representative of all sources being used (hereafter called a sampling point) under normal operating conditions. The supplier must take each sample at the same sampling point, unless conditions make another sampling point more representative of each source or the Agency has designated a distribution system location, in accordance with subsection (b)(2)(C).

2) Applicability and sampling location for a new CWS supplier. A new CWS supplier or a CWS supplier that uses a new source of water must begin to conduct initial monitoring for the new source within the first quarter after initiating use of the source. A CWS supplier must conduct more frequent monitoring when ordered by the Agency in the event of possible contamination or when changes in the distribution system or treatment processes occur that may increase the concentration of radioactivity in finished water.

b) Initial monitoring: A CWS supplier must conduct initial monitoring for gross alpha particle activity, radium-226, radium-228, and uranium as follows:

1) A CWS supplier without acceptable historical data, as defined in subsection (b)(2) ~~of this Section~~, is required to have collected four consecutive quarterly samples at all sampling points before December 31, 2007.

2) Grandfathering of data: A CWS supplier may use historical monitoring data collected at a sampling point to satisfy the initial monitoring requirements for that sampling point, under the following situations.

A) To satisfy initial monitoring requirements, a CWS supplier having only one entry point to the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003.

B) To satisfy initial monitoring requirements, a CWS supplier with multiple entry points and having appropriate historical monitoring data for each entry point to the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003.

C) To satisfy initial monitoring requirements, a CWS supplier with appropriate historical data for a representative point in the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003, provided that the Agency finds that the historical data satisfactorily demonstrate that each entry point to the distribution system is expected to be in compliance based upon the historical data and reasonable assumptions about the variability of contaminant levels between entry points. The Agency must make its finding in writing, by a SEP ~~issued pursuant to Section 611.110~~, indicating how the data conforms to the requirements of this subsection (b)(2).

3) For gross alpha particle activity, uranium, radium-226, and radium-228 monitoring, the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, waive the final two quarters of initial monitoring for a sampling point if the results of the samples from the previous two quarters are below the detection limit.

4) If the average of the initial monitoring results for a sampling point is above the MCL, the supplier must collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are at or below the MCL, unless the supplier enters into another schedule as part of a formal compliance agreement with the Agency.

c) Reduced monitoring: The Agency may allow a CWS supplier to reduce the future frequency of monitoring from once every three years to once every six or nine years at each sampling point, based on the following criteria:

1) If the average of the initial monitoring results for each contaminant (i.e., gross alpha particle activity, uranium, radium-226, or radium-228) is below the detection limit specified in the table at Section 611.720(c)(1), the supplier must collect and analyze for that contaminant using at least one sample at that sampling point every nine years.

2) For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is at or above the detection limit but at or below one-half the MCL, the supplier must collect and analyze for that contaminant using at least one sample at that sampling point every six years. For combined radium-226 and radium-228, the analytical results must be combined. If the average of the combined initial monitoring results for radium-226 and radium-228 is at or above the

detection limit but at or below one-half the MCL, the supplier must collect and analyze for that contaminant using at least one sample at that sampling point every six years.

3) For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is above one-half the MCL but at or below the MCL, the supplier must collect and analyze at least one sample at that sampling point every three years. For combined radium-226 and radium-228, the analytical results must be combined. If the average of the combined initial monitoring results for radium-226 and radium-228 is above one-half the MCL but at or below the MCL, the supplier must collect and analyze at least one sample at that sampling point every three years.

4) A supplier must use the samples collected during the reduced monitoring period to determine the monitoring frequency for subsequent monitoring periods (e.g., if a supplier's sampling point is on a nine year monitoring period, and the sample result is above one-half the MCL, then the next monitoring period for that sampling point is three years).

5) If a supplier has a monitoring result that exceeds the MCL while on reduced monitoring, the supplier must collect and analyze quarterly samples at that sampling point until the supplier has results from four consecutive quarters that are below the MCL, unless the supplier enters into another schedule as part of a formal compliance agreement with the Agency.

d) Compositing: To fulfill quarterly monitoring requirements for gross alpha particle activity, radium-226, radium-228, or uranium, a supplier may composite up to four consecutive quarterly samples from a single entry point if analysis is done within a year after the first sample. The analytical results from the composited sample must be treated as the average analytical result to determine compliance with the MCLs and the future monitoring frequency. If the analytical result from the composited sample is greater than one-half the MCL, the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, direct the supplier to take additional quarterly samples before allowing the supplier to sample under a reduced monitoring schedule.

e) A gross alpha particle activity measurement may be substituted for the required radium-226 measurement, provided that the measured gross alpha particle activity does not exceed 5 pCi/ℓ. A gross alpha particle activity measurement may be substituted for the required uranium measurement provided that the measured gross alpha particle activity does not exceed 15 pCi/ℓ.

1) The gross alpha measurement must have a confidence interval of 95% (1.65σ, where σ is the standard deviation of the net counting rate of the sample) for radium-226 and uranium.

2) When a supplier uses a gross alpha particle activity measurement in lieu of a radium-226 or uranium measurement, the gross alpha particle activity analytical result will be used to determine the future monitoring frequency for radium-226 or uranium.

3) If the gross alpha particle activity result is less than detection, one-half the detection limit will be used to determine compliance and the future monitoring frequency.

BOARD NOTE: Subsections (a) through (e) derive from 40 CFR 141.26(a) (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.732 Beta Particle and Photon Radioactivity

Monitoring and compliance requirements for manmade radioactivity. To determine compliance with the maximum contaminant levels in Section 611.330(d) for beta particle and photon radioactivity, a supplier must monitor at a frequency as follows:

a) A CWS supplier (either a surface water or groundwater supplier) designated by the Agency, by a SEP ~~issued pursuant to Section 611.110~~, as vulnerable must sample for beta particle and photon radioactivity. A supplier must collect quarterly samples for beta emitters and annual samples for tritium and strontium-90 at each entry point to the distribution system (hereafter called a sampling point), beginning within one quarter after being notified by the Agency. A supplier already designated by the Agency must continue to sample until the Agency reviews and either reaffirms or removes the designation, by a SEP ~~issued pursuant to Section 611.110~~.

1) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity at a sampling point has a running annual average (computed quarterly) less than or equal to 50 pCi/ℓ (screening level), the Agency may reduce the frequency of monitoring at that sampling point to once every three years. A supplier must collect all samples required in subsection (a) during the reduced monitoring period.

2) For a supplier in the vicinity of a nuclear facility, the Agency may allow the CWS supplier to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the supplier's entry points,

where the Agency determines if such data is applicable to a particular water system, by a SEP ~~issued pursuant to Section 611.110~~. In the event that there is a release from a nuclear facility, a supplier that is using surveillance data must begin monitoring at the community water supplier's entry points in accordance with subsection (b)(1).

b) A CWS supplier (either a surface water or groundwater supplier) designated by the Agency, by a SEP ~~issued pursuant to Section 611.110~~, as utilizing waters contaminated by effluents from nuclear facilities must sample for beta particle and photon radioactivity. A supplier must collect quarterly samples for beta emitters and iodine-131 and annual samples for tritium and strontium-90 at each entry point to the distribution system (hereafter called a sampling point), beginning within one quarter after being notified by the Agency. A supplier already designated by the Agency as a supplier using waters contaminated by effluents from nuclear facilities must continue to sample until the Agency reviews and either reaffirms or removes the designation, by a SEP ~~issued pursuant to Section 611.110~~.

1) Quarterly monitoring for gross beta particle activity must be based on the analysis of monthly samples or the analysis of a composite of three monthly samples.

BOARD NOTE: In corresponding 40 CFR 141.26(b)(2)(i), USEPA recommends the use of a composite of three monthly samples.

2) For iodine-131, a composite of five consecutive daily samples must be analyzed once each quarter. The Agency must require, by a SEP ~~issued pursuant to Section 611.110~~, more frequent monitoring for iodine-131 where iodine-131 is identified in the finished water.

3) Annual monitoring for strontium-90 and tritium must be conducted by means of the analysis of a composite of four consecutive quarterly samples or analysis of four quarterly samples.
BOARD NOTE: In corresponding 40 CFR 141.26(b)(2)(iii), USEPA recommends the analysis of four consecutive quarterly samples.

4) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity at a sampling point has a running annual average (computed quarterly) less than or equal to 15 pCi/ℓ, the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, reduce the frequency of monitoring at that sampling point to once every three years. The supplier must collect the same type of samples required in subsection (b) during the reduced monitoring period.

5) For a supplier in the vicinity of a nuclear facility, the Agency may allow the CWS to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry points, where the Agency determines, by a SEP ~~issued pursuant to Section 611.110~~, that such data is applicable to the particular water system. In the event that there is a release from a nuclear facility, a supplier that uses such surveillance data must begin monitoring at the CWS's entry points in accordance with subsection (b).

c) A CWS supplier designated by the Agency to monitor for beta particle and photon radioactivity cannot~~can not~~ apply to the Agency for a waiver from the monitoring frequencies specified in subsection (a) or (b).

d) A CWS supplier may analyze for naturally occurring potassium-40 beta particle activity from the same or equivalent sample used for the gross beta particle activity analysis. A supplier is allowed to subtract the potassium-40 beta particle activity value from the total gross beta particle activity value to determine if the screening level is exceeded. The potassium-40 beta particle activity must be calculated by multiplying elemental potassium concentrations (in mg/ℓ) by a factor of 0.82.

e) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity exceeds the appropriate screening level, an analysis of the sample must be performed to identify the major radioactive constituents present in the sample and the appropriate doses must be calculated and summed to determine compliance with Section 611.330(d)(1), using the formula in Section 611.330(d)(2). Doses must also be calculated and combined for measured levels of tritium and strontium to determine compliance.

f) A supplier must monitor monthly at the sampling points that exceeds the maximum contaminant level in Section 611.330(d) beginning the month after the exceedence occurs. A supplier must continue monthly monitoring until the supplier has established, by a rolling average of three monthly samples, that the MCL is being met. A supplier that establishes that the MCL is being met must return to quarterly monitoring until it meets the requirements set forth in subsection (a)(1) or (b)(4).

BOARD NOTE: Derived from 40 CFR 141.26(b) (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.733 General Monitoring and Compliance Requirements

a) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, require more frequent monitoring than specified in Sections 611.731 and 611.732 or may require confirmation samples. The results of the initial and confirmation samples will be averaged for use in a compliance determination.

b) Each PWS supplier must monitor at the time designated by the Agency during each compliance period.

c) Compliance: compliance with Section 611.330(b) through (e) must be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of an MCL, the supplier is in violation of the MCL.

1) For a supplier monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point. If the average of any sampling point is greater than the MCL, then the supplier is out of compliance with the MCL.

2) For a supplier monitoring more than once per year, if any sample result would cause the running average to exceed the MCL at any single sampling point, the supplier is immediately out of compliance with the MCL.

3) a supplier must include all samples taken and analyzed under the provisions ~~of this Section~~ and Sections 611.731 and 611.732 in determining compliance, even if that number is greater than the minimum required.

4) If a supplier does not collect all required samples when compliance is based on a running annual average of quarterly samples, compliance will be based on the running average of the samples collected.

5) If a sample result is less than the detection limit, zero will be used to calculate the annual average, unless a gross alpha particle activity is being used in lieu of radium-226 or uranium. If the gross alpha particle activity result is less than detection, one-half the detection limit will be used to calculate the annual average.

d) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, allow the supplier to delete results of obvious sampling or analytic errors.

e) If the MCL for radioactivity set forth in Section 611.330 (b) through (e) is exceeded, the operator of a CWS must give notice to the Agency <u>under</u>~~pursuant to~~ Section 611.840 and to the public, as required by Subpart V.

BOARD NOTE: Derived from 40 CFR 141.26(c) (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART S: GROUNDWATER RULE

Section 611.800 General Requirements and Applicability

a) Scope of this Subpart S. The requirements of this Subpart S constitute NPDWRs.

b) Applicability. This Subpart S applies to all PWS suppliers that use groundwater, except that it does not apply to public water systems that combine all of their groundwater with surface water or with groundwater under the direct influence of surface water prior to treatment underpursuant to Subpart B. For the purposes of this Subpart S, "GWS" is defined as any PWS that meets this applicability statement, including a consecutive system receiving finished groundwater.

c) General requirements. A supplier subject to this Subpart S must comply with the following requirements:

1) Sanitary survey information requirements for all GWS suppliers, as described in Section 611.801.

2) Microbial source water monitoring requirements for GWS suppliers that do not treat all of their groundwater to at least 99.99 percent (4-log) treatment of viruses (using inactivation, removal, or an Agency-approved combination of 4-log virus inactivation and removal) before or at the first customer, as described in Section 611.802.

3) Treatment technique requirements, described in Section 611.803, that apply to GWS suppliers that have fecally contaminated source waters, as determined by source water monitoring conducted underpursuant to Section 611.802, or which have significant deficiencies that are identified by the Agency, by a SEP issued pursuant to Section 611.110, or which are identified by USEPA underpursuant to SDWA section 1445 (42 USC 300j-4). A GWS supplier with fecally contaminated source water or with significant deficiencies subject to the treatment technique requirements of this Subpart S must implement one or more of the following corrective action options: correct all significant deficiencies; provide an alternate source of water; eliminate the source of contamination; or provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or an Agency-approved combination of 4-log virus inactivation and removal) before or at the first customer.

4) A GWS supplier that provides at least 4-log treatment of viruses (using inactivation, removal, or an Agency-approved combination of 4-log virus inactivation and removal) before or at the first customer is required to conduct compliance monitoring to demonstrate treatment effectiveness, as described in Section 611.803(b).

5) If requested by the Agency, a GWS supplier must provide the Agency with any existing information that will enable the Agency to perform a hydrogeologic sensitivity assessment.

BOARD NOTE: The Board moved the definition of "hydrogeologic sensitivity assessment" to the definitions provision: Section 611.101.

d) This subsection (d) corresponds with 40 CFR 141.400(d), which recites past effective dates. This statement maintains structural consistency with the corresponding federal provision.

BOARD NOTE: Derived from 40 CFR 141.400 (2016).

(Source: Amended at 42 Ill. Reg._____, effective_____)

Section 611.801 Sanitary Surveys for GWS Suppliers

a) A GWS supplier must provide the Agency, at the Agency's request, any existing information that will enable the Agency to conduct a sanitary survey.

b) For the purposes of this Subpart S, a "sanitary survey," as conducted by the Agency, includes but is not limited to, an onsite review of the delineated WHPAs (identifying sources of contamination within the WHPAs and evaluations of the hydrogeologic sensitivity of the delineated WHPAs conducted under source water assessments or utilizing other relevant information where available), facilities, equipment, operation, maintenance, and monitoring compliance of a public water system to evaluate the adequacy of the system, its sources and operations and the distribution of safe drinking water.

c) The sanitary survey must include an evaluation of the applicable components listed in subsections (c)(1) through (c)(8):

1) Source;

2) Treatment;

3) Distribution system;

4) Finished water storage;

5) Pumps, pump facilities, and controls;

6) Monitoring, reporting, and data verification;

7) System management and operation; and

8) Operator compliance with Agency requirements.

d) The Agency must repeat the sanitary survey as follows:

1) The Agency must conduct a sanitary survey that addresses the eight sanitary survey components listed in subsection (c) no less frequently than every three years for a CWS supplier, except as provided in subsection (d)(3), and every five years for a non-CWS supplier. The Agency may conduct more frequent sanitary surveys for any supplier. The sanitary survey must include an evaluation of each of the elements set forth in subsection (c), as applicable.

2) The Agency may use a phased review process to meet the requirements of subsection (d)(1) if all the applicable elements of subsection (c) are evaluated within the required interval.

3) The Agency may conduct sanitary surveys once every five years for community water systems under any of the following circumstances:

A) If the system either provides at least 4-log treatment of viruses (using inactivation, removal, or an Agency-approved combination of 4-log inactivation and removal) before or at the first customer for all its groundwater sources; or

B) If the supplier has an outstanding performance record, as determined by the Agency and documented in previous sanitary surveys, and the supplier had no history of total coliform MCL or monitoring violations under former Sections 611.521 through 611.527 since the last sanitary survey.

4) This subsection (d)(4) corresponds with 40 CFR 142.16(o)(2)(iv), which imposes requirements for describing the elements of the State's regulatory system. This statement maintains structural consistency with the corresponding federal provision.

5) The Agency must provide a GWS supplier with written notice by a SEP ~~issued pursuant to Section 611.110~~ that describes any significant deficiency which it has found no later than 30 days after the Agency has identified the significant deficiency. The notice may specify corrective actions and deadlines for completion of corrective actions. The Agency may provide the written notice at the time of the sanitary survey.

BOARD NOTE: Subsections (a) through (c) are derived from 40 CFR 141.401 (2016). Subsection (d) is derived from 40 CFR 142.16(o)(2) (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.802 Groundwater Source Microbial Monitoring and Analytical Methods

a) Triggered source water monitoring.

1) General requirements. A GWS supplier must conduct triggered source water monitoring if the following conditions exist.

A) The supplier does not provide at least 4-log treatment of viruses (using inactivation, removal, or an Agency-approved combination of 4-log virus inactivation and removal) before or at the first customer for each groundwater source.

B) This subsection (a)(1)(B) corresponds with 40 CFR 141.802(a)(1)(ii), which has no operative effect after a past implementation date. This statement maintains structural consistency with the federal regulations.

C) The system is notified that a sample collected under Sections 611.1054 through 611.1057 is total coliform-positive and the sample is not invalidated under Section 611.1053(c).

2) Sampling requirements. A GWS supplier must collect, within 24 hours after notification of the total coliform-positive sample, at least one groundwater source sample from each groundwater source in use at the time the total coliform-positive sample was collected pursuant to Sections 611.1054 through 611.1057, except as provided in subsection (a)(2)(B).

A) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, extend the 24-hour time limit on a case-by-case basis if it determines that the supplier cannot collect the groundwater source water sample within 24 hours due to circumstances beyond the

supplier's control. In the case of an extension, the Agency must specify how much time the supplier has to collect the sample.

B) If approved by the Agency, a supplier with more than one groundwater source may meet the requirements of this subsection (a)(2) by sampling a representative groundwater source or sources. If directed by the Agency by a SEP ~~issued pursuant to Section 611.110~~, the supplier must submit for Agency approval a triggered source water monitoring plan that identifies one or more groundwater sources that are representative of each monitoring site in the system's sample siting plan under~~pursuant to~~ Section 611.521 and that the system intends to use for representative sampling pursuant to this subsection (a).

C) This subsection (a)(2)(C) corresponds with 40 CFR 141.802(a)(1)(ii), a now-obsolete implementing provision. This statement maintains structural consistency with the federal regulations.

D) A GWS supplier that serves 1,000 or fewer people may use a repeat sample collected from a groundwater source to meet both the requirements of Subpart AA and to satisfy the monitoring requirements of subsection (a)(2) for that groundwater source only if the Agency, by a SEP ~~issued pursuant to Section 611.110~~, approves the use of E. coli as a fecal indicator for source water monitoring under~~pursuant to~~ this subsection (a) and approves the use of a single sample for meeting both the triggered source water monitoring requirements in this subsection (a) and the repeat monitoring requirements in Section 611.1058. If the repeat sample collected from the groundwater source is E. coli-positive, the system must comply with subsection (a)(3).

3) Additional requirements. If the Agency does not require corrective action under~~pursuant to~~ Section 611.803(a)(2) for a fecal indicator-positive source water sample collected under~~pursuant to~~ subsection (a)(2) that is not invalidated under~~pursuant to~~ subsection (d), the system must collect five additional source water samples from the same source within 24 hours after being notified of the fecal indicator-positive sample.

4) Consecutive and wholesale systems.

A) In addition to the other requirements of this subsection (a), a consecutive GWS supplier that has a total coliform-positive sample collected under~~pursuant to~~ Sections 611.1054 through 611.1057,

must notify the wholesale systems within 24 hours after being notified of the total coliform-positive sample.

B) In addition to the other requirements of this subsection (a), a wholesale GWS supplier must comply with the following requirements:

i) A wholesale GWS supplier that receives notice from a consecutive system it serves that a sample collected underpursuant to Sections 611.1054 through 611.1057, is total coliform-positive must, within 24 hours after being notified, collect a sample from its groundwater sources underpursuant to subsection (a)(2) and analyze it for a fecal indicator underpursuant to subsection (c).

ii) If the sample collected underpursuant to subsection (a)(4)(B)(i) is fecal indicator-positive, the wholesale GWS supplier must notify all consecutive systems served by that groundwater source of the fecal indicator source water positive within 24 hours after being notified of the groundwater source sample monitoring result and must meet the requirements of subsection (a)(3).

5) Exceptions to the triggered source water monitoring requirements. A GWS supplier is not required to comply with the source water monitoring requirements of subsection (a) if either of the following conditions exists:

A) The Agency determines, and documents in writing, by a SEP issued pursuant to Section 611.110, that the total coliform-positive sample collected underpursuant to Sections 611.1054 through 611.1057, is caused by a distribution system deficiency; or

B) The total coliform-positive sample collected underpursuant to Sections 611.1054 through 611.1057, is collected at a location that meets Agency criteria for distribution system conditions that will cause total coliform-positive samples.

b) Assessment source water monitoring. If directed by the Agency by a SEP issued pursuant to Section 611.110, a GWS supplier must conduct assessment source water monitoring that meets Agency-determined requirements for such monitoring. A GWS supplier conducting assessment source water monitoring may use a triggered source water sample collected underpursuant to subsection (a)(2) to meet the requirements of subsection (b). Agency-determined assessment source water monitoring requirements may include the following:

1) Collection of a total of 12 groundwater source samples that represent each month the system provides groundwater to the public;

2) Collection of samples from each well, unless the system obtains written Agency approval to conduct monitoring at one or more wells within the GWS that are representative of multiple wells used by that system and which draw water from the same hydrogeologic setting;

3) Collection of a standard sample volume of at least 100 mℓ for fecal indicator analysis, regardless of the fecal indicator or analytical method used;

4) Analysis of all groundwater source samples using one of the analytical methods listed in subsection (c)(2) for the presence of E. coli, enterococci, or coliphage;

5) Collection of groundwater source samples at a location prior to any treatment of the groundwater source unless the Agency approves a sampling location after treatment; and

6) Collection of groundwater source samples at the well itself, unless the system's configuration does not allow for sampling at the well itself and the Agency approves an alternate sampling location by a SEP ~~issued pursuant to Section 611.110~~ that is representative of the water quality of that well.

c) Analytical methods.

1) A GWS supplier subject to the source water monitoring requirements of subsection (a) must collect a standard sample volume of at least 100 mℓ for fecal indicator analysis, regardless of the fecal indicator or analytical method used.

2) A GWS supplier must analyze all groundwater source samples collected under~~pursuant to~~ subsection (a) using one of the analytical methods listed in subsections (c)(2)(A) through (c)(2)(C), each incorporated by reference in Section 611.102, or alternative methods approved by the Agency under~~pursuant to~~ Section 611.480, subject to the limitations of subsection (c)(2)(D), for the presence of E. coli, enterococci, or coliphage:

A) E. coli:

i) Colilert® Test: Standard Methods, 20th, 21st, or 22nd ed., Method 9223 B.

ii) Colisure™ Test: Standard Methods, 20th, 21st, or 22nd ed., Method 9223 B.

iii) Membrane Filter Method with MI Agar: USEPA Method 1604.

iv) m-ColiBlue24 Test.

v) E*Colite Test.

vi) EC–MUG: Standard Methods, 20th or 22nd ed., Method 9221 F.

vii) NA–MUG: Standard Methods, 20th ed., Method 9222 G.

viii) Colilert®-18 Test: Standard Methods, 20th, 21st, or 22nd ed., Method 9223 B.

ix) Readycult® 2007.

x) Modified Colitag™ Test.

xi) Chromocult® Method.

xii) Tecta EC/TC P-A Test, ver. 1.0 or 2.0.

BOARD NOTE: EC–MUG (Standard Methods, Method 9221 F) or NA–MUG (Standard Methods, Method 9222 G) can be used for E. coli testing step, as described in Section 611.526(f)(1) or (f)(2) after use of Standard Methods, 20th ed., Method 9221 B, 9221 D, 9222 B, or 9222 C. USEPA added Standard Methods, 21st ed., Method 9223 B as an approved alternative method on June 3, 2008 (at 73 Fed. Reg. 31616). USEPA added Readycult® 2007, Modified Colitag™ Test, and Chromocult® Method as approved alternative methods on June 8, 2010 (at 75 Fed. Reg. 32295). USEPA added Standard Methods, 22nd ed., Methods 9221 F and 9223 B as approved alternative methods on May 31, 2013 (at 78 Fed. Reg. 32558). USEPA added Standard Methods Online, Method 9221 F-06 and 9223 B-04 and Tecta EC/TC P-A Test, ver. 1.0 as approved alternative methods on June 19, 2014 (at 79 Fed. Reg. 35081). USEPA added Tecta EC/TC P-A Test, ver. 2.0 as an approved alternative method on July 27, 2017 (at 82 Fed. Reg. 34861). Because Standard Methods, 22nd ed., Methods 9223 B and 9221 F are the same versions as Standard Methods Online, Methods 9223 B-04 and 9221 F-06, the Board has not listed the

Standard Methods Online versions separately.

B) Enterococci:

i) Multiple-Tube Technique: Standard Methods, 20th ed., Method 9230 B or Standard Methods Online, Method 9230 B-04.

ii) Membrane Filter Technique: Standard Methods, 20th ed., Method 9230 C, and USEPA Method 1600.

BOARD NOTE: The holding time and temperature for groundwater samples are specified in subsection (c)(2)(D), rather than as specified in Section 8 of USEPA Method 1600.

iii) Enterolert.

BOARD NOTE: Medium is available through IDEXX Laboratories, Inc., at the address set forth in Section 611.102(b). Preparation and use of the medium must be as set forth in the article that embodies the method as incorporated by reference in Section 611.102(b).

BOARD NOTE: USEPA added Standard Methods Online, Method 9230 B-04 as an approved alternative method on June 3, 2008 (at 73 Fed. Reg. 31616).

C) Coliphage:

i) Two-Step Enrichment Presence-Absence Procedure: USEPA Method 1601 or Charm Fast Phage.

ii) Single Agar Layer Procedure: USEPA Method 1602.

D) Limitation on methods use. The time from sample collection to initiation of analysis may not exceed 30 hours. The GWS supplier is encouraged but is not required to hold samples below 10°C during transit.

d) Invalidation of a fecal indicator-positive groundwater source sample.

1) A GWS supplier may obtain Agency invalidation of a fecal indicator-positive groundwater source sample collected underpursuant to subsection (a) only under either of the following conditions:

A) The supplier provides the Agency with written notice from the laboratory that improper sample analysis occurred; or

B) The Agency determines and documents in writing by a SEP ~~issued pursuant to Section 611.110~~ that there is substantial evidence that a fecal indicator-positive groundwater source sample is not related to source water quality.

2) If the Agency invalidates a fecal indicator-positive groundwater source sample, the GWS supplier must collect another source water sample under~~pursuant to~~ subsection (a) within 24 hours after being notified by the Agency of its invalidation decision, and the supplier must have it analyzed for the same fecal indicator using the analytical methods in subsection (c). The Agency may extend the 24-hour time limit on a case-by-case basis if the supplier cannot collect the source water sample within 24 hours due to circumstances beyond its control. In the case of an extension, the Agency must specify how much time the system has to collect the sample.

e) Sampling location.

1) Any groundwater source sample required under~~pursuant to~~ subsection (a) must be collected at a location prior to any treatment of the groundwater source unless the Agency approves a sampling location after treatment.

2) If the supplier's system configuration does not allow for sampling at the well itself, it may collect a sample at an Agency-approved location to meet the requirements of subsection (a) if the sample is representative of the water quality of that well.

f) New sources. If directed by the Agency by a SEP ~~issued pursuant to Section 611.110~~, a GWS supplier that places a new groundwater source into service must conduct assessment source water monitoring under~~pursuant to~~ subsection (b). If directed by the SEP, the system must begin monitoring before the groundwater source is used to provide water to the public.

g) Public Notification. A GWS supplier with a groundwater source sample collected under~~pursuant to~~ subsection (a) or (b) that is fecal indicator-positive and which is not invalidated under~~pursuant to~~ subsection (d), including a consecutive system supplier served by the groundwater source, must conduct public notification pursuant to Section 611.902.

h) Monitoring Violations. A failure to meet the requirements of subsections (a) through (f) is a monitoring violation that requires the GWS supplier to provide public notification under~~pursuant to~~ Section 611.904.

BOARD NOTE: Derived from 40 CFR 141.402 and appendix A to subpart C of 40 CFR 141 (2017).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.803 Treatment Technique Requirements for GWS Suppliers

a) GWS suppliers with significant deficiencies or source water fecal contamination.

1) The treatment technique requirements of this Section must be met by GWS suppliers when a significant deficiency is identified or when a groundwater source sample collected underpursuant to Section 611.802(a)(3) is fecal indicator-positive.

2) If directed by the Agency by a SEP issued pursuant to Section 611.110, a GWS supplier with a groundwater source sample collected underpursuant to Section 611.802(a)(2), (a)(4), or (b) that is fecal indicator-positive must comply with the treatment technique requirements of this Section.

3) When a significant deficiency is identified at a Subpart B PWS that uses both groundwater and surface water or groundwater under the direct influence of surface water, the system must comply with provisions of this subsection (b) except in cases where the Agency determines that the significant deficiency is in a portion of the distribution system that is served solely by surface water or groundwater under the direct influence of surface water.

4) Unless the Agency, by a SEP issued pursuant to Section 611.110, directs the GWS supplier to implement a specific corrective action, the GWS supplier must consult with the Agency regarding the appropriate corrective action within 30 days after receiving written notice from the Agency of a significant deficiency, written notice from a laboratory that a groundwater source sample collected underpursuant to Section 611.802(a)(3) was found to be fecal indicator-positive, or direction from the Agency that a fecal indicator-positive collected underpursuant to Section 611.802(a)(2), (a)(4), or (b) requires corrective action. For the purposes of this Subpart S, significant deficiencies include, but are not limited to, defects in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that the Agency determines to be causing, or have potential for causing, the introduction of contamination into the water delivered to consumers.

5) Within 120 days (or earlier if directed by the Agency) after receiving written notification from the Agency of a significant deficiency, written

notice from a laboratory that a groundwater source sample collected underpursuant to Section 611.802(a)(3) was found to be fecal indicator-positive, or written notice from the Agency that a fecal indicator-positive sample collected underpursuant to Section 611.802(a)(2), (a)(4), or (b) requires corrective action, the GWS supplier must do either of the following:

A) It must have completed corrective action in accordance with any applicable plan review processes adopted by the Agency or with any SEP issued by the Agency, if any, including Agency-specified interim measures; or

B) It must be in compliance with an Agency-approved corrective action plan and schedule, subject to the following conditions:

i) Any subsequent modifications to an Agency-approved corrective action plan and schedule must also be approved by the Agency; and

ii) If the Agency specifies interim measures for protection of the public health pending Agency approval of the corrective action plan and schedule or pending completion of the corrective action plan, the supplier must comply with those interim measures, as well as with any schedule specified by the Agency.

6) Corrective action alternatives. A GWS supplier that meets the conditions of subsection (a)(1) or (a)(2) must implement one or more of the following corrective action alternatives:

A) It must correct all significant deficiencies;

B) It must provide an alternate source of water;

C) It must eliminate the source of contamination; or

D) It must provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or an Agency-approved combination of 4-log virus inactivation and removal) before or at the first customer for the groundwater source.

7) Special notice to the public of significant deficiencies or source water fecal contamination.

A) In addition to the applicable public notification requirements of Section 611.902, a community GWS supplier that receives notice from the Agency of a significant deficiency or notification of a fecal indicator-positive groundwater source sample that is not invalidated by the Agency underpursuant to Section 611.802(d) must inform the public served by the water system underpursuant to Section 611.883(h)(6) of the fecal indicator-positive source sample or of any significant deficiency that has not been corrected. The supplier must continue to inform the public annually until the significant deficiency is corrected or the fecal contamination in the groundwater source is determined by the Agency to be corrected underpursuant to subsection (a)(5) of this Section.

B) In addition to the applicable public notification requirements of Section 611.902, a non-community GWS supplier that receives notice from the Agency of a significant deficiency must inform the public served by the water system in a manner approved by the Agency of any significant deficiency that has not been corrected within 12 months after being notified by the Agency, or earlier if directed by the Agency. The supplier must continue to inform the public annually until the significant deficiency is corrected. The information must include the following information:

i) The nature of the significant deficiency and the date the significant deficiency was identified by the Agency;

ii) The Agency-approved plan and schedule for correction of the significant deficiency, including interim measures, progress to date, and any interim measures completed; and

iii) For a supplier with a large proportion of non-English speaking consumers, as determined by the Agency, information in the appropriate languages regarding the importance of the notice or a telephone number or address where consumers may contact the system to obtain a translated copy of the notice or assistance in the appropriate language.

C) If directed by the Agency, a non-CWS supplier with significant deficiencies that have been corrected must inform its customers of the significant deficiencies, how the deficiencies were corrected, and the dates of correction underpursuant to subsection (a)(7)(B).

b) Compliance monitoring.

1) Existing groundwater sources. A GWS supplier that is not required by Section 611.802(a)(1) to meet the source water monitoring requirements of this Subpart S for any groundwater source must notify the Agency in writing that it provides at least 4-log treatment of viruses (using inactivation, removal, or an Agency-approved combination of 4-log virus inactivation and removal) before or at the first customer for the specified groundwater source and begin compliance monitoring in accordance with subsection (b)(3). Notification to the Agency must include engineering, operational, or other information that the Agency requests to evaluate the submission. If the supplier subsequently discontinues 4-log treatment of viruses (using inactivation, removal, or an Agency-approved combination of 4-log virus inactivation and removal) before or at the first customer for a groundwater source, the supplier must conduct groundwater source monitoring, as required underpursuant to Section 611.802.

2) New groundwater sources. A GWS supplier that places a groundwater source in service which is not required by Section 611.802(a)(1) to meet the source water monitoring requirements of this Subpart S must comply with the requirements of subsections (b)(2)(A), (b)(2)(B), and (b)(2)(C).

A) The supplier must notify the Agency in writing that it provides at least 4-log treatment of viruses (using inactivation, removal, or an Agency-approved combination of 4-log virus inactivation and removal) before or at the first customer for the groundwater source. Notification to the Agency must include engineering, operational, or other information that the Agency requests by a SEP issued pursuant to Section 611.110 to evaluate the submission.

B) The supplier must conduct compliance monitoring, as required underpursuant to Section 611.803(b)(3), within 30 days after placing the source in service.

C) The supplier must conduct groundwater source monitoring underpursuant to Section 611.802 if it subsequently discontinues 4-log treatment of viruses (using inactivation, removal, or an Agency-approved combination of 4-log virus inactivation and removal) before or at the first customer for the groundwater source.

3) Monitoring requirements. A GWS supplier subject to the requirements of subsection (a), (b)(1) or (b)(2) must monitor the effectiveness and

reliability of treatment for that groundwater source before or at the first customer as follows:

A) Chemical disinfection.

i) GWS suppliers serving more than 3,300 people. A GWS supplier that serves more than 3,300 people must continuously monitor the residual disinfectant concentration using analytical methods specified in Section 611.531(b) at a location approved by the Agency and must record the lowest residual disinfectant concentration each day that water from the groundwater source is served to the public. The GWS supplier must maintain the Agency-approved residual disinfectant concentration every day it serves water from the groundwater source to the public. If there is a failure in the continuous monitoring equipment, the GWS supplier must conduct grab sampling every four hours until the continuous monitoring equipment is returned to service. The supplier must resume continuous residual disinfectant monitoring within 14 days.

ii) GWS suppliers serving 3,300 or fewer people. A GWS supplier that serves 3,300 or fewer people must monitor the residual disinfectant concentration using analytical methods specified in Section 611.531(b) at a location approved by the Agency and record the residual disinfection concentration each day that water from the groundwater source is served to the public. The GWS supplier must determine and maintain the Agency-approved residual disinfectant concentration every day that it serves water from the groundwater source to the public. The GWS supplier must take a daily grab sample during the hour of peak flow or at another time specified by the Agency. If any daily grab sample measurement falls below the Agency-approved residual disinfectant concentration, the GWS supplier must take follow-up samples every four hours until the residual disinfectant concentration is restored to the Agency-approved level. Alternatively, a GWS supplier that serves 3,300 or fewer people may monitor continuously and meet the requirements of subsection (b)(3)(A)(i).

B) Membrane filtration. A GWS supplier that uses membrane filtration to meet the requirements of this Subpart S must monitor the membrane filtration process in accordance with all Agency-specified monitoring requirements and must operate the membrane filtration in accordance with all Agency-specified compliance requirements. A GWS supplier that uses membrane filtration is in compliance with the requirement to achieve at least 4-log removal of viruses when it fulfills the following conditions:

i) The membrane has an absolute molecular weight cut-off, or an alternative parameter that describes the exclusion characteristics of the membrane, that can reliably achieve at least 4-log removal of viruses;

ii) The membrane process is operated in accordance with Agency-specified compliance requirements; and

iii) The integrity of the membrane is intact.

C) Alternative treatment. A GWS supplier that uses an Agency-approved alternative treatment to meet the requirements of this Subpart S by providing at least 4-log treatment of viruses (using inactivation, removal, or an Agency-approved combination of 4-log virus inactivation and removal) before or at the first customer must do both of the following:

i) It must monitor the alternative treatment in accordance with all Agency-specified monitoring requirements; and

ii) It must operate the alternative treatment in accordance with all operational requirements determined by the supplier that the Agency has approved as necessary to achieve at least 4-log treatment of viruses.

c) Discontinuing treatment. A GWS supplier may discontinue 4-log treatment of viruses (using inactivation, removal, or an Agency-approved combination of 4-log virus inactivation and removal) before or at the first customer for a groundwater source if the supplier determines and documents and the Agency approves in writing that 4-log treatment of viruses is no longer necessary for that groundwater source. A system that discontinues 4-log treatment of viruses is subject to the source water monitoring and analytical methods requirements of Section 611.802 of this Subpart S.

d) A failure to meet the monitoring requirements of subsection (b) is a monitoring violation and requires the GWS supplier to provide public notification underpursuant to Section 611.904.

BOARD NOTE: Derived from 40 CFR 141.403 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.804 Treatment Technique Violations for GWS Suppliers

a) A GWS supplier with a significant deficiency is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the Agency by a SEP issued pursuant to Section 611.110) of receiving written notice from the Agency of the significant deficiency, the system does not do either of the following:

1) It does not complete corrective action in accordance with any applicable Agency plan review processes or other Agency guidance and direction, including Agency specified interim actions and measures, or

2) It is not in compliance with an Agency-approved corrective action plan and schedule.

b) Unless the Agency invalidates a fecal indicator-positive groundwater source sample underpursuant to Section 611.802(d), a GWS supplier is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the Agency) after meeting the conditions of Section 611.803(a)(1) or (a)(2), the supplier does not do either of the following:

1) It does not complete corrective action in accordance with any applicable Agency plan review processes or other Agency guidance and direction, including Agency-specified interim measures, or

2) It is not in compliance with an Agency-approved corrective action plan and schedule.

c) A GWS supplier subject to the requirements of Section 611.803(b)(3) that fails to maintain at least 4-log treatment of viruses (using inactivation, removal, or an Agency-approved combination of 4-log virus inactivation and removal) before or at the first customer for a groundwater source is in violation of the treatment technique requirement if the failure is not corrected within four hours after determining the supplier is not maintaining at least 4-log treatment of viruses before or at the first customer.

d) A GWS supplier must give public notification underpursuant to Section 611.903 for the treatment technique violations specified in subsections (a), (b) and (c).

BOARD NOTE: Derived from 40 CFR 141.404 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART T: REPORTING AND RECORDKEEPING

Section 611.831 Monthly Operating Report (Repealed)

Within 30 days following the last day of the month, each CWS supplier must submit a monthly operating report to the Agency on forms provided or approved by the Agency.

BOARD NOTE: This is an additional State requirement.

(Source: Repealed at 42 Ill. Reg. _____, effective _____)

Section 611.833 Cross Connection Reporting (Repealed)

Each CWS supplier exempted pursuant to Section 17(b) of the Act [415 ILCS 5/17(b)] from the disinfection requirement must report monthly to the Agency its activity to educate and inform its customers about preventing contamination into the distribution system.

BOARD NOTE: This is an additional State requirement.

(Source: Repealed at 42 Ill. Reg. _____, effective _____)

Section 611.840 Reporting

a) Except where a shorter period is specified in this Part, a supplier must report to the Agency the results of any test measurement or analysis required by this Part within the following times, whichever is shortest:

1) The first ten days following the month in which the result is received; or

2) The first ten days following the end of the required monitoring period, as specified by a SEP issued pursuant to Section 611.110.

b) Except where a different reporting period is specified in this Part, the supplier must report to the Agency within 48 hours any failure to comply with any provision (including failure to comply with monitoring requirements) of this Part.

c) The supplier is not required to report analytical results to the Agency in cases where an Agency laboratory performs the analysis.

d) The supplier, within ten days after completing the public notification requirements under Subpart V ~~of this Part~~ for the initial public notice and any repeat notices, must submit to the Agency a certification that it has fully complied with the public notification regulations. The PWS must include with this certification a representative copy of each type of notice distributed, published, posted, or made available to the persons served by the supplier or to the media.

e) The supplier must submit to the Agency within the time stated in the request copies of any records required to be maintained under Section 611.860 or copies of any documents then in existence that the Agency is entitled to inspect under~~pursuant to~~ the authority of Section 4 of the Act [415 ILCS 5/4].

BOARD NOTE: Derived from 40 CFR 141.31 (2002).

(Source: Amended at 42 Ill. Reg._____, effective_____)

SUBPART U: CONSUMER CONFIDENCE REPORTS

Section 611.883 Content of the Reports

a) Each CWS must provide to its customers an annual report that contains the information specified in this Section and Section 611.884.

b) Information on the source of the water delivered.

1) Each report must identify the sources of the water delivered by the CWS by providing information on the following:

A) The type of the water (e.g., surface water, groundwater); and

B) The commonly used name (if any) and location of the body (or bodies) of water.

2) If a source water assessment has been completed, the report must notify consumers of the availability of this information and the means to obtain it. In addition, systems are encouraged to highlight in the report significant sources of contamination in the source water area if they have readily available information. Where a system has received a source water assessment from the Agency, the report must include a brief summary of the system's susceptibility to potential sources of contamination, using language provided by the Agency or written by the supplier.

c) Definitions.

1) Each report must include the following definitions:

A) Maximum Contaminant Level Goal or MCLG: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

BOARD NOTE: Although an MCLG is not an NPDWR that the Board must include in the Illinois SDWA regulations, the use of this definition is mandatory where the term "MCLG" is defined.

B) Maximum Contaminant Level or MCL: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

2) A report for a CWS operating under relief from an NPDWR issued under Section 611.111, 611.112, 611.130, or 611.131 must include the following definition: "Variances, Adjusted Standards, and Site-specific Rules: State permission not to meet an MCL or a treatment technique under certain conditions."

3) A report that contains data on contaminants that USEPA regulates using any of the following terms must include the applicable definitions:

A) Treatment technique: A required process intended to reduce the level of a contaminant in drinking water.

B) Action level: The concentration of a contaminant that, if exceeded, triggers treatment or other requirements that a water system must follow.

C) Maximum residual disinfectant level goal or MRDLG: The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

BOARD NOTE: Although an MRDLG is not an NPDWR that the Board must include in the Illinois SDWA regulations, the use of this definition is mandatory where the term "MRDLG" is defined.

D) Maximum residual disinfectant level or MRDL: The highest level of a disinfectant allowed in drinking water. There is convincing

evidence that addition of a disinfectant is necessary for control of microbial contaminants.

4) A report that contains information regarding a Level 1 or Level 2 assessment required under Subpart AA must include the applicable of the following definitions:

A) "Level 1 assessment: A Level 1 assessment is a study of the water system to identify potential problems and determine (if possible) why total coliform bacteria have been found in our water system."

B) "Level 2 assessment: A Level 2 assessment is a very detailed study of the water system to identify potential problems and determine (if possible) why an E. coli MCL violation has occurred or why total coliform bacteria have been found in our water system on multiple occasions."

d) Information on detected contaminants.

1) This subsection (d) specifies the requirements for information to be included in each report for contaminants subject to mandatory monitoring (except Cryptosporidium). It applies to the following:

A) Contaminants subject to an MCL, action level, MRDL, or treatment technique (regulated contaminants);

B) Contaminants for which monitoring is required by USEPA underpursuant to 40 CFR 141.40 (unregulated contaminants); and

C) Disinfection byproducts or microbial contaminants for which monitoring is required by Section 611.382 and Subpart L, except as provided under subsection (e)(1), and which are detected in the finished water.

2) The data relating to these contaminants must be displayed in one table or in several adjacent tables. Any additional monitoring results that a CWS chooses to include in its report must be displayed separately.

3) The data must have been derived from data collected to comply with monitoring and analytical requirements during calendar year 1998 for the first report and must be derived from the data collected in subsequent calendar years, except that the following requirements also apply:

A) Where a system is allowed to monitor for regulated contaminants less often than once a year, the tables must include the date and

results of the most recent sampling, and the report must include a brief statement indicating that the data presented in the report is from the most recent testing done in accordance with the regulations. No data older than five years need be included.

B) Results of monitoring in compliance with Section 611.382 and Subpart L need only be included for five years from the date of last sample or until any of the detected contaminants becomes regulated and subject to routine monitoring requirements, whichever comes first.

4) For detected regulated contaminants (listed in Appendix A), the tables must contain the following:

A) The MCL for that contaminant expressed as a number equal to or greater than 1.0 (as provided in Appendix A);

B) The federal Maximum Contaminant Level Goal (MCLG) for that contaminant expressed in the same units as the MCL;

C) If there is no MCL for a detected contaminant, the table must indicate that there is a treatment technique, or specify the action level, applicable to that contaminant, and the report must include the definitions for treatment technique or action level, as appropriate, specified in subsection (c)(3);

D) For contaminants subject to an MCL, except turbidity, total coliforms, fecal coliforms, and E. coli, the highest contaminant level used to determine compliance with an NPDWR, and the range of detected levels, as follows:

i) When compliance with the MCL is determined annually or less frequently: the highest detected level at any sampling point and the range of detected levels expressed in the same units as the MCL.

ii) When compliance with the MCL is determined by calculating a running annual average of all samples taken at a monitoring location: the highest average of any of the monitoring locations and the range of all monitoring locations expressed in the same units as the MCL. For the MCLs for TTHM and HAA5 in Section 611.312(b)(2), the supplier must include the highest locational running annual average for TTHM and HAA5 and the range of individual sample results for all monitoring locations expressed in the

same units as the MCL. If results from more than one location exceed the TTHM or HAA5 MCL, the supplier must include the locational running annual average for each location whose results exceed the MCL.

iii) When compliance with the MCL is determined on a system-wide basis by calculating a running annual average of all samples at all monitoring locations: the average and range of detection expressed in the same units as the MCL. The supplier is required to include individual sample results for the IDSE conducted under Subpart W when determining the range of TTHM and HAA5 results to be reported in the annual consumer confidence report for the calendar year that the IDSE samples were taken.

BOARD NOTE to subsection (d)(4)(D): When rounding of results to determine compliance with the MCL is allowed by the regulations, rounding should be done prior to multiplying the results by the factor listed in Appendix; derived from 40 CFR 153 (2016).

E) For turbidity the following:

i) When it is reported underpursuant to Section 611.560: the highest average monthly value.

ii) When it is reported underpursuant to the requirements of Section 611.211(b): the highest monthly value. The report must include an explanation of the reasons for measuring turbidity.

iii) When it is reported underpursuant to Section 611.250, 611.743, or 611.955(b): the highest single measurement and the lowest monthly percentage of samples meeting the turbidity limits specified in Section 611.250, 611.743, or 611.955(b) for the filtration technology being used. The report must include an explanation of the reasons for measuring turbidity;

F) For lead and copper the following: the 90th percentile value of the most recent round of sampling and the number of sampling sites exceeding the action level;

G) This subsection (d)(4)(G) corresponds with 40 CFR 141.153(d)(4)(vii), which has no operative effect after a past implementation date. This statement maintains structural

consistency with the federal regulations.

H) This subsection (d)(4)(H) corresponds with 40 CFR 141.153(d)(4)(viii), a now-obsolete implementing provision. This statement maintains structural consistency with the federal regulations.

I) The likely sources of detected contaminants to the best of the supplier's knowledge. Specific information regarding contaminants may be available in sanitary surveys and source water assessments, and must be used when available to the supplier. If the supplier lacks specific information on the likely source, the report must include one or more of the typical sources for that contaminant listed in Appendix G that are most applicable to the CWS; and

J) For E. coli analytical results under Subpart AA, the total number of positive samples.

5) If a CWS distributes water to its customers from multiple hydraulically independent distribution systems that are fed by different raw water sources, the table must contain a separate column for each service area and the report must identify each separate distribution system. Alternatively, a CWS may produce separate reports tailored to include data for each service area.

6) The tables must clearly identify any data indicating violations of MCLs, MRDLs, or treatment techniques, and the report must contain a clear and readily understandable explanation of the violation including the following: the length of the violation, the potential adverse health effects, and actions taken by the CWS to address the violation. To describe the potential health effects, the CWS must use the relevant language of Appendix A.

7) For detected unregulated contaminants for which monitoring is required by USEPA under~~pursuant to~~ 40 CFR 141.40 (except Cryptosporidium), the tables must contain the average and range at which the contaminant was detected. The report may include a brief explanation of the reasons for monitoring for unregulated contaminants.

e) Information on Cryptosporidium, radon, and other contaminants as follows:

1) If the CWS has performed any monitoring for Cryptosporidium, including monitoring performed to satisfy the requirements of Subpart L, that indicates that Cryptosporidium may be present in the source water or the finished water, the report must include the following:

A) A summary of the results of the monitoring; and

B) An explanation of the significance of the results.

2) If the CWS has performed any monitoring for radon that indicates that radon may be present in the finished water, the report must include the following:

A) The results of the monitoring; and

B) An explanation of the significance of the results.

3) If the CWS has performed additional monitoring that indicates the presence of other contaminants in the finished water, the report must include the following:

A) The results of the monitoring; and

B) An explanation of the significance of the results noting the existence of any health advisory or proposed regulation.

f) Compliance with an NPDWR. In addition to the requirements of subsection (d)(6), the report must note any violation that occurred during the year covered by the report of a requirement listed below, and include a clear and readily understandable explanation of the violation, any potential adverse health effects, and the steps the CWS has taken to correct the violation.

1) Monitoring and reporting of compliance data.

2) Filtration and disinfection prescribed by Subpart B. For CWSs that have failed to install adequate filtration or disinfection equipment or processes, or have had a failure of such equipment or processes that constitutes a violation, the report must include the following language as part of the explanation of potential adverse health effects: Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

3) Lead and copper control requirements prescribed by Subpart G. For systems that fail to take one or more actions prescribed by Section 611.350(d), 611.351, 611.352, 611.353, or 611.354, the report must include the applicable language of Appendix A for lead, copper, or both.

4) Treatment techniques for acrylamide and epichlorohydrin prescribed by Section 611.296. For systems that violate the requirements of Section 611.296, the report must include the relevant language from Appendix A.

5) Recordkeeping of compliance data.

6) Special monitoring requirements prescribed by Section 611.630.

7) Violation of the terms of a variance, adjusted standard, site-specific rule, or administrative or judicial order.

g) Variances, adjusted standards, and site-specific rules. If a system is operating under the terms of a variance, adjusted standard, or site-specific rule issued under Section 611.111, 611.112, or 611.131, the report must contain the following:

1) An explanation of the reasons for the variance, adjusted standard, or site-specific rule;

2) The date on which the variance, adjusted standard, or site-specific rule was issued;

3) A brief status report on the steps the CWS is taking to install treatment, find alternative sources of water, or otherwise comply with the terms and schedules of the variance, adjusted standard, or site-specific rule; and

4) A notice of any opportunity for public input in the review, or renewal, of the variance, adjusted standard, or site-specific rule.

h) Additional information.

1) The report must contain a brief explanation regarding contaminants that may reasonably be expected to be found in drinking water, including bottled water. This explanation may include the language of subsections (h)(1)(A) through (h)(1)(C) or CWSs may use their own comparable language. The report also must include the language of subsection (h)(1)(D).

A) The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

B) Contaminants that may be present in source water include the following:

i) Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife;

ii) Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming;

iii) Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses;

iv) Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems; and

v) Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

C) In order to ensure that tap water is safe to drink, USEPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. United States Food and Drug Administration (USFDA) regulations establish limits for contaminants in bottled water that must provide the same protection for public health.

D) Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA Safe Drinking Water Hotline (800-426-4791).

2) The report must include the telephone number of the owner, operator, or designee of the CWS as a source of additional information concerning the report.

3) In communities with a large proportion of non-English speaking residents, as determined by the Agency, the report must contain information in the appropriate languages regarding the importance of the report or contain a telephone number or address where such residents may contact the system to obtain a translated copy of the report or assistance in the appropriate language.

4) The report must include information about opportunities for public participation in decisions that may affect the quality of the water.

5) The CWS may include such additional information as it deems necessary for public education consistent with, and not detracting from, the purpose of the report.

6) Suppliers required to comply with Subpart S.

A) Any GWS supplier that receives written notice from the Agency of a significant deficiency or which receives notice from a laboratory of a fecal indicator-positive groundwater source sample that is not invalidated by the Agency underpursuant to Section 611.802(d) must inform its customers of any significant deficiency that is uncorrected at the time of the next report or of any fecal indicator-positive groundwater source sample in the next report. The supplier must continue to inform the public annually until the Agency, by a SEP issued pursuant to Section 611.110, determines that particular significant deficiency is corrected or the fecal contamination in the groundwater source is addressed underpursuant to Section 611.803(a). Each report must include the following information:

i) The nature of the particular significant deficiency or the source of the fecal contamination (if the source is known) and the date the significant deficiency was identified by the Agency or the dates of the fecal indicator-positive groundwater source samples;

ii) Whether or not the fecal contamination in the groundwater source has been addressed underpursuant to Section 611.803(a) and the date of such action;

iii) For each significant deficiency or fecal contamination in the groundwater source that has not been addressed underpursuant to Section 611.803(a), the Agency-approved plan and schedule for correction, including interim measures, progress to date, and any interim measures completed; and

iv) If the system receives notice of a fecal indicator-positive groundwater source sample that is not invalidated by the Agency underpursuant to Section 611.802(d), the potential

health effects using the health effects language of Appendix A.

B) If directed by the Agency by a SEP ~~issued pursuant to Section 611.110~~, a supplier with significant deficiencies that have been corrected before the next report is issued must inform its customers of the significant deficiency, how the deficiency was corrected, and the date of correction under~~pursuant to~~ subsection (h)(6)(A).

7) Suppliers required to comply with Subpart AA.

A) Any supplier required to comply with the Level 1 assessment requirement or a Level 2 assessment requirement that is not due to an E. coli MCL violation must include in the report the text found in subsections (h)(7)(A)(i) and (h)(7)(A)(ii) or (h)(7)(A)(i) and (h)(7)(A)(iii), as appropriate, filling in the blanks accordingly and the text found in subsection (h)(7)(A)(iv), if appropriate.

i) "Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, waterborne pathogens may be present or that a potential pathway exists through which contamination may enter the drinking water distribution system. We found coliforms indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct assessment(s) to identify problems and to correct any problems that were found during these assessments."

ii) "During the past year we were required to conduct [insert number of Level 1 assessments] Level 1 assessment(s). [insert number of Level 1 assessments] Level 1 assessment(s) were completed. In addition, we were required to take [insert number of corrective actions] corrective actions and we completed [insert number of corrective actions] of these actions."

iii) "During the past year [insert number of Level 2 assessments] Level 2 assessments were required to be completed for our water system. [insert number of Level 2 assessments] Level 2 assessments were completed. In addition, we were required to take [insert number of corrective actions] corrective actions and we completed [insert number of corrective actions] of these actions."

iv) Any supplier that has failed to complete all the required assessments or correct all identified sanitary defects, is in violation of the treatment technique requirement and must also include one or both of the following statements, as appropriate: "During the past year we failed to conduct all of the required assessment(s)." or "During the past year we failed to correct all identified defects that were found during the assessment."

B) Any supplier required to conduct a Level 2 assessment due to an E. coli MCL violation must include in the report the text found in subsections (h)(7)(B)(i) and (h)(7)(B)(ii), filling in the blanks accordingly and the appropriate alternative text found in subsection (h)(7)(B)(ii), if appropriate.

i) "E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, the elderly, and people with severely compromised immune systems. We found *E. coli* bacteria, indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct assessment(s) to identify problems and to correct any problems that were found during these assessments."

ii) "We were required to complete a Level 2 assessment because we found E. coli in our water system. In addition, we were required to take [insert number of corrective actions] corrective actions and we completed [insert number of corrective actions] of these actions."

iii) Any supplier that has failed to complete the required assessment or correct all identified sanitary defects, is in violation of the treatment technique requirement and must also include one or both of the following statements, as appropriate: "We failed to conduct the required assessment." or "We failed to correct all sanitary defects that were identified during the assessment that we conducted."

C) If a supplier detects E. coli and has violated the E. coli MCL, in addition to completing the table, as required in subsection (d)(4), the supplier must include one or more of the following statements to describe any noncompliance, as applicable:

i) "We had an E. coli-positive repeat sample following a total coliform-positive routine sample."

ii) "We had a total coliform-positive repeat sample following an E. coli-positive routine sample."

iii) "We failed to take all required repeat samples following an E. coli-positive routine sample."

iv) "We failed to test for E. coli when any repeat sample tested positive for total coliform."

D) If a supplier detects E. coli and has not violated the E. coli MCL, in addition to completing the table as required in subsection (d)(4), the supplier may include a statement that explains that although it has detected E. coli, the supplier is not in violation of the E. coli MCL.

BOARD NOTE: Derived from 40 CFR 141.153 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.885 Report Delivery and Recordkeeping

a) Except as provided in subsection (g), each CWS must mail or otherwise directly deliver one copy of the report to each customer.

b) The CWS must make a good faith effort to reach consumers who do not get water bills, using a means approved by the Agency by a SEP ~~issued pursuant to Section 611.110~~. A good faith effort to reach consumers includes, but is not limited to, methods such as the following: posting the reports on the Internet, advertising the availability of the report in the news media, publication in a local newspaper, or delivery to community organizations.

c) No later than the date the CWS is required to distribute the report to its customers, each CWS must mail a copy of the report to the Agency, followed within three months by a certification that the report has been distributed to customers, and that the information is correct and consistent with the compliance monitoring data previously submitted to the Agency.

d) No later than the date the CWS is required to distribute the report to its customers, each CWS must deliver the report to any other agency or clearinghouse identified by the Agency.

e) Each CWS must make its reports available to the public upon request.

f) Each CWS serving 100,000 or more persons must post its current year's report to a publicly-accessible site on the Internet.

g) The Governor or his designee may waive the requirement of subsection (a) for a CWS serving fewer than 10,000 persons.

1) Such a CWS must do the following:

A) The CWS must publish the report in one or more local newspapers serving the county in which the CWS is located;

B) The CWS must inform the customers that the report will not be mailed, either in the newspapers in which the report is published or by other means approved by the Agency; and

C) The CWS must make the report available to the public upon request.

2) Systems serving fewer than 500 persons may forgo the requirements of subsections (g)(1)(A) and (g)(1)(B) if they provide notice at least once per year to their customers by mail, by door-to-door delivery, or by posting in a location approved by the Agency that the report is available upon request.

h) Any system subject to this Subpart U must retain copies of its consumer confidence report for no less than three years.

BOARD NOTE: Derived from 40 CFR 141.155 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART V: PUBLIC NOTIFICATION OF DRINKING WATER VIOLATIONS

Section 611.901 General Public Notification Requirements

The requirements of this Subpart V replace former notice requirements.

a) Who must give public notice. Each owner or operator of a public water system (a CWS, an NTNCWS, or a transient non-CWS) must give notice for all violations

of an NPDWR and for other situations, as listed in this subsection (a). The term "NPDWR violation" is used in this Subpart V to include violations of an MCL, an MRDL, a treatment technique, monitoring requirements, or a testing procedure set forth in this Part. Appendix G identifies the tier assignment for each specific violation or situation requiring a public notice.

1) NPDWR violations.

   A) A failure to comply with an applicable MCL or MRDL.

   B) A failure to comply with a prescribed treatment technique.

   C) A failure to perform water quality monitoring, as required by this Part.

   D) A failure to comply with testing procedures as prescribed by this Part.

2) Relief equivalent to a variance and exemptions under sections 1415 and 1416 of SDWA.

   A) Operation under relief equivalent to a SDWA section 1415 variance, under Section 611.111, or a SDWA section 1416 exemption, under Section 611.112.

   B) A failure to comply with the requirements of any schedule that has been set under relief equivalent to a SDWA section 1415 variance, under Section 611.111, or a SDWA section 1415 exemption, under Section 611.112.

3) Special public notices.

   A) The occurrence of a waterborne disease outbreak or other waterborne emergency.

   B) An exceedance of the nitrate MCL by a non-CWS, where granted permission by the Agency under Section 611.300(d).

   C) The notice required by Section 611.908 for an exceedance of 2 mg/ℓ fluoride (the federal secondary MCL for fluoride (see 40 CFR 143.3)).

      BOARD NOTE: See the Board Note appended to Section 611.908 for explanation.

D) The availability of unregulated contaminant monitoring data collected as required by USEPA underpursuant to 40 CFR 141.40.

E) Other violations and situations determined by the Agency by a SEP issued pursuant to Section 611.110 to require a public notice under this Subpart V, not already listed in Appendix G.

b) The type of public notice required for each violation or situation. The public notice requirements of this Subpart V are divided into three tiers, to take into account the seriousness of the violation or situation and of any potential adverse health effects that may be involved. The public notice requirements for each violation or situation listed in subsection (a) are determined by the tier to which it is assigned. This subsection (b) provides the definition of each tier. Appendix G identifies the tier assignment for each specific violation or situation.

1) Tier 1 public notice: required for NPDWR violations and situations with significant potential to have serious adverse effects on human health as a result of short-term exposure.

2) Tier 2 public notice: required for all other NPDWR violations and situations with potential to have serious adverse effects on human health.

3) Tier 3 public notice: required for all other NPDWR violations and situations not included in Tier 1 and Tier 2.

c) Who must receive notice.

1) Each PWS supplier must provide public notice to persons served by the water supplier, in accordance with this Subpart V. A PWS supplier that sells or otherwise provides drinking water to another PWS supplier (i.e., to a consecutive system) is required to give public notice to the owner or operator of the consecutive system; the consecutive system supplier is responsible for providing public notice to the persons it serves.

2) If a PWS supplier has a violation in a portion of the distribution system that is physically or hydraulically isolated from other parts of the distribution system, the Agency may allow the system to limit distribution of the public notice to only persons served by that portion of the system that is out of compliance. Permission by the Agency for limiting distribution of the notice must be granted in writing, by a SEP issued pursuant to Section 611.110.

3) A copy of the notice must also be sent to the Agency, in accordance with the requirements under Section 611.840(d).

BOARD NOTE: Derived from 40 CFR 141.201 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.902 Tier 1 Public Notice: Form, Manner, and Frequency of Notice

a) Violations or situations that require a Tier 1 public notice. This subsection (a) lists the violation categories and other situations requiring a Tier 1 public notice. Appendix G identifies the tier assignment for each specific violation or situation. The violation categories include:

1) Violation of the MCL for E. coli (as specified in Section 611.325(c)).

2) Violation of the MCL for nitrate, nitrite, or total nitrate and nitrite, as defined in Section 611.301, or when the water supplier fails to take a confirmation sample within 24 hours after the supplier's receipt of the results from the first sample showing an exceedance of the nitrate or nitrite MCL, as specified in Section 611.606(b).

3) Exceedance of the nitrate MCL by a non-CWS supplier, where permitted to exceed the MCL by the Agency under Section 611.300(d), as required under Section 611.909.

4) Violation of the MRDL for chlorine dioxide, as defined in Section 611.313(a), when one or more samples taken in the distribution system the day following an exceedance of the MRDL at the entrance of the distribution system exceed the MRDL, or when the water supplier does not take the required samples in the distribution system, as specified in Section 611.383(c)(2)(A).

5) This subsection (a)(5) refers to a violation of the former turbidity standard of Section 611.320, which the Board repealed because it applied to no suppliers in Illinois. This statement maintains structural consistency with the federal regulations.

6) Violation of the Surface Water Treatment Rule (SWTR), Interim Enhanced Surface Water Treatment Rule (IESWTR), or Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit (as identified in Appendix G), where the Agency determines after consultation that a Tier 1 notice is required or where consultation does not take place within 24 hours after the supplier learns of the violation.

7) Occurrence of a waterborne disease outbreak, as defined in Section 611.101, or other waterborne emergency (such as a failure or significant interruption in key water treatment processes, a natural disaster that disrupts the water supply or distribution system, or a chemical spill or unexpected loading of possible pathogens into the source water that significantly increases the potential for drinking water contamination).

8) Detection of E. coli, enterococci, or coliphage in source water samples, as specified in Section 611.802(a) and (b).

9) Other violations or situations with significant potential to have serious adverse effects on human health as a result of short-term exposure, as determined by the Agency by a SEP ~~issued pursuant to Section 611.110~~.

b) When the Tier 1 public notice is to be provided. Additional steps required. A PWS supplier must do the following:

1) It must provide a public notice as soon as practical but no later than 24 hours after the supplier learns of the violation;

2) It must initiate consultation with the Agency as soon as practical, but no later than 24 hours after the PWS supplier learns of the violation or situation, to determine additional public notice requirements; and

3) It must comply with any additional public notification requirements (including any repeat notices or direction on the duration of the posted notices) that are established as a result of the consultation with the Agency. Such requirements may include the timing, form, manner, frequency, and content of repeat notices (if any) and other actions designed to reach all persons served.

c) The form and manner of the public notice. A PWS supplier must provide the notice within 24 hours in a form and manner reasonably calculated to reach all persons served. The form and manner used by the PWS supplier are to fit the specific situation, but must be designed to reach residential, transient, and non-transient users of the water system. In order to reach all persons served, a water supplier is to use, at a minimum, one or more of the following forms of delivery:

1) Appropriate broadcast media (such as radio and television);

2) Posting of the notice in conspicuous locations throughout the area served by the water supplier;

3) Hand delivery of the notice to persons served by the water supplier; or

4) Another delivery method approved in writing by the Agency by a SEP ~~issued pursuant to Section 611.110~~.

BOARD NOTE: Derived from 40 CFR 141.202 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.903 Tier 2 Public Notice: Form, Manner, and Frequency of Notice

a) Violations or situations that require a Tier 2 public notice. This subsection (a) lists the violation categories and other situations requiring a Tier 2 public notice. Appendix G identifies the tier assignment for each specific violation or situation.

1) All violations of the MCL, MRDL, and treatment technique requirements, except where a Tier 1 notice is required under Section 611.902(a) or where the Agency determines by a SEP ~~issued pursuant to Section 611.110~~ that a Tier 1 notice is required.

2) Violations of the monitoring and testing procedure requirements, where the Agency determines by a SEP ~~issued pursuant to Section 611.110~~ that a Tier 2 rather than a Tier 3 public notice is required, taking into account potential health impacts and persistence of the violation.

3) Failure to comply with the terms and conditions of any relief equivalent to a SDWA section 1415 variance or a SDWA section 1416 exemption in place.

4) Failure to take corrective action or failure to maintain at least 4-log treatment of viruses (using inactivation, removal, or an Agency-approved combination of 4-log virus inactivation and removal) before or at the first customer under~~pursuant to~~ Section 611.803(a).

b) When Tier 2 public notice is to be provided.

1) A PWS supplier must provide the public notice as soon as practical, but no later than 30 days after the supplier learns of the violation. If the public notice is posted, the notice must remain in place for as long as the violation or situation persists, but in no case for less than seven days, even if the violation or situation is resolved. The Agency may, in appropriate circumstances, by a SEP ~~issued pursuant to Section 611.110~~, allow additional time for the initial notice of up to three months from the date the supplier learns of the violation. It is not appropriate for the Agency to grant an extension to the 30-day deadline for any unresolved violation or to allow across-the-board extensions by rule or policy for other violations

or situations requiring a Tier 2 public notice. Extensions granted by the Agency must be in writing.

2) The PWS supplier must repeat the notice every three months as long as the violation or situation persists, unless the Agency determines that appropriate circumstances warrant a different repeat notice frequency. In no circumstance may the repeat notice be given less frequently than once per year. It is not appropriate for the Agency to allow less frequent repeat notice for an MCL or treatment technique violation under the Total Coliform Rule or Subpart AA or a treatment technique violation under the Surface Water Treatment Rule or Interim Enhanced Surface Water Treatment Rule. It is also not appropriate for the Agency to allow across-the-board reductions in the repeat notice frequency for other ongoing violations requiring a Tier 2 repeat notice. An Agency determination allowing repeat notices to be given less frequently than once every three months must be in writing.

3) For the turbidity violations specified in this subsection (b)(3), a PWS supplier must consult with the Agency as soon as practical but no later than 24 hours after the supplier learns of the violation, to determine whether a Tier 1 public notice under Section 611.902(a) is required to protect public health. When consultation does not take place within the 24-hour period, the water system must distribute a Tier 1 notice of the violation within the next 24 hours (i.e., no later than 48 hours after the supplier learns of the violation), following the requirements under Section 611.902(b) and (c). Consultation with the Agency is required for the following:

A) Violation of the turbidity MCL under Section 611.320(b); or

B) Violation of the SWTR, IESWTR, or treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit.

c) The form and manner of Tier 2 public notice. A PWS supplier must provide the initial public notice and any repeat notices in a form and manner that is reasonably calculated to reach persons served in the required time period. The form and manner of the public notice may vary based on the specific situation and type of water system, but it must at a minimum meet the following requirements:

1) Unless directed otherwise by the Agency in writing, by a SEP ~~issued pursuant to Section 611.110~~, a CWS supplier must provide notice by the following:

A) Mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the PWS supplier; and

B) Any other method reasonably calculated to reach other persons regularly served by the supplier, if they would not normally be reached by the notice required in subsection (c)(1)(A). Such persons may include those who do not pay water bills or do not have service connection addresses (e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc.). Other methods may include: Publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others (e.g., apartment building owners or large private employers); posting in public places served by the supplier or on the Internet; or delivery to community organizations.

2) Unless directed otherwise by the Agency in writing, by a SEP ~~issued pursuant to Section 611.110~~, a non-CWS supplier must provide notice by the following means:

A) Posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the supplier, or by mail or direct delivery to each customer and service connection (where known); and

B) Any other method reasonably calculated to reach other persons served by the system if they would not normally be reached by the notice required in subsection (c)(2)(A). Such persons may include those served who may not see a posted notice because the posted notice is not in a location they routinely pass by. Other methods may include the following: Publication in a local newspaper or newsletter distributed to customers; use of E-mail to notify employees or students; or delivery of multiple copies in central locations (e.g., community centers).

BOARD NOTE: Derived from 40 CFR 141.203 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.904 Tier 3 Public Notice: Form, Manner, and Frequency of Notice

a) Violations or situations that require a Tier 3 public notice. This subsection (a) lists the violation categories and other situations requiring a Tier 3 public notice. Appendix G identifies the tier assignment for each specific violation or situation.

1) Monitoring violations under this Part, except where a Tier 1 notice is required under Section 611.902(a) or where the Agency determines by a SEP ~~issued pursuant to Section 611.110~~ that a Tier 2 notice is required;

2) Failure to comply with a testing procedure established in this Part, except where a Tier 1 notice is required under Section 611.902(a) or where the Agency determines by a SEP ~~issued pursuant to Section 611.110~~ that a Tier 2 notice is required;

3) Operation under relief equivalent to a SDWA section 1415 variance granted under Section 611.111 or relief equivalent to a SDWA section 1416 exemption granted under Section 611.112;

4) Availability of unregulated contaminant monitoring results, as required under Section 611.907;

5) The notice for an exceedance of 2 mg/ℓ fluoride (the federal secondary MCL for fluoride (see 40 CFR 143.3)), as required under Section 611.908; and

BOARD NOTE: See the Board Note appended to Section 611.908 for explanation.

6) Reporting and recordkeeping violations under Subpart AA.

b) When the Tier 3 public notice is to be provided.

1) A PWS supplier must provide the public notice not later than one year after the supplier learns of the violation or situation or begins operating under relief equivalent to a SDWA section 1415 variance or section 1416 exemption. Following the initial notice, the supplier must repeat the notice annually for as long as the violation, relief equivalent to a SDWA section 1415 variance or section 1416 exemption, or other situation persists. If the public notice is posted, the notice must remain in place for as long as the violation, relief equivalent to a SDWA section 1415 variance or section 1416 exemption, or other situation persists, but in no case less than seven days (even if the violation or situation is resolved).

2) Instead of individual Tier 3 public notices, a PWS supplier may use an annual report detailing all violations and situations that occurred during

the previous twelve months, as long as the timing requirements of subsection (b)(1) are met.

c) The form and manner of the Tier 3 public notice. A PWS supplier must provide the initial notice and any repeat notices in a form and manner that is reasonably calculated to reach persons served in the required time period. The form and manner of the public notice may vary based on the specific situation and type of water system, but it must at a minimum meet the following requirements:

1) Unless directed otherwise by the Agency by a SEP ~~issued pursuant to Section 611.110~~ in writing, a CWS supplier must provide notice by the following:

A) Mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the supplier; and

B) Any other method reasonably calculated to reach other persons regularly served by the supplier, if they would not normally be reached by the notice required in subsection (c)(1)(A). Such persons may include those who do not pay water bills or do not have service connection addresses (e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc.). Other methods may include the following: publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others (e.g., apartment building owners or large private employers); posting in public places or on the Internet; or delivery to community organizations.

2) Unless directed otherwise by the Agency by a SEP ~~issued pursuant to Section 611.110~~ in writing, a non-CWS supplier must provide notice by the following:

A) Posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the supplier, or by mail or direct delivery to each customer and service connection (where known); and

B) Any other method reasonably calculated to reach other persons served by the supplier, if they would not normally be reached by the notice required in subsection (c)(2)(A). Such persons may include those who may not see a posted notice because the notice is not in a location they routinely pass by. Other methods may

include the following: publication in a local newspaper or newsletter distributed to customers; use of E-mail to notify employees or students; or delivery of multiple copies in central locations (e.g., community centers).

d) When the Consumer Confidence Report may be used to meet the Tier 3 public notice requirements. For a CWS supplier, the Consumer Confidence Report (CCR) required under Subpart U may be used as a vehicle for the initial Tier 3 public notice and all required repeat notices, as long as the following is true:

1) The CCR is provided to persons served no later than 12 months after the supplier learns of the violation or situation as required under Section 611.904(b);

2) The Tier 3 notice contained in the CCR follows the content requirements under Section 611.905; and

3) The CCR is distributed following the delivery requirements under Section 611.904(c).

BOARD NOTE: Derived from 40 CFR 141.204 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART W: INITIAL DISTRIBUTION SYSTEM EVALUATIONS

Section 611.920 General Requirements

a) USEPA has designated that the requirements of this Subpart W constitute National Primary Drinking Water Regulations. The regulations in this Subpart W establish monitoring and other requirements for identifying Subpart Y compliance monitoring locations for determining compliance with maximum contaminant levels for TTHMs and HAA5. The supplier must use an initial distribution system evaluation (IDSE) to determine the locations in its distribution system that are representative of high TTHM and HAA5 concentrations throughout the supplier's distribution system. An IDSE is used in conjunction with, but separate from, Subpart I compliance monitoring, to identify and select Subpart Y compliance monitoring locations.

b) Applicability. A supplier is subject to the requirements of this Subpart W if it fulfills any of the following conditions:

1) The supplier owns or operates a community water system that uses a primary or residual disinfectant other than ultraviolet light;

2) The supplier delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light; or

3) The supplier owns or operates a non-transient non-community water system that serves at least 10,000 people, and it either uses a primary or residual disinfectant other than ultraviolet light, or it delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light.

c) The Agency may determine, by a SEP issued pursuant to Section 611.110, that a combined distribution system does not include certain consecutive systems based on such factors as the delivery of water to a consecutive system only on an emergency basis or the receiving only a small percentage and small volume of water from a wholesale system. The Agency may also determine, by a SEP issued pursuant to Section 611.110, that a combined distribution system does not include certain wholesale systems based on such factors as the delivery of water to a consecutive system only on an emergency basis or the delivery of only a small percentage and small volume of water to a consecutive system.
BOARD NOTE: Implementation of this Subpart W occurred in stages during October 1, 2006 through October 1, 2014, depending on population served and other factors. See 40 CFR 141.600(c). The Board removed the now-obsolete implementation dates.

d) A supplier must do one of the following: it must conduct standard monitoring that meets the requirements in Section 611.921; it must conduct a system-specific study that meets the requirements in Section 611.922; it must certify to the Agency that it meets the 40/30 certification criteria under Section 611.923; or it must qualify for a very small system waiver under Section 611.924.

1) The supplier must have taken the full complement of routine TTHM and HAA5 compliance samples required of a system that serves the appropriate population and which uses the appropriate source water under Subpart I (or the supplier must have taken the full complement of reduced TTHM and HAA5 compliance samples required of a system with the supplier's population and source water under Subpart I if the supplier meets reduced monitoring criteria under Subpart I) during the period specified in Section 611.923(a) to meet the 40/ 30 certification criteria in Section 611.923. The supplier must have taken TTHM and HAA5 samples under Sections 611.381 and 611.382 to be eligible for the very small system waiver in Section 611.924.

2) If the supplier has not taken the required samples, the supplier must conduct standard monitoring that meets the requirements in Section

611.921, or a system-specific study that meets the requirements in Section 611.922.

e) The supplier must use only the analytical methods specified in Section 611.381, or otherwise approved by the Agency for monitoring under this Subpart W, to demonstrate compliance with the requirements of this Subpart W.

f) IDSE results will not be used for the purpose of determining compliance with MCLs in Section 611.312.

BOARD NOTE: Derived from 40 CFR 141.600 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.922 System-Specific Studies

a) System-specific study plan. A supplier's system-specific study plan must be based on either existing monitoring results, as required under subsection (a)(1), or modeling, as required under subsection (a)(2). The supplier must prepare and submit the supplier's system-specific study plan to the Agency according to the schedule in Section 611.920(c).

1) Existing monitoring results. A supplier may comply by submitting monitoring results collected before it is required to begin monitoring under~~pursuant to~~ Section 611.920(c). The monitoring results and analysis must meet the criteria in subsections (a)(1)(A) and (a)(1)(B).

A) Minimum requirements.

i) TTHM and HAA5 results must be based on samples collected and analyzed in accordance with Section 611.381. Samples must be collected no earlier than five years prior to the study plan submission date.

ii) The monitoring locations and frequency must meet the conditions identified in the applicable of subsections (a)(1)(A)(iii) through (a)(1)(A)(xv). Each location must be sampled once during the peak historical month for TTHM levels or HAA5 levels or the month of warmest water temperature for every 12 months of data submitted for that location. Monitoring results must include all Subpart I compliance monitoring results, plus additional monitoring results as necessary to meet minimum sample requirements.

iii) A Subpart B system supplier that serves fewer than 500 persons must collect samples from three monitoring locations: three samples for TTHM and three samples for HAA5.

iv) A Subpart B system supplier that serves 500 to 3,300 persons must collect samples from three monitoring locations: nine samples for TTHM and nine samples for HAA5.

v) A Subpart B system supplier that serves 3,301 to 9,999 persons must collect samples from six monitoring locations: 36 samples for TTHM and 36 samples for HAA5.

vi) A Subpart B system supplier that serves 10,000 to 49,999 persons must collect samples from each of 12 monitoring locations: 72 samples for TTHM and 72 samples for HAA5.

vii) A Subpart B system supplier that serves 50,000 to 249,999 persons must collect samples from 24 monitoring locations: 144 samples for TTHM and 144 samples for HAA5.

viii) A Subpart B system supplier that serves 250,000 to 999,999 persons must collect samples from 36 monitoring locations: 216 samples for TTHM and 216 samples for HAA5.

ix) A Subpart B system supplier that serves 1,000,000 to 4,999,999 persons must collect samples from 48 monitoring locations: 288 samples for TTHM and 288 samples for HAA5.

x) A Subpart B system supplier that serves 5,000,000 or more persons must collect samples from 60 monitoring locations: 360 samples for TTHM and 360 samples for HAA5.

xi) A groundwater system supplier that serves fewer than 500 persons must collect samples from three monitoring locations: three samples for TTHM and three samples for HAA5.

xii) A groundwater system supplier that serves 500 to 9,999 persons must collect samples from three monitoring locations: nine samples for TTHM and nine samples for HAA5.

xiii) A groundwater system supplier that serves 10,000 to 99,999 persons must collect samples from 12 monitoring locations: 48 samples for TTHM and 48 samples for HAA5.

xiv) A groundwater system supplier that serves 100,000 to 499,999 persons must collect samples from 18 monitoring locations: 72 samples for TTHM and 72 samples for HAA5.

xv) A groundwater system supplier that serves 500,000 or more persons must collect samples from 24 monitoring locations: 96 samples for TTHM and 96 samples for HAA5.

B) Reporting monitoring results. A supplier must report the following information:

i) The supplier must report previously collected monitoring results and certify that the reported monitoring results include all compliance and noncompliance results generated during the time period that began with the first reported result and which ended with the most recent Subpart I results;

ii) The supplier must certify that the samples were representative of the entire distribution system and treatment and that the distribution system and treatment have not changed significantly since the samples were collected;

iii) The supplier's study monitoring plan must include a schematic of its distribution system (including distribution system entry points and their sources and storage facilities in the system), with notes indicating the locations and dates of all completed or planned system-specific study monitoring;

iv) The supplier's system-specific study plan must specify the population served and its system type (i.e., that it is a Subpart B or groundwater system);

v) The supplier must retain a complete copy of its system-specific study plan submitted under this subsection (a)(1), including any Agency modification of the supplier's system-specific study plan, for as long as the supplier is required to retain its IDSE report under subsection (b)(5) ~~of this Section~~; and

vi) If the supplier submits previously collected data that fully meet the number of samples required under subsection (a)(1)(A)(ii), and the Agency rejects some of the data in writing, by a SEP ~~issued pursuant to Section 611.110~~, the supplier must either conduct additional monitoring to replace rejected data on a schedule approved by the Agency in the SEP, or it must conduct standard monitoring under Section 611.921.

2) Modeling. A supplier may comply through analysis of an extended-period simulation hydraulic model. The extended-period simulation hydraulic model and analysis must meet the following criteria:

A) Minimum extended-period hydraulic model requirements.

i) The extended-period hydraulic model must simulate 24-hour variation in demand and show a consistently repeating 24-~~-~~hour pattern of residence time.

ii) The extended-period hydraulic model must represent the criteria listed in subsection (a)(2)(D).

BOARD NOTE: This subsection (a)(2)(A)(ii) is derived from 40 CFR 141.602(a)(2)(i)(B), as added at 71 Fed. Reg. 388 (Jan. 4, 2006). The Board has codified 40 CFR 141.602(a)(2)(i)(B)(*1*) through (a)(2)(i)(B)(*9*) as subsections (a)(2)(D)(i) through (a)(2)(D)(ix) to comport with Illinois Administrative Code codification requirements.

iii) The extended-period hydraulic model must be calibrated or have calibration plans for the current configuration of the

distribution system during the period of high TTHM formation potential. All storage facilities in the system must be evaluated as part of the calibration process. All required calibration must be completed no later than 12 months after the supplier has submitted the plan.

B) Reporting modeling. The supplier's system-specific study plan must include the information described in subsections (a)(2)(B)(i) through (a)(2)(B)(vii), subject to the requirements of subsection (a)(2)(B)(vii).

i) Tabular or spreadsheet data demonstrating that the model meets requirements in subsections (a)(2)(A)(ii) and (a)(2)(D).

ii) A description of all calibration activities undertaken and, if calibration is complete, a graph of predicted tank levels versus measured tank levels for the system storage facility with the highest residence time in each pressure zone, and a time-series graph of the residence time at the longest residence time storage facility in the distribution system showing the predictions for the entire simulation period (i.e., from time zero until the time it takes for the model to reach a consistently repeating pattern of residence time).

iii) Model output showing preliminary 24-hour average residence time predictions throughout the distribution system.

iv) The timing and the number of samples representative of the distribution system planned for at least one monitoring period of TTHM and HAA5 dual-sample monitoring at a number of locations no fewer than would be required for the system under standard monitoring in Section 611.921 during the historical month of high TTHM. These samples must be taken at locations other than existing Subpart I compliance monitoring locations.

v) A description of how all requirements will be completed no later than 12 months after the supplier submits the supplier's system-specific study plan.

vi) A schematic of the supplier's distribution system (including distribution system entry points and their sources and system storage facilities), with notes indicating the locations and dates of all completed system-specific study monitoring (if calibration is complete) and all Subpart I compliance monitoring.

vii) The population served and system type (i.e., that it is a Subpart B or groundwater system).

viii) The supplier must retain a complete copy of the supplier's system-specific study plan submitted under this subsection (a)(2), including any Agency modification of the supplier's system-specific study plan, for as long as the supplier is required to retain the supplier's IDSE report under subsection (b)(7).

C) If the supplier submits a model that does not fully meet the requirements under subsection (a)(2), the supplier must correct the Agency-cited deficiencies and respond to Agency inquiries concerning the model. If the supplier fails to correct deficiencies or respond to inquiries to the Agency's satisfaction, the supplier must conduct standard monitoring under Section 611.921.

D) The extended-period hydraulic model must represent the following criteria:

i) 75 percent of pipe volume;

ii) 50 percent of pipe length;

iii) All pressure zones;

iv) All 12-inch diameter and larger pipes;

v) All eight-inch and larger pipes that connect pressure zones, influence zones from different sources, storage facilities, major demand areas, pumps, and control valves or which are known or expected to be significant conveyors of water;

vi) All six-inch and larger pipes that connect remote areas of a distribution system to the main portion of the system;

vii) All storage facilities with standard operations represented in the model;

viii) All active pump stations with controls represented in the model; and

ix) All active control valves.

BOARD NOTE: This subsection (a)(2)(D) is derived from 40 CFR 141.602(a)(2)(i)(B), as added at 71 Fed. Reg. 388 (Jan. 4, 2006). The Board has codified 40 CFR 141.602(a)(2)(i)(B)(*1*) through (a)(2)(i)(B)(*9*) as subsections (a)(2)(D)(i) through (a)(2)(D)(ix) to comport with Illinois Administrative Code codification requirements.

b) IDSE report. The supplier's IDSE report must include the elements required in subsections (b)(1) through (b)(6). The supplier must submit its IDSE report according to the applicable of the schedules in Section 611.920(c).

1) The supplier's IDSE report must include all TTHM and HAA5 analytical results from Subpart I compliance monitoring and all system-specific study monitoring conducted during the period of the system-specific study presented in a tabular or spreadsheet format acceptable to the Agency. If changed from the supplier's system-specific study plan submitted under subsection (a), the supplier's IDSE report must also include a schematic of its distribution system, the population served, and system type (i.e., that it is a Subpart B or groundwater system).

2) If the supplier used the modeling provision under subsection (a)(2), it must include final information for the elements described in subsection (a)(2)(B), and a 24-hour time-series graph of residence time for each Subpart Y compliance monitoring location selected.

3) The supplier must recommend and justify Subpart Y compliance monitoring locations and timing based on the protocol in Section 611.925.

4) The supplier's IDSE report must include an explanation of any deviations from its approved system-specific study plan.

5) The supplier's IDSE report must include the basis (analytical and modeling results) and justification that it used to select the recommended Subpart Y monitoring locations.

6) The supplier may submit its IDSE report in lieu of its system-specific study plan on the schedule identified in Section 611.920(c) for submission of the system-specific study plan if the supplier believes that it has the necessary information before the time that the system-specific study plan is due. If the supplier elects this approach, its IDSE report must also include all information required under subsection (a).

7) The supplier must retain a complete copy of its IDSE report submitted under this Section for 10 years after the date that the supplier submitted its IDSE report. If the Agency modifies the Subpart Y monitoring requirements that the supplier recommended in the supplier's IDSE report or if the Agency approves alternative monitoring locations, the supplier must keep a copy of the Agency's notification on file for 10 years after the date of the Agency's notification. The supplier must make the IDSE report and any Agency notification available for review by the Agency or the public.

BOARD NOTE: Derived from 40 CFR 141.602 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.924 Very Small System Waivers

a) If the supplier serves fewer than 500 people and it has taken TTHM and HAA5 samples underpursuant to Subpart I ~~of this Part~~, the supplier is not required to comply with this Subpart W unless the Agency notifies the supplier, by a SEP ~~issued pursuant to Section 611.110~~, that it must conduct standard monitoring pursuant to Section 611.921 or a system-specific study underpursuant to Section 611.922.

b) If the supplier has not taken TTHM and HAA5 samples underpursuant to Subpart I ~~of this Part~~ or if the Agency notifies the supplier, by a SEP ~~issued pursuant to Section 611.110~~, that it must comply with this Subpart W, the supplier must conduct standard monitoring samples underpursuant to Section 611.921 or a system-specific study samples underpursuant to Section 611.922.

BOARD NOTE: Derived from 40 CFR 141.604 (2006).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART X: ENHANCED FILTRATION AND DISINFECTION--SYSTEMS SERVING FEWER THAN 10,000 PEOPLE

Section 611.953 Disinfection Profile

a) Applicability. A disinfection profile is a graphical representation of a system's level of Giardia lamblia or virus inactivation measured during the course of a year. A Subpart B community or non-transient non-community water system that serves fewer than 10,000 persons must develop a disinfection profile unless the Agency, by a SEP ~~issued pursuant to Section 611.110~~, determines that a profile is unnecessary. The Agency may approve the use of a more representative data set for disinfection profiling than the data set required under subsections (c) through (g).

b) Determination that a disinfection profile is not necessary. The Agency may only determine that a disinfection profile is not necessary if the system's TTHM and HAA5 levels are below 0.064 mg/ℓ and 0.048 mg/ℓ, respectively. To determine these levels, TTHM and HAA5 samples must have been collected during the month with the warmest water temperature, and at the point of maximum residence time in the distribution system. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, approve the use of a different data set to determine these levels if it determines that the data set is representative TTHM and HAA5 data.

c) Development of a disinfection profile. A disinfection profile consists of the following three steps:

1) First, the supplier must collect data for several parameters from the plant, as discussed in subsection (d), over the course of 12 months;

2) Second, the supplier must use this data to calculate weekly log inactivation as discussed in subsections (e) and (f); and

3) Third, the supplier must use these weekly log inactivations to develop a disinfection profile as specified in subsection (g).

d) Data required for a disinfection profile. A supplier must monitor the following parameters to determine the total log inactivation using the analytical methods in Section 611.531, once per week on the same calendar day, over 12 consecutive months:

1) The temperature of the disinfected water at each residual disinfectant concentration sampling point during peak hourly flow;

2) If a supplier uses chlorine, the pH of the disinfected water at each residual disinfectant concentration sampling point during peak hourly flow;

3) The disinfectant contact times ("T") during peak hourly flow; and

4) The residual disinfectant concentrations ("C") of the water before or at the first customer and prior to each additional point of disinfection during peak hourly flow.

e) Calculations based on the data collected. The tables in Appendix B must be used to determine the appropriate $CT_{99.9}$ value. The supplier must calculate the total inactivation ratio as follows, and multiply the value by 3.0 to determine log inactivation of Giardia lamblia:

1) If the supplier uses only one point of disinfectant application, it must determine either of the following:

A) One inactivation ratio ($CT_{calc}/CT_{99.9}$) before or at the first customer during peak hourly flow; or

B) Successive $CT_{calc}/CT_{99.9}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the supplier must calculate the total inactivation ratio by determining $CT_{calc}/CT_{99.9}$ for each sequence and then adding the $CT_{calc}/CT_{99.9}$ values together to determine $\sum CT_{calc}/CT_{99.9}$.

2) If the supplier uses more than one point of disinfectant application before the first customer, it must determine the $CT_{calc}/CT_{99.9}$ value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow using the procedure specified in subsection (e)(1)(B).

f) Use of chloramines, ozone, or chlorine dioxide as a primary disinfectant. If a supplier uses chloramines, ozone, or chlorine dioxide for primary disinfection, the supplier must also calculate the logs of inactivation for viruses and develop an additional disinfection profile for viruses using methods approved by the Agency.

g) Development and maintenance of the disinfection profile in graphic form. Each log inactivation serves as a data point in the supplier's disinfection profile. A supplier will have obtained 52 measurements (one for every week of the year). This will allow the supplier and the Agency the opportunity to evaluate how microbial inactivation varied over the course of the year by looking at all 52 measurements (the supplier's disinfection profile). The supplier must retain the disinfection profile data in graphic form, such as a spreadsheet, which must be available for review by the Agency as part of a sanitary survey. The supplier must use this data to calculate a benchmark if the supplier is considering changes to disinfection practices.

BOARD NOTE: Derived from 40 CFR 141.530 through 141.536 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.955 Combined Filter Effluent Turbidity Limits

a) Applicability. A Subpart B system supplier that serves fewer than 10,000 persons, which is required to filter, and which utilizes filtration other than slow sand filtration or diatomaceous earth filtration must meet the combined filter effluent turbidity requirements of subsections (b) through (d). If the supplier uses slow sand or diatomaceous earth filtration the supplier is not required to meet the combined filter effluent turbidity limits of this Subpart X, but the supplier must continue to meet the combined filter effluent turbidity limits in Section 611.250.

b) Combined filter effluent turbidity limits. A supplier must meet two strengthened combined filter effluent turbidity limits.

1) The first combined filter effluent turbidity limit is a "95th percentile" turbidity limit that a supplier must meet in at least 95 percent of the turbidity measurements taken each month. Measurements must continue to be taken as described in Sections 611.531 and 611.533. Monthly reporting must be completed according to Section 611.957(a). The following are the required limits for specific filtration technologies:

A) For a system with conventional filtration or direct filtration, the 95th percentile turbidity value is 0.3 NTU.

B) For a system with any other alternative filter technology, the 95th percentile turbidity value is a value (not to exceed 1 NTU) to be determined by the Agency, by a SEP ~~issued pursuant to Section 611.110~~, based on the demonstration described in subsection (c).

2) The second combined filter effluent turbidity limit is a "maximum" turbidity limit that a supplier may at no time exceed during the month. Measurements must continue to be taken as described in Sections 611.531 and 611.533. Monthly reporting must be completed according to Section 611.957(a). The following are the required limits for specific filtration technologies:

A) For a system with conventional filtration or direct filtration, the maximum turbidity value is 1 NTU.

B) For a system with any other alternative filter technology, the maximum turbidity value is a value (not to exceed 5 NTU) to be

determined by the Agency, by a SEP ~~issued pursuant to Section 611.110~~, based on the demonstration described in subsection (c).

c) Requirements for an alternative filtration system.

1) If a supplier's system consists of alternative filtration (filtration other than slow sand filtration, diatomaceous earth filtration, conventional filtration, or direct filtration) the supplier is required to conduct a demonstration (see tables in subsection (b)). The supplier must demonstrate to the Agency, using pilot plant studies or other means, that its system's filtration, in combination with disinfection treatment, consistently achieves the following:

A) 99 percent removal of Cryptosporidium oocysts;

B) 99.9 percent removal or inactivation of Giardia lamblia cysts; and

C) 99.99 percent removal or inactivation of viruses.

2) This subsection (c)(2) corresponds with 40 CFR 141.552(b), which USEPA has designated as "reserved." This statement maintains structural correspondence with the corresponding federal regulation.

d) Requirements for a lime-softening system. If a supplier practices lime softening, the supplier may acidify representative combined filter effluent turbidity samples prior to analysis using a protocol approved by the Agency.

BOARD NOTE: Derived from 40 CFR 141.550 through 141.553 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART Y: STAGE 2 DISINFECTION BYPRODUCTS REQUIREMENTS

Section 611.970 General Requirements

a) General. The requirements of this Subpart Y constitute NPDWRs. The regulations in this Subpart Y establish monitoring and other requirements for achieving compliance with MCLs based on LRAAs for TTHM and HAA5, and for achieving compliance with MRDLs for chlorine and chloramine for certain consecutive systems.

b) Applicability. A supplier is subject to these requirements if its system is a CWS or a NTNCWS that uses a primary or residual disinfectant other than ultraviolet

light or which delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light.

c) A supplier must comply with the requirements in this Subpart Y as follows:

1) The supplier's monitoring frequency is specified in Section 611.971(a)(2).

A) If a supplier is required to conduct quarterly monitoring, it must begin monitoring in the first full calendar quarter that includes the applicable compliance date set forth in this subsection (c).

B) If a supplier is required to conduct monitoring less frequently than quarterly, it must begin monitoring in the calendar month recommended in the IDSE report prepared pursuant to Section 611.921 or Section 611.922 or in the calendar month identified in the Subpart Y monitoring plan developed pursuant to Section 611.972, but in no instance later than 12 months after the applicable compliance date set forth in this subsection (c).

2) If a supplier is required to conduct quarterly monitoring, it must make compliance calculations at the end of the fourth calendar quarter that follows the compliance date and at the end of each subsequent quarter (or earlier if the LRAA calculated based on fewer than four quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters). If a supplier is required to conduct monitoring less frequently than quarterly, it must make compliance calculations beginning with the first compliance sample taken after the compliance date.

3) The Agency may, by a SEP issued pursuant to Section 611.110, determine that the combined distribution system does not include certain consecutive systems based on factors such as receipt of water from a wholesale system only on an emergency basis or receipt of only a small percentage and small volume of water from a wholesale system. The Agency may also determine that the combined distribution system does not include certain wholesale systems based on factors such as delivery of water to a consecutive system only on an emergency basis or delivery of only a small percentage and small volume of water to a consecutive system.

BOARD NOTE: Implementation of this Subpart Y occurred in stages during October 1, 2012 through October 1, 2014, depending on population served. See 40 CFR 141.620(c)(1) through (c)(5). The Board removed the now-obsolete implementation dates.

d) Monitoring and compliance.

1) Suppliers required to monitor quarterly. To comply with Subpart Y MCLs in Section 611.312(b)(2), the supplier must calculate LRAAs for TTHM and HAA5 using monitoring results collected under this Subpart Y, and it must determine that each LRAA does not exceed the MCL. If the supplier fails to complete four consecutive quarters of monitoring, it must calculate compliance with the MCL based on the average of the available data from the most recent four quarters. If the supplier takes more than one sample per quarter at a monitoring location, it must average all samples taken in the quarter at that location to determine a quarterly average to be used in the LRAA calculation.

2) Suppliers required to monitor yearly or less frequently. To determine compliance with Subpart Y MCLs in Section 611.312(b)(2), the supplier must determine that each sample taken is less than the MCL. If any sample exceeds the MCL, the supplier must comply with the requirements of Section 611.975. If no sample exceeds the MCL, the sample result for each monitoring location is considered the LRAA for that monitoring location.

e) Violation for failure to monitor. A supplier is in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if the supplier fails to monitor.

BOARD NOTE: Derived from 40 CFR 141.620 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.971 Routine Monitoring

a) Monitoring.

1) If a supplier submitted an IDSE report, it must begin monitoring at the locations and during the months that the supplier has recommended in its IDSE report submitted underpursuant to Section 611.925, following the schedule set forth in Section 611.970(c), unless the Agency, by a SEP issued pursuant to Section 611.110, requires other locations or additional locations after its review. If the supplier submitted a 40/30 certification underpursuant to Section 611.923, it qualified for a very small system waiver underpursuant to Section 611.924, or it is a NTNCWS that serves fewer than 10,000 persons, the supplier must monitor at the locations and on the dates identified in its monitoring plan as described in Section 611.382(f), updated as required by Section 611.972.

2) The supplier must monitor at no fewer than the number of locations identified in the applicable of subsections (a)(2)(A) through (a)(2)(M), subject to the limitations of subsections (a)(2)(N) and (a)(2)(O).

A) A Subpart B system supplier that serves fewer than 500 persons must monitor annually at two distribution system monitoring locations during each monitoring period.

B) A Subpart B system supplier that serves 500 to 3,300 persons must monitor quarterly at two distribution system monitoring locations during each monitoring period.

C) A Subpart B system supplier that serves 3,301 to 9,999 persons must monitor quarterly at two distribution system monitoring locations during each monitoring period.

D) A Subpart B system supplier that serves 10,000 to 49,999 persons must monitor quarterly at four distribution system monitoring locations during each monitoring period.

E) A Subpart B system supplier that serves 50,000 to 249,999 persons must monitor quarterly at eight distribution system monitoring locations during each monitoring period.

F) A Subpart B system supplier that serves 250,000 to 999,999 persons must monitor quarterly at 12 distribution system monitoring locations during each monitoring period.

G) A Subpart B system supplier that serves 1,000,000 to 4,999,999 persons must monitor quarterly at 16 distribution system monitoring locations during each monitoring period.

H) A Subpart B system supplier that serves 5,000,000 or more persons must monitor quarterly at 20 distribution system monitoring locations during each monitoring period.

I) A groundwater system supplier that serves fewer than 500 persons must monitor annually at two distribution system monitoring locations during each monitoring period.

J) A groundwater system supplier that serves 500 to 9,999 persons must monitor annually at two distribution system monitoring locations during each monitoring period.

K) A groundwater system supplier that serves 10,000 to 99,999 persons must monitor quarterly at four distribution system monitoring locations during each monitoring period.

L) A groundwater system supplier that serves 100,000 to 499,999 persons must monitor quarterly at six distribution system monitoring locations during each monitoring period.

M) A groundwater system supplier that serves 500,000 or more persons must monitor quarterly at eight distribution system monitoring locations during each monitoring period.

N) The supplier must monitor during month of highest DBP concentrations.

O) A supplier on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for a Subpart B system supplier that serves 500 to 3,300. A groundwater system supplier that serves 500 to 9,999 persons which is on annual monitoring must take dual sample sets at each monitoring location. Any other supplier that is on annual monitoring or which is a Subpart B system supplier that serves 500 to 3,300 is required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. For a supplier that serves fewer than 500 people, only one location with a dual sample set per monitoring period is needed if the highest TTHM and HAA5 concentrations occur at the same location and month.

3) If a supplier is an undisinfected system that begins using a disinfectant other than UV light after the dates set forth in Subpart W for complying with the IDSE requirements, the supplier must consult with the Agency to identify compliance monitoring locations for this Subpart Y. The supplier must then develop a monitoring plan under~~pursuant to~~ Section 611.972 that includes those monitoring locations.

b) Analytical methods. A supplier must use an approved method listed in Section 611.381 for TTHM and HAA5 analyses in this Subpart Y. Analyses must be conducted by laboratories that have received certification as specified in Section 611.381.

BOARD NOTE: Derived from 40 CFR 141.621 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.972 Subpart Y Monitoring Plan

a) Development of a monitoring plan.

1) A supplier must develop and implement a monitoring plan that it must keep on file for Agency and public review. The monitoring plan must contain the following elements, and it must be complete no later than the date when the supplier conducts its initial monitoring underpursuant to this Subpart Y:

A) The monitoring locations;

B) The monitoring dates;

C) The compliance calculation procedures; and

D) The monitoring plans for any other systems in the combined distribution system if the Agency has reduced monitoring requirements underpursuant to Section 611.161.

2) If the supplier was not required to submit an IDSE report underpursuant to either Section 611.921 or Section 611.922, and it does not have sufficient Subpart I monitoring locations to identify the required number of Subpart Y compliance monitoring locations indicated in Section 611.925(b), the supplier must identify additional locations by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of compliance monitoring locations have been identified. The supplier must also provide the rationale for identifying the locations as having high levels of TTHM or HAA5. If the supplier has more Subpart I monitoring locations than required for Subpart Y compliance monitoring in Section 611.925(b), it must identify which locations it will use for Subpart Y compliance monitoring by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of Subpart Y compliance monitoring locations have been identified.

b) A Subpart B system supplier that serves more than 3,300 people must submit a copy of its monitoring plan to the Agency prior to the date it conducts its initial monitoring underpursuant to this Subpart Y, unless the supplier's IDSE report submitted underpursuant to Subpart W of this Part contains all the information required by this Section.

c) After consultation with the Agency regarding the need for and appropriateness of changes and issuance of a SEP ~~pursuant to Section 611.110~~ that provides for the changes, a supplier may revise its monitoring plan to reflect changes in treatment, distribution system operations and layout (including new service areas), or other factors that may affect TTHM or HAA5 formation, or for Agency-approved reasons. If the supplier changes monitoring locations, the supplier must replace existing compliance monitoring locations with the lowest LRAA with new locations that reflect the current distribution system locations with expected high TTHM or HAA5 levels. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, also require modifications in the supplier's monitoring plan. If a supplier is a Subpart B system supplier that serves more than 3,300 people, it must submit a copy of its modified monitoring plan to the Agency prior to the date when it is required to comply with the revised monitoring plan.

BOARD NOTE: Derived from 40 CFR 141.622 (2006).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.973 Reduced Monitoring

a) A supplier may reduce monitoring to the level specified in the applicable of subsections (a)(1) through (a)(13), subject to the limitation of subsection (a)(14), any time the LRAA is 0.040 mg/ℓ or less for TTHM and 0.030 mg/ℓ or less for HAA5 at all monitoring locations. The supplier may only use data collected <u>under</u>~~pursuant to~~ the provisions of this Subpart Y or pursuant to Subpart I ~~of this Part~~ to qualify for reduced monitoring. In addition, the source water annual average TOC level, before any treatment, must be 4.0 mg/ℓ or less at each treatment plant treating surface water or groundwater under the direct influence of surface water, based on monitoring conducted <u>under</u>~~pursuant to~~ either Section 611.382(b)(1)(C) or Section 611.382(d).

1) A Subpart B system supplier that serves fewer than 500 persons may not qualify for reduced monitoring.

2) A Subpart B system supplier that serves 500 to 3,300 persons qualifies for reduced monitoring to a minimum of one TTHM sample collected annually from the location and during the quarter with the highest single TTHM measurement and one HAA5 sample collected annually from the location and during the quarter with the highest single HAA5 measurement, with the two samples collected as one dual sample set if the highest TTHM and HAA5 measurements occurred at the same location and during the same quarter.

3) A Subpart B system supplier that serves 3,301 to 9,999 persons qualifies for reduced monitoring to a minimum of one dual sample set collected annually for TTHM from the location and during the quarter with the highest single TTHM measurement and one dual sample set collected annually for HAA5 from the location and during the quarter with the highest single HAA5 measurement.

4) A Subpart B system supplier that serves 10,000 to 49,999 persons qualifies for reduced monitoring to a minimum of two dual sample sets collected quarterly from the locations with the highest TTHM and HAA5 LRAAs.

5) A Subpart B system supplier that serves 50,000 to 249,999 persons qualifies for reduced monitoring to a minimum of four dual sample sets collected quarterly from the locations with the two highest TTHM and two HAA5 LRAAs.

6) A Subpart B system supplier that serves 250,000 to 999,999 persons qualifies for reduced monitoring to a minimum of six dual sample sets collected quarterly from the locations with the three highest TTHM and three HAA5 LRAAs.

7) A Subpart B system supplier that serves 1,000,000 to 4,999,999 persons qualifies for reduced monitoring to a minimum of eight dual sample sets collected quarterly from the locations with the four highest TTHM and four HAA5 LRAAs.

8) A Subpart B system supplier that serves more than 5,000,000 persons qualifies for reduced monitoring to a minimum of 10 dual sample sets collected quarterly from the locations with the five highest TTHM and five HAA5 LRAAs.

9) A groundwater system supplier that serves fewer than 500 persons qualifies for reduced monitoring to a minimum of one TTHM sample collected triennially from the location and during the quarter with the highest single TTHM measurement and one HAA5 sample collected annually from the location and during the quarter with the highest single HAA5 measurement, with the two samples collected as one dual sample set if the highest TTHM and HAA5 measurements occurred at the same location and during the same quarter.

10) A groundwater system supplier that serves 500 to 9,999 persons qualifies for reduced monitoring to a minimum of one TTHM sample collected

annually from the location and during the quarter with the highest single TTHM measurement and one HAA5 sample collected annually from the location and during the quarter with the highest single HAA5 measurement, with the two samples collected as one dual sample set if the highest TTHM and HAA5 measurements occurred at the same location and during the same quarter.

11) A groundwater system supplier that serves 10,000 to 99,999 persons qualifies for reduced monitoring to a minimum of one TTHM dual sample set collected annually from the location and during the quarter with the highest single TTHM measurement and one HAA5 dual sample set collected annually from the location and during the quarter with the highest single HAA5 measurement.

12) A groundwater system supplier that serves 100,000 to 499,999 persons qualifies for reduced monitoring to a minimum of two dual sample sets collected quarterly from the locations with the highest TTHM and highest HAA5 LRAAs.

13) A groundwater system supplier that serves more than 500,000 persons qualifies for reduced monitoring to a minimum of four dual sample sets collected quarterly from the two locations with the highest TTHM and two highest HAA5 LRAAs.

14) A supplier on quarterly monitoring must take dual sample sets every 90 days.

b) The supplier may remain on reduced monitoring as long as the TTHM LRAA does not exceed 0.040 mg/ℓ and the HAA5 LRAA does not exceed 0.030 mg/ℓ at each monitoring location (for a supplier with quarterly reduced monitoring) or each TTHM sample does not exceed 0.060 mg/ℓ and each HAA5 sample does not exceed 0.045 mg/ℓ (for a supplier with annual or less frequent monitoring). In addition, the source water annual average TOC level, before any treatment, must not exceed 4.0 mg/ℓ at each treatment plant treating surface water or groundwater under the direct influence of surface water, based on monitoring conducted <u>under</u>~~pursuant to~~ either Section 611.382(b)(1)(C) or (d).

c) If the LRAA based on quarterly monitoring at any monitoring location exceeds either 0.040 mg/ℓ for TTHM or 0.030 mg/ℓ for HAA5, if the annual (or less frequent) sample at any location exceeds either 0.060 mg/ℓ for TTHM or 0.045 mg/ℓ for HAA5, or if the source water annual average TOC level, before any treatment, exceeds 4.0 mg/ℓ at any treatment plant treating surface water or groundwater under the direct influence of surface water, the supplier must resume

routine monitoring under~~pursuant to~~ Section 611.971 or begin increased monitoring if Section 611.975 applies.

d) The Agency may return a supplier to routine monitoring by a SEP ~~issued pursuant to Section 611.110~~.

BOARD NOTE: Derived from 40 CFR 141.623 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.979 Reporting and Recordkeeping Requirements

a) Reporting.

1) A supplier must report the following information to the Agency within 10 days after the end of any quarter in which monitoring is required for each monitoring location:

A) The number of samples taken during the last quarter;

B) The date and results of each sample taken during the last quarter;

C) The arithmetic average of quarterly results for the last four quarters for each monitoring location (LRAA), beginning at the end of the fourth calendar quarter that follows the compliance date and at the end of each subsequent quarter. If the LRAA calculated based on fewer than four quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters, the supplier must report this information to the Agency as part of the first report due following the compliance date or anytime thereafter that this determination is made. If the supplier is required to conduct monitoring at a frequency that is less than quarterly, it must make compliance calculations beginning with the first compliance sample taken after the compliance date, unless the supplier is required to conduct increased monitoring pursuant to Section 611.975;

D) A statement whether, based on Section 611.312(b)(2) and this Subpart Y, the MCL was violated at any monitoring location; and

E) Any operational evaluation levels that were exceeded during the quarter and, if so, the location and date, and the calculated TTHM and HAA5 levels.

2) If a supplier is a Subpart B system supplier that seeks to qualify for or remain on reduced TTHM and HAA5 monitoring, it must report the following source water TOC information for each treatment plant that treats surface water or groundwater under the direct influence of surface water to the Agency within 10 days after the end of any quarter in which monitoring is required:

A) The number of source water TOC samples taken each month during last quarter;

B) The date and result of each sample taken during last quarter;

C) The arithmetic average of monthly samples taken during the last quarter or the result of the quarterly sample;

D) The running annual average (RAA) of quarterly averages from the past four quarters; and

E) Whether the RAA exceeded 4.0 mg/ℓ.

3) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, choose to perform calculations and determine whether the MCL was exceeded or the system is eligible for reduced monitoring in lieu of having the system report that information under~~pursuant to~~ this Section.

b) Recordkeeping. A supplier must retain any Subpart Y monitoring plans and the supplier's Subpart Y monitoring results as required by Section 611.860.

BOARD NOTE: Derived from 40 CFR 141.629 (2006).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART Z: ENHANCED TREATMENT FOR CRYPTOSPORIDIUM

Section 611.1001 Source Water Monitoring Requirements: Source Water Monitoring

a) Initial round of source water monitoring. A supplier must conduct the following monitoring on the schedule in subsection (c), unless it meets the monitoring exemption criteria in subsection (d).

1) A filtered system supplier that serves 10,000 or more people must sample its source water for Cryptosporidium, E. coli, and turbidity at least monthly for 24 months.

2) An unfiltered system supplier that serves 10,000 or more people must sample its source water for Cryptosporidium at least monthly for 24 months.

3) Smaller system suppliers monitoring for E. coli.

   A) A filtered system supplier that serves fewer than 10,000 people must sample its source water for E. coli at least once every two weeks for 12 months.

   B) A filtered system supplier that serves fewer than 10,000 people may avoid E. coli monitoring if the system notifies the Agency that it will monitor for Cryptosporidium as described in subsection (a)(4). The system must notify the Agency no later than three months prior to the date before which the system is otherwise required to start E. coli monitoring pursuant to Section 611.1001(c).

4) Smaller system suppliers monitoring for Cryptosporidium. A filtered system supplier that serves fewer than 10,000 people must sample its source water for Cryptosporidium at least twice per month for 12 months or at least monthly for 24 months if it meets any of the conditions set forth in subsections (a)(4)(A) through (a)(4)(C), subject to the limitations of subsection (a)(4)(D), based on monitoring conducted under~~pursuant to~~ subsection (a)(3).

   A) For a supplier that uses a lake or reservoir source, the annual mean E. coli concentration is greater than 10 E. coli/100 mℓ.

   B) For a supplier that uses a flowing stream source, the annual mean E. coli concentration is greater than 50 E. coli/ 100 mℓ.

   C) The supplier does not conduct E. coli monitoring as described in subsection (a)(3).

   D) A supplier that uses groundwater under the direct influence of surface water must comply with the requirements of subsection (a)(4) based on the E. coli level that applies to the nearest surface water body. If no surface water body is nearby, the system must comply based on the requirements that apply to a supplier that uses a lake or reservoir source.

5) For a filtered system supplier that serves fewer than 10,000 people, the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, approve monitoring for an indicator other than E. coli pursuant to subsection (a)(3). The Agency may also, by a SEP ~~issued pursuant to Section 611.110~~, approve an alternative to the E. coli concentration in subsection (a)(4)(A), (a)(4)(B) or (a)(4)(D) to trigger Cryptosporidium monitoring. This approval by the Agency must be provided to the supplier in writing, and it must include the basis for the Agency's determination that the alternative indicator or trigger level will provide a more accurate identification of whether a system will exceed the Bin 1 Cryptosporidium level set forth in Section 611.1010.

6) An unfiltered system supplier that serves fewer than 10,000 people must sample its source water for Cryptosporidium at least twice per month for 12 months or at least monthly for 24 months.

7) A supplier may sample more frequently than required by this Section if the sampling frequency is evenly spaced throughout the monitoring period.

b) Second round of source water monitoring. A supplier must conduct a second round of source water monitoring that meets the requirements for monitoring parameters, frequency, and duration described in subsection (a), unless it meets the monitoring exemption criteria in subsection (d). The supplier must conduct this monitoring on the schedule set forth in subsection (c).

c) Monitoring schedule. A supplier must perform the monitoring required in subsections (a) and (b), except that a supplier serving fewer than 10,000 persons must begin monitoirng no later than the month beginning with the applicable date listed in subsections (c)(1) and (c)(2).

1) A supplier that serves fewer than 10,000 persons, that is a filtered system supplier, and which monitors for E. coli is required to begin the second round of source water monitoring no later than the month beginning October 1, 2017.

2) A supplier that serves fewer than 10,000 persons, that is an unfiltered system supplier, or that is a filtered system supplier which meets the conditions of subsection (a)(4), and which monitors for Cryptosporidium, is required to begin the second round of source water monitoring no later than the month beginning April 1, 2019.

BOARD NOTE: Implementation of the first round of monitoring for this Subpart Z occurred in stages during October 1, 2006 through October 1, 2014, depending

on population served. Implementation of the second round of monitoring occurred between April 15, 2015 and April 1, 2019. See 40 CFR 141.701(c). Subsections (c)(1) and (c)(2) correspond with 40 CFR 141.701(c)(4) and (c)(5). The Board removed the past implementation dates.

d) Monitoring avoidance.

1) A filtered system supplier is not required to conduct source water monitoring underpursuant to this Subpart Z if the system will provide a total of at least 5.5-log of treatment for Cryptosporidium, equivalent to meeting the treatment requirements of Bin 4 in Section 611.1011.

2) An unfiltered system supplier is not required to conduct source water monitoring underpursuant to this Subpart Z if the system will provide a total of at least 3-log Cryptosporidium inactivation, equivalent to meeting the treatment requirements for an unfiltered system supplier with a mean Cryptosporidium concentration of greater than 0.01 oocysts/ℓ in Section 611.1012.

3) If a supplier chooses to provide the level of treatment set forth in subsection (d)(1) or (d)(2), as applicable, rather than start source water monitoring, it must notify the Agency in writing no later than the date on which the system is otherwise required to submit a sampling schedule for monitoring underpursuant to Section 611.1002. Alternatively, a supplier may choose to stop sampling at any point after it has initiated monitoring if it notifies the Agency in writing that it will provide this level of treatment. The supplier must install and operate technologies to provide this level of treatment before the applicable treatment compliance date set forth in Section 611.1013.

e) Plants operating only part of the year. A supplier that has a Subpart B plant that operates for only part of the year must conduct source water monitoring in accordance with this Subpart Z, but with the following modifications:

1) The supplier must sample its source water only during the months that the plant operates, unless the Agency, by a SEP issued pursuant to Section 611.110, specifies another monitoring period based on plant operating practices.

2) A supplier with plants that operate less than six months per year and which monitors for Cryptosporidium must collect at least six Cryptosporidium samples per year during each of two years of monitoring.

Samples must be evenly spaced throughout the period during which the plant operates.

f) New sources and new systems.

1) New sources. A supplier that begins using a new source of surface water or groundwater under the direct influence of surface water after the supplier is required to begin monitoring underpursuant to subsection (c) must monitor the new source on a schedule that the Agency has approved by a SEP issued pursuant to Section 611.110. Source water monitoring must meet the requirements of this Subpart Z. The supplier must also meet the bin classification and Cryptosporidium treatment requirements of Sections 611.1010 and 611.1011 or Section 611.1012, as applicable, for the new source on a schedule that the Agency has approved by a SEP issued pursuant to Section 611.110.

2) The requirements of Section 611.1001(f) apply to a Subpart B system supplier that begins operation after the applicable monitoring start date set forth in subsection (c).

3) The supplier must begin a second round of source water monitoring no later than six years following initial bin classification underpursuant to Section 611.1010 or determination of the mean Cryptosporidium level underpursuant to Section 611.1012.

g) Failure to collect any source water sample required under this Section in accordance with the sampling schedule, sampling location, analytical method, approved laboratory, and reporting requirements of Sections 611.1002 through 611.1006 is a monitoring violation.

h) Grandfathering monitoring data. A supplier may use (grandfather) monitoring data collected prior to the applicable monitoring start date in subsection (c) to meet the initial source water monitoring requirements in subsection (a). Grandfathered data may substitute for an equivalent number of months at the end of the monitoring period. All data submitted underpursuant to this subsection must meet the requirements set forth in Section 611.1007.

BOARD NOTE: Derived from 40 CFR 141.701 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1002 Source Water Monitoring Requirements: Sampling Schedules

a) A supplier required to conduct source water monitoring pursuant to Section 611.1001 must submit a sampling schedule that specifies the calendar dates on which it will collect each required sample.

1) The supplier must submit sampling schedules no later than three months prior to the applicable date listed in Section 611.1001(c) for each round of required monitoring.

2) Submission of the sampling schedule to USEPA.

A) A supplier that serves 10,000 or more people must submit its sampling schedule for the initial round of source water monitoring underpursuant to Section 611.1001(a) to USEPA electronically at https://intranet.epa.gov/lt2/.

B) If a supplier is unable to submit the sampling schedule electronically, the supplier may use an alternative approach for submitting the sampling schedule that USEPA approves.

3) A supplier that serves fewer than 10,000 people must submit to the Agency its sampling schedules for the initial round of source water monitoring Section 611.1001(a).

4) A supplier must submit to the Agency sampling schedules for the second round of source water monitoring required by Section 611.1001(b).

5) If USEPA or the Agency does not respond to a supplier regarding its sampling schedule, the supplier must sample at the reported schedule.

b) A supplier must collect samples within two days before or two days after the dates indicated in its sampling schedule (i.e., within a five-day period around the schedule date) unless one of the conditions of subsection (b)(1) or (b)(2) applies.

1) If an extreme condition or situation exists that may pose danger to the sample collector, or one that cannot be avoided and which causes the supplier to be unable to sample in the scheduled five-day period, the supplier must sample as close to the scheduled date as is feasible, unless the Agency approves an alternative sampling date by a SEP issued pursuant to Section 611.110. The supplier must submit an explanation for the delayed sampling date to the Agency concurrent with the shipment of the sample to the laboratory.

2) Replacement samples.

A) If a supplier is unable to report a valid analytical result for a scheduled sampling date due to equipment failure; loss of or damage to the sample; failure to comply with the analytical method requirements, including the quality control requirements in Section 611.1004; or the failure of an approved laboratory to analyze the sample, then the supplier must collect a replacement sample.

B) The supplier must collect the replacement sample not later than 21 days after receiving information that an analytical result cannot be reported for the scheduled date, unless the supplier demonstrates that collecting a replacement sample within this time frame is not feasible or the Agency approves an alternative resampling date by a SEP ~~issued pursuant to Section 611.110~~. The supplier must submit an explanation for the delayed sampling date to the Agency concurrent with the shipment of the sample to the laboratory.

c) A supplier that fails to meet the criteria of subsection (b) for any source water sample required under~~pursuant to~~ Section 611.1001 must revise its sampling schedule to add dates for collecting all missed samples. A supplier must submit the revised schedule to the Agency for approval prior to collecting the missed samples.

BOARD NOTE: Derived from 40 CFR 141.702 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1003 Source Water Monitoring Requirements: Sampling Locations

a) A supplier required to conduct source water monitoring pursuant to Section 611.1001 must collect samples for each plant that treats a surface water or groundwater under the direct influence of surface water source. Where multiple plants draw water from the same influent, such as the same pipe or intake, the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, approve one set of monitoring results to be used to satisfy the requirements of Section 611.1001 for all of the plants.

b) Source water sampling.

1) A supplier must collect source water samples prior to chemical treatment, such as coagulants, oxidants, and disinfectants, unless the supplier meets the condition of subsection (b)(2).

2) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, approve a supplier to collect a source water sample after chemical treatment. To

grant this approval, the Agency must determine that collecting a sample prior to chemical treatment is not feasible for the supplier and that the chemical treatment is unlikely to have a significant adverse effect on the analysis of the sample.

c) A supplier that recycles filter backwash water must collect source water samples prior to the point of filter backwash water addition.

d) Bank filtration.

1) A supplier that receives Cryptosporidium treatment credit for bank filtration underpursuant to Section 611.743(b) or Section 611.955(c)(1), as applicable, must collect source water samples in the surface water prior to bank filtration.

2) A supplier that uses bank filtration as pretreatment to a filtration plant must collect source water samples from the well (i.e., after bank filtration). The use of bank filtration during monitoring must be consistent with routine operational practice. A supplier collecting samples after a bank filtration process may not receive treatment credit for the bank filtration underpursuant to Section 611.1017(c).

e) Multiple sources. A supplier with plants that use multiple water sources, including multiple surface water sources and blended surface water and groundwater sources, must collect samples as specified in subsection (e)(1) or (e)(2). The use of multiple sources during monitoring must be consistent with routine operational practice.

1) If a sampling tap is available where the sources are combined prior to treatment, the supplier must collect samples from the tap.

2) If a sampling tap where the sources are combined prior to treatment is not available, the supplier must collect samples at each source near the intake on the same day, and it must follow either of the following procedures for sample analysis:

A) The supplier may composite samples from each source into one sample prior to analysis. The volume of sample from each source must be weighted according to the proportion of the source in the total plant flow at the time the sample is collected; or

B) The supplier may analyze samples from each source separately and calculate a weighted average of the analysis results for each

sampling date. The weighted average must be calculated by multiplying the analysis result for each source by the fraction the source contributed to total plant flow at the time the sample was collected and then summing these values.

f) Additional Requirements. A supplier must submit a description of its sampling locations to the Agency at the same time as the sampling schedule required underpursuant to Section 611.1002. This description must address the position of the sampling location in relation to the supplier's water sources and treatment processes, including pretreatment, points of chemical treatment, and filter backwash recycle. If the Agency does not respond to a supplier regarding sampling locations, the supplier must sample at the reported locations.

BOARD NOTE: Derived from 40 CFR 141.703 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1004 Source Water Monitoring Requirements: Analytical Methods

a) Cryptosporidium. A supplier must analyze for Cryptosporidium using USEPA OGWDW Methods, Method 1623 (05), 1623.1, or 1622 (05), each incorporated by reference in Section 611.102, or alternative methods approved by the Agency underpursuant to Section 611.480.

1) The supplier must analyze at least a 10 ℓ sample or a packed pellet volume of at least 2 mℓ as generated by the methods listed in subsection (a). A supplier unable to process a 10 ℓ sample must analyze as much sample volume as can be filtered by two filters approved by USEPA for the methods listed in subsection (a), up to a packed pellet volume of at least 2 mℓ.

2) Matrix spike (MS) samples.

A) MS samples, as required by the methods in subsection (a), must be spiked and filtered by a laboratory approved for Cryptosporidium analysis underpursuant to Section 611.1005.

B) If the volume of the MS sample is greater than 10 ℓ, the supplier may filter all but 10 ℓ of the MS sample in the field, and ship the filtered sample and the remaining 10 ℓ of source water to the laboratory. In this case, the laboratory must spike the remaining 10 ℓ of water and filter it through the filter used to collect the balance of the sample in the field.

3) Flow cytometer-counted spiking suspensions must be used for MS samples and ongoing precision and recovery samples.

b) E. coli. A supplier must use methods for enumeration of E. coli in source water approved in 40 CFR 136.3(a), incorporated by reference in Section 611.102, or alternative methods approved by the Agency under~~pursuant to~~ Section 611.480.

1) The time from sample collection to initiation of analysis may not exceed 30 hours, unless the supplier meets the condition of subsection (b)(2).

2) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, approve on a case-by-case basis the holding of an E. coli sample for up to 48 hours between sample collection and initiation of analysis if it determines that analyzing an E. coli sample within 30 hours is not feasible. E. coli samples held between 30 to 48 hours must be analyzed by the Colilert® Test reagent version of Standard Methods, 18th, 19th, or 20th ed., Method 9223 B incorporated by reference in Section 611.102.

3) A supplier must maintain the temperature of its samples between 0ºC and 10ºC during storage and transit to the laboratory.

4) The supplier may use the membrane filtration, two-step procedure described in Standard Methods, 20th ed., Method 9222 D and G, incorporated by reference in Section 611.102.

BOARD NOTE: USEPA added Standard Methods, 20th ed., Method 9222 D and G on June 3, 2008 (at 73 Fed. Reg. 31616).

c) Turbidity. A supplier must use methods for turbidity measurement approved in Section 611.531(a).

BOARD NOTE: Derived from 40 CFR 141.704 and appendix A to subpart C of 40 CFR 141 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1007 Source Water Monitoring Requirements: Grandfathering Previously Collected Data

a) Initial source monitoring and Cryptosporidium samples.

1) A supplier may comply with the initial source water monitoring requirements of Section 611.1001(a) by grandfathering sample results collected before the supplier is required to begin monitoring (i.e.,

previously collected data). To be grandfathered, the sample results and analysis must meet the criteria in this Section and the Agency must approve the use of the data by a SEP ~~issued pursuant to Section 611.110~~.

2) A filtered system supplier may grandfather Cryptosporidium samples to meet the requirements of Section 611.1001(a) when the supplier does not have corresponding E. coli and turbidity samples. A supplier that grandfathers Cryptosporidium samples without E. coli and turbidity samples is not required to collect E. coli and turbidity samples when it completes the requirements for Cryptosporidium monitoring under~~pursuant to~~ Section 611.1001(a).

b) E. coli sample analysis. The analysis of E. coli samples must meet the analytical method and approved laboratory requirements of Sections 611.1004 and 611.1005.

c) Cryptosporidium sample analysis. The analysis of Cryptosporidium samples must meet the criteria in this subsection (c).

1) Laboratories must analyze Cryptosporidium samples using one of the following analytical methods, incorporated by reference in Section 611.102, or alternative methods approved by the Agency under~~pursuant to~~ Section 611.480:

A) USEPA OGWDW Methods, Method 1623 (05);

B) USEPA OGWDW Methods, Method 1622 (05);

C) USEPA OGWDW Methods, Method 1623 (01);

D) USEPA OGWDW Methods, Method 1622 (01);

E) USEPA OGWDW Methods, Method 1623 (99); or

F) USEPA OGWDW Methods, Method 1622 (99).

2) For each Cryptosporidium sample, the laboratory analyzed at least 10 ℓ of sample or at least 2 mℓ of packed pellet or as much volume as could be filtered by two filters that USEPA approved for the methods listed in subsection (c)(1).

d) Sampling location. The sampling location must meet the conditions in Section 611.1003.

e) Sampling frequency. Cryptosporidium samples were collected no less frequently than each calendar month on a regular schedule, beginning no earlier than January 1999. Sample collection intervals may vary for the conditions specified in Section 611.1002(b)(1) and (b)(2) if the supplier provides documentation of the condition when reporting monitoring results.

1) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, approve grandfathering of previously collected data where there are time gaps in the sampling frequency if the supplier conducts additional monitoring that the Agency has specified by a SEP ~~issued pursuant to Section 611.110~~ to ensure that the data used to comply with the initial source water monitoring requirements of Section 611.1001(a) are seasonally representative and unbiased.

2) A supplier may grandfather previously collected data where the sampling frequency within each month varied. If the Cryptosporidium sampling frequency varied, the supplier must follow the monthly averaging procedure in Section 611.1010(b)(5) or Section 611.1012(a)(3), as applicable, when calculating the bin classification for a filtered system supplier or the mean Cryptosporidium concentration for an unfiltered system supplier.

f) Reporting monitoring results for grandfathering. A supplier that requests to grandfather previously collected monitoring results must report the following information by the applicable dates listed in this subsection. A supplier must report this information to the Agency.

1) A supplier must report that it intends to submit previously collected monitoring results for grandfathering. This report must specify the number of previously collected results the supplier will submit, the dates of the first and last sample, and whether a supplier will conduct additional source water monitoring to meet the requirements of Section 611.1001(a). The supplier must report this information no later than the applicable date set forth in Section 611.1002.

2) A supplier must report previously collected monitoring results for grandfathering, along with the associated documentation listed in subsections (f)(2)(A) through (f)(2)(D), no later than two months after the applicable date listed in Section 611.1001(c).

A) For each sample result, a supplier must report the applicable data elements in Section 611.1006.

B) A supplier must certify that the reported monitoring results include all results that it generated during the time period beginning with the first reported result and ending with the final reported result. This applies to samples that were collected from the sampling location specified for source water monitoring under~~pursuant to~~ this Subpart Z, which were not spiked, and which were analyzed using the laboratory's routine process for the analytical methods listed in this Section.

C) The supplier must certify that the samples were representative of a plant's source waters and the source waters have not changed. It must report a description of the sampling locations, which must address the position of the sampling location in relation to its water sources and treatment processes, including points of chemical addition and filter backwash recycle.

D) For Cryptosporidium samples, the laboratory or laboratories that analyzed the samples must provide a letter certifying that the quality control criteria specified in the methods listed in subsection (c)(1) were met for each sample batch associated with the reported results. Alternatively, the laboratory may provide bench sheets and sample examination report forms for each field, matrix spike, initial precision and recovery, ongoing precision and recovery, and method blank sample associated with the reported results.

g) If the Agency determines that a previously collected data set submitted for grandfathering was generated during source water conditions that were not normal for the supplier, such as a drought, the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, disapprove the data. Alternatively, the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, approve the previously collected data if the supplier reports additional source water monitoring data, as determined by the Agency, to ensure that the data set used under~~pursuant to~~ Section 611.1010 or Section 611.1012 represents average source water conditions for the supplier.

h) If a supplier submits previously collected data that fully meet the number of samples required for initial source water monitoring under~~pursuant to~~ Section 611.1001(a), and some of the data are rejected due to not meeting the requirements-of this Section, the supplier must conduct additional monitoring to replace rejected data on a schedule that the Agency has approved by a SEP ~~issued pursuant to Section 611.110~~. A supplier is not required to begin this additional monitoring until two months after notification that data have been rejected and additional monitoring is necessary.

BOARD NOTE: Derived from 40 CFR 141.707 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1008 Disinfection Profiling and Benchmarking Requirements: Requirements When Making a Significant Change in Disinfection Practice

a) Following the completion of initial source water monitoring underpursuant to Section 611.1001(a), a supplier that plans to make a significant change to its disinfection practice, as defined in subsection (b), must develop disinfection profiles and calculate disinfection benchmarks for Giardia lamblia and viruses, as described in Section 611.1009. Prior to changing the disinfection practice, the supplier must notify the Agency, and it must include in this notice the following information:

1) A completed disinfection profile and disinfection benchmark for Giardia lamblia and viruses, as described in Section 611.1009;

2) A description of the proposed change in disinfection practice; and

3) An analysis of how the proposed change will affect the current level of disinfection.

b) Significant changes to disinfection practice are defined as any of the following:

1) Changes to the point of disinfection;

2) Changes to the disinfectants used in the treatment plant;

3) Changes to the disinfection process; or

4) Any other modification identified by the Agency, by a SEP issued pursuant to Section 611.110, as a significant change to disinfection practice.

BOARD NOTE: Derived from 40 CFR 141.708 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1009 Disinfection Profiling and Benchmarking Requirements: Developing the Disinfection Profile and Benchmark

a) A supplier required to develop disinfection profiles underpursuant to Section 611.1008 must follow the requirements of this Section. The supplier must monitor at least weekly for a period of 12 consecutive months to determine the

total log inactivation for Giardia lamblia and viruses. If the supplier monitors more frequently than weekly, the monitoring frequency must be evenly spaced. A supplier that operates for fewer than 12 months per year must monitor weekly during the period of operation. A supplier must determine log inactivation for Giardia lamblia through the entire plant, based on the applicable $CT_{99.9}$ values in Appendix B. A supplier must determine log inactivation for viruses through the entire treatment plant based on a protocol approved by the Agency by a SEP ~~issued pursuant to Section 611.110~~.

b) A supplier with a single point of disinfectant application prior to the entrance to the distribution system must conduct the monitoring in subsections (b)(1) through (b)(4). A supplier with more than one point of disinfectant application must conduct the monitoring in subsections (b)(1) through (b)(4)~~-~~for each disinfection segment. A supplier must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in Section 611.531.

1) For a supplier using a disinfectant other than UV, the temperature of the disinfected water must be measured at each residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the Agency by a SEP ~~issued pursuant to Section 611.110~~.

2) For a supplier using chlorine, the pH of the disinfected water must be measured at each chlorine residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the Agency by a SEP ~~issued pursuant to Section 611.110~~.

3) The disinfectant contact times (t) must be determined during peak hourly flow.

4) The residual disinfectant concentrations (C) of the water before or at the first customer and prior to each additional point of disinfectant application must be measured during peak hourly flow.

c) In lieu of conducting new monitoring <u>under</u>~~pursuant to~~ subsection (b), a supplier may elect to meet the following requirements:

1) A supplier that has at least one year of existing data that are substantially equivalent to data collected <u>under</u>~~pursuant to~~ the provisions of subsection (b) may use these data to develop disinfection profiles as specified in this Section if the supplier has neither made a significant change to its treatment practice nor changed sources since the data were collected. The

supplier may develop disinfection profiles using up to three years of existing data.

2) A supplier may use disinfection profiles developed under~~pursuant to~~ Section 611.742 or Section 611.953 in lieu of developing a new profile if the supplier has neither made a significant change to its treatment practice nor changed sources since the profile was developed. A supplier that has not developed a virus profile under~~pursuant to~~ Section 611.742 or Section 611.953 must develop a virus profile using the same monitoring data on which the Giardia lamblia profile is based.

d) A supplier must calculate the total inactivation ratio for Giardia lamblia, as specified in subsections (d)(1) through (d)(3).

1) A supplier using only one point of disinfectant application may determine the total inactivation ratio for the disinfection segment based on either of the following methods:

A) It may determine one inactivation ratio (Ai) before or at the first customer during peak hourly flow; or

B) It may determine successive Ai values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. The supplier must calculate the total inactivation ratio by determining Ai for each sequence and then adding the Ai values together to determine the total inactivation ratio (Σ Ai).

2) A supplier using more than one point of disinfectant application before the first customer must determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The Ai value of each segment and Σ Ai must be calculated using the method in subsection (d)(1)(B).

3) The supplier must determine the total logs of inactivation by multiplying the value calculated in subsection (d)(1) or (d)(2) by 3.0.

4) The supplier must calculate the log of inactivation for viruses using a protocol approved by the Agency by regulation or by a SEP ~~issued pursuant to Section 611.110~~.

e) A supplier must use the following procedures to calculate a disinfection benchmark:

1) For each year of profiling data collected and calculated underpursuant to subsections (a) through (d), the supplier must determine the lowest mean monthly level of both Giardia lamblia and virus inactivation. A supplier must determine the mean Giardia lamblia and virus inactivation for each calendar month for each year of profiling data by dividing the sum of daily or weekly Giardia lamblia and virus log inactivation by the number of values calculated for that month.

2) The disinfection benchmark is the lowest monthly mean value (for a supplier with one year of profiling data) or the mean of the lowest monthly mean values (for a supplier with more than one year of profiling data) of Giardia lamblia and virus log inactivation in each year of profiling data.

BOARD NOTE: Derived from 40 CFR 141.709 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1011 Treatment Technique Requirements: Filtered System Additional Cryptosporidium Treatment Requirements

a) A filtered system supplier must provide the level of additional treatment for Cryptosporidium specified in subsections (a)(1) through (a)(4) based on its bin classification, as determined underpursuant to Section 611.1010, and according to the applicable schedule set forth in Section 611.1013.

1) If the supplier's bin classification is Bin 1, and the supplier uses conventional filtration treatment (including softening) in full compliance with the applicable provisions of Subparts B, R, and X of this Part, no additional treatment is required.

2) If the supplier's bin classification is Bin 2, and the supplier uses conventional filtration treatment (including softening) in full compliance with the applicable provisions of Subparts B, R, and X of this Part, then the additional Cryptosporidium treatment requirements are a 1-log treatment.

3) If the supplier's bin classification is Bin 2, and the supplier uses direct filtration in full compliance with the applicable provisions of Subparts B, R, and X of this Part, then the additional Cryptosporidium treatment requirements are a 1.5-log treatment.

4) If the supplier's bin classification is Bin 2, and the supplier uses slow sand or diatomaceous earth filtration in full compliance with the applicable provisions of Subparts B, R, and X ~~of this Part~~, then the additional Cryptosporidium treatment requirements are a 1-log treatment.

5) If the supplier's bin classification is Bin 2, and the supplier uses alternative filtration technologies in full compliance with the applicable provisions of Subparts B, R, and X ~~of this Part~~, then the additional Cryptosporidium treatment requirements are as determined by the Agency, by a SEP ~~issued pursuant to Section 611.110~~, such that the total Cryptosporidium removal and inactivation is at least 4.0-log.

6) If the supplier's bin classification is Bin 3, and the supplier uses conventional filtration treatment (including softening) in full compliance with the applicable provisions of Subparts B, R, and X ~~of this Part~~, then the additional Cryptosporidium treatment requirements are a 2-log treatment.

7) If the supplier's bin classification is Bin 3, and the supplier uses direct filtration in full compliance with the applicable provisions of Subparts B, R, and X ~~of this Part~~, then the additional Cryptosporidium treatment requirements are a 2.5-log treatment.

8) If the supplier's bin classification is Bin 3, and the supplier uses slow sand or diatomaceous earth filtration in full compliance with the applicable provisions of Subparts B, R, and X ~~of this Part~~, then the additional Cryptosporidium treatment requirements are a 2-log treatment.

9) If the supplier's bin classification is Bin 3, and the supplier uses alternative filtration technologies in full compliance with the applicable provisions of Subparts B, R, and X ~~of this Part~~, then the additional Cryptosporidium treatment requirements are as determined by the Agency, by a SEP ~~issued pursuant to Section 611.110~~, such that the total Cryptosporidium removal and inactivation is at least 5.0-log.

10) If the supplier's bin classification is Bin 4, and the supplier uses conventional filtration treatment (including softening) in full compliance with the applicable provisions of Subparts B, R, and X ~~of this Part~~, then the additional Cryptosporidium treatment requirements are a 2.5-log treatment.

11) If the supplier's bin classification is Bin 4, and the supplier uses direct filtration in full compliance with the applicable provisions of Subparts B,

R, and X ~~of this Part~~, then the additional Cryptosporidium treatment requirements are a 3-log treatment.

12) If the supplier's bin classification is Bin 4, and the supplier uses slow sand or diatomaceous earth filtration in full compliance with the applicable provisions of Subparts B, R, and X ~~of this Part~~, then the additional Cryptosporidium treatment requirements are a 2.5-log treatment.

13) If the supplier's bin classification is Bin 4, and the supplier uses alternative filtration technologies in full compliance with the applicable provisions of Subparts B, R, and X ~~of this Part~~, then the additional Cryptosporidium treatment requirements are as determined by the Agency, by a SEP ~~issued pursuant to Section 611.110~~, such that the total Cryptosporidium removal and inactivation is at least 5.5-log.

b) Required treatment.

1) A filtered system supplier must use one or more of the treatment and management options listed in Section 611.1015, termed the microbial toolbox, to comply with the additional Cryptosporidium treatment required in subsection (a).

2) A supplier classified in Bin 3 or Bin 4 must achieve at least 1-log of the additional Cryptosporidium treatment required under~~pursuant to~~ subsection (a) using either one or a combination of the following: bag filters, bank filtration, cartridge filters, chlorine dioxide, membranes, ozone, or UV, as described in Sections 611.1016 through 611.1020.

c) A failure by a supplier in any month to achieve treatment credit by meeting criteria in Sections 611.1016 through 611.1020 for microbial toolbox options that is at least equal to the level of treatment required in subsection (a) is a violation of the treatment technique requirement.

d) If the Agency determines, by a SEP ~~issued pursuant to Section 611.110~~, during a sanitary survey or an equivalent source water assessment that after a supplier completed the monitoring conducted under~~pursuant to~~ Section 611.1001(a) or 611.1001(b), significant changes occurred in the supplier's watershed that could lead to increased contamination of the source water by Cryptosporidium, the supplier must take actions specified by the Agency in the SEP to address the contamination. These actions may include additional source water monitoring or implementing microbial toolbox options listed in Section 611.1015.

BOARD NOTE: Derived from 40 CFR 141.711 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1013 Treatment Technique Requirements: Schedule for Compliance with Cryptosporidium Treatment Requirements

a) Following initial bin classification underpursuant to Section 611.1010(c), a filtered system supplier must provide the level of treatment for Cryptosporidium required by Section 611.1011 according to the applicable schedule set forth in subsection (c).

b) Following initial determination of the mean Cryptosporidium level underpursuant to Section 611.1012(a)(1), an unfiltered system supplier must provide the level of treatment for Cryptosporidium required by Section 611.1012 according to the applicable schedule set forth in subsection (c).

c) Cryptosporidium treatment compliance dates.

1) A supplier that serves 100,000 or more persons is required to have complied with Cryptosporidium treatment requirements before April 1, 2012.

2) A supplier that serves 50,000 to 99,999 persons is required to have complied with Cryptosporidium treatment requirements before October 1, 2012.

3) A supplier that serves 10,000 to 49,999 persons must comply with Cryptosporidium treatment requirements before October 1, 2013.

4) A supplier that serves fewer than 10,000 persons must comply with Cryptosporidium treatment requirements before October 1, 2014.

5) The Agency may, by a SEP issued pursuant to Section 611.110, allow up to an additional two years from the applicable date set forth in this subsection (c) for complying with the treatment requirement if it determines that the additional time is necessary for the supplier to make capital improvements to implement the treatment.

d) If the bin classification for a filtered system supplier changes following the second round of source water monitoring, as determined underpursuant to Section 611.1010(d), the supplier must provide the level of treatment for Cryptosporidium required by Section 611.1011 on a schedule approved by the Agency by a SEP issued pursuant to Section 611.110.

e) If the mean Cryptosporidium level for an unfiltered system supplier changes following the second round of monitoring, as determined underpursuant to Section 611.1012(a)(2), and if the supplier must provide a different level of Cryptosporidium treatment underpursuant to Section 611.1012 due to this change, the supplier must meet this treatment requirement on a schedule approved by the Agency by a SEP issued pursuant to Section 611.110.

BOARD NOTE: Derived from 40 CFR 141.713 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1016 Requirements for Microbial Toolbox Components: Source Toolbox Components

a) Watershed control program. A supplier receives 0.5-log Cryptosporidium treatment credit for implementing a watershed control program that meets the requirements.

1) A supplier that intends to apply for the watershed control program credit must notify the Agency of its intent no later than two years prior to the treatment compliance date applicable to the supplier in Section 611.1013.

2) A supplier must submit to the Agency a proposed watershed control plan no later than one year before the applicable treatment compliance date in Section 611.1013. The Agency must approve the watershed control plan for the supplier to receive watershed control program treatment credit. The watershed control plan must include the following elements:

A) Identification of an "area of influence" outside of which the likelihood of Cryptosporidium or fecal contamination affecting the treatment plant intake is not significant. This is the area to be evaluated in future watershed surveys underpursuant to subsection (a)(5)(B);

B) Identification of both potential and actual sources of Cryptosporidium contamination and an assessment of the relative impact of these sources on the supplier's source water quality;

C) An analysis of the effectiveness and feasibility of control measures that could reduce Cryptosporidium loading from sources of contamination to the supplier's source water; and

D) A statement of goals and specific actions the supplier will undertake to reduce source water Cryptosporidium levels. The plan must explain how the actions are expected to contribute to

specific goals, identify watershed partners and their roles, identify resource requirements and commitments, and include a schedule for plan implementation with deadlines for completing specific actions identified in the plan.

3) A supplier with an existing watershed control program (i.e., a program in place on January 5, 2006) is eligible to seek this credit. Its watershed control plans must meet the criteria in subsection (a)(2) and must specify ongoing and future actions that will reduce source water Cryptosporidium levels.

4) If the Agency does not respond to a supplier regarding approval of a watershed control plan submitted underpursuant to this Section and the supplier meets the other requirements of this Section, the watershed control program will be considered approved and 0.5 log Cryptosporidium treatment credit will be awarded, unless and until the Agency subsequently withdraws such approval by a SEP issued pursuant to Section 611.110.

5) A supplier must complete each of the following actions to maintain the 0.5-log credit.

A) It must submit an annual watershed control program status report to the Agency. The annual watershed control program status report must describe the supplier's implementation of the approved plan and assess the adequacy of the plan to meet its goals. The report must explain how the supplier is addressing any shortcomings in plan implementation, including those previously identified by the Agency or as the result of the watershed survey conducted underpursuant to subsection (a)(5)(B. The report must also describe any significant changes that have occurred in the watershed since the last watershed sanitary survey. If a supplier determines during implementation that making a significant change to its approved watershed control program is necessary, the supplier must notify the Agency prior to making any such changes. If any change is likely to reduce the level of source water protection, the supplier must also list in its notification the actions the supplier will take to mitigate this effect;

B) The supplier must undergo a watershed sanitary survey every three years for a CWS supplier and every five years for a non-CWS supplier and submit the survey report to the Agency. The survey

must be conducted according to Agency guidelines and by persons that the Agency approves.

i) The watershed sanitary survey must meet the following criteria: it must encompass the region identified in the Agency-approved watershed control plan as the area of influence; assess the implementation of actions to reduce source water Cryptosporidium levels; and identify any significant new sources of Cryptosporidium.

ii) If the Agency determines that significant changes may have occurred in the watershed since the previous watershed sanitary survey, the supplier must undergo another watershed sanitary survey before a date the Agency requires by a SEP ~~issued pursuant to Section 611.110~~, which may be earlier than the regular date in subsection (a)(5)(B); and

C) The supplier must make the watershed control plan, annual status reports, and watershed sanitary survey reports available to the public upon request. These documents must be in a plain language style and include criteria by which to evaluate the success of the program in achieving plan goals. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, approve that a supplier withhold from the public portions of the annual status report, watershed control plan, and watershed sanitary survey based on water supply security considerations.

6) If the Agency determines that a supplier is not carrying out the approved watershed control plan, the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, withdraw the watershed control program treatment credit.

b) Alternative source.

1) A supplier may conduct source water monitoring that reflects a different intake location (either in the same source or for an alternate source) or a different procedure for the timing or level of withdrawal from the source (alternative source monitoring). If the Agency approves by a SEP ~~issued pursuant to Section 611.110~~, a supplier may determine its bin classification <u>under</u>~~pursuant to~~ Section 611.1010 based on the alternative source monitoring results.

2) If a supplier conducts alternative source monitoring under~~pursuant to~~ subsection (b)(1), it must also monitor their current plant intake concurrently as described in Section 611.1001.

3) Alternative source monitoring under~~pursuant to~~ subsection (b)(1) must meet the requirements for source monitoring to determine bin classification, as described in Sections 611.1001 through 611.1006. A supplier must report the alternative source monitoring results to the Agency, along with supporting information documenting the operating conditions under which the samples were collected.

4) If a supplier determines its bin classification under~~pursuant to~~ Section 611.1010 using alternative source monitoring results that reflect a different intake location or a different procedure for managing the timing or level of withdrawal from the source, the supplier must relocate the intake or permanently adopt the withdrawal procedure, as applicable, no later than the applicable treatment compliance date in Section 611.1013.

BOARD NOTE: Derived from 40 CFR 141.716 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1017 Requirements for Microbial Toolbox Components: Pre-Filtration Treatment Toolbox Components

a) Presedimentation. A supplier receives 0.5-log Cryptosporidium treatment credit for a presedimentation basin during any month the process meets the criteria in this subsection (a).

1) The presedimentation basin must be in continuous operation and must treat the entire plant flow taken from a surface water or groundwater under the direct influent of surface water source.

2) The supplier must continuously add a coagulant to the presedimentation basin.

3) The presedimentation basin must achieve both of the following performance criteria:

A) It demonstrates at least 0.5-log mean reduction of influent turbidity. This reduction must be determined using daily turbidity measurements in the presedimentation process influent and effluent, and it must be calculated as follows: $\log_{10}$(monthly mean

of daily influent turbidity)-$\log_{10}$(monthly mean of daily effluent turbidity); and

B) It complies with Agency-approved performance criteria that demonstrate at least 0.5-log mean removal of micronsized particulate material through the presedimentation process.

b) Two-stage lime softening. A supplier receives an additional 0.5-log Cryptosporidium treatment credit for a two-stage lime softening plant if chemical addition and hardness precipitation occur in two separate and sequential softening stages prior to filtration. Both softening stages must treat the entire plant flow taken from a surface water or groundwater under the direct influent of surface water source.

c) Bank filtration. A supplier receives Cryptosporidium treatment credit for bank filtration that serves as pretreatment to a filtration plant by meeting the criteria in this subsection (c). A supplier using bank filtration when it begins source water monitoring under~~pursuant to~~ Section 611.1001(a) must collect samples as described in Section 611.1003(d), and it is not eligible for this credit.

1) A well with a groundwater flow path of at least 25 feet receives 0.5-log treatment credit, or a well with a groundwater flow path of at least 50 feet receives 1.0-log treatment credit. The groundwater flow path must be determined as specified in subsection (c)(4).

2) Only a well in granular aquifers is eligible for treatment credit. A granular aquifer is one comprised of sand, clay, silt, rock fragments, pebbles or larger particles, and minor cement. A supplier must characterize the aquifer at the well site to determine aquifer properties. A supplier must extract a core from the aquifer and demonstrate that in at least 90 percent of the core length, grains less than 1.0 mm in diameter constitute at least 10 percent of the core material.

3) Only a horizontal or vertical well is eligible for treatment credit.

4) For a vertical well, the groundwater flow path is the measured distance from the edge of the surface water body under high flow conditions (determined by the 100 year floodplain elevation boundary or by the floodway, as defined in Federal Emergency Management Agency flood hazard maps) to the well screen. For a horizontal well, the groundwater flow path is the measured distance from the bed of the river under normal flow conditions to the closest horizontal well lateral screen.

5) The supplier must monitor each wellhead for turbidity at least once every four hours while the bank filtration process is in operation. If monthly average turbidity levels, based on daily maximum values in the well, exceed 1 NTU, the supplier must report this result to the Agency and conduct an assessment within 30 days to determine the cause of the high turbidity levels in the well. If the Agency determines that microbial removal has been compromised, it may, by a SEP ~~issued pursuant to Section 611.110~~, revoke treatment credit until the supplier implements corrective actions approved by the Agency to remediate the problem.

6) Springs and infiltration galleries are not eligible for treatment credit under~~pursuant to~~ this Section, but are eligible for credit under~~pursuant to~~ Section 611.1018(c).

7) Bank filtration demonstration of performance. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, approve Cryptosporidium treatment credit for bank filtration based on a demonstration of performance study that meets the criteria in this subsection. This treatment credit may be greater than 1.0-log and may be awarded to bank filtration that does not meet the criteria in subsections (c)(1) through (c)(5).

A) The study must follow an Agency-approved protocol and must involve the collection of data on the removal of Cryptosporidium or a surrogate for Cryptosporidium and related hydrogeologic and water quality parameters during the full range of operating conditions.

B) The study must include sampling both from the production wells and from monitoring wells that are screened and located along the shortest flow path between the surface water source and the production wells.

BOARD NOTE: Derived from 40 CFR 141.717 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1018 Requirements for Microbial Toolbox Components: Treatment Performance Toolbox Components

a) Combined filter performance. A supplier that uses conventional filtration treatment or direct filtration treatment receives an additional 0.5-log Cryptosporidium treatment credit during any month it meets the criteria in this

subsection (a). Its combined filter effluent (CFE) turbidity must be less than or equal to 0.15 NTU in at least 95 percent of the measurements. Turbidity must be measured as described in Sections 611.531 and 611.533.

b) Individual filter performance. A supplier that uses conventional filtration treatment or direct filtration treatment receives 0.5-log Cryptosporidium treatment credit, which can be in addition to the 0.5-log credit under~~pursuant to~~ subsection (a), during any month it meets the criteria in this subsection (b). Compliance with these criteria must be based on individual filter turbidity monitoring as described in Section 611.744 or 611.956(a), as applicable.

1) The filtered water turbidity for each individual filter must be less than or equal to 0.15 NTU in at least 95 percent of the measurements recorded each month.

2) No individual filter may have a measured turbidity greater than 0.3 NTU in two consecutive measurements taken 15 minutes apart.

3) Any supplier that has received treatment credit for individual filter performance and fails to meet the requirements of subsection (b)(1) or (b)(2) during any month does not receive a treatment technique violation under~~pursuant to~~ Section 611.1011(c) if the Agency determines the following:

A) The failure was due to unusual and short-term circumstances that could not reasonably be prevented through optimizing treatment plant design, operation, and maintenance; and

B) The supplier has experienced no more than two such failures in any calendar year.

c) Demonstration of performance. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, approve Cryptosporidium treatment credit for drinking water treatment processes based on a demonstration of performance study that meets the criteria in this subsection (c). This treatment credit may be greater than or less than the prescribed treatment credits in Section 611.1011 or Sections 611.1017 through 611.1020 and may be awarded to treatment processes that do not meet the criteria for the prescribed credits.

1) The supplier cannot receive the prescribed treatment credit for any toolbox option in Sections 611.1017 through 611.1020 if that toolbox option is included in a demonstration of performance study for which treatment credit is awarded under~~pursuant t~~o this subsection (b).

2) The demonstration of performance study must follow an Agency-approved protocol and must demonstrate the level of Cryptosporidium reduction the treatment process will achieve under the full range of expected operating conditions for the supplier.

3) Approval by the Agency must be in writing and may include monitoring and treatment performance criteria that the supplier must demonstrate and report on an ongoing basis to remain eligible for the treatment credit. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, designate such criteria where necessary to verify that the conditions under which the demonstration of performance credit was approved are maintained during routine operation.

BOARD NOTE: Derived from 40 CFR 141.718 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1019 Requirements for Microbial Toolbox Components: Additional Filtration Toolbox Components

a) Bag and cartridge filters. A supplier receives Cryptosporidium treatment credit of up to 2.0-log for individual bag or cartridge filters and up to 2.5-log for bag or cartridge filters operated in series by meeting the criteria set forth in subsections (a)(1) through (a)(10). To be eligible for this credit, the supplier must report the results of challenge testing that meets the requirements of subsections (a)(2) through (a)(9) to the Agency. The filters must treat the entire plant flow taken from a Subpart B source.

1) The Cryptosporidium treatment credit awarded to bag or cartridge filters must be based on the removal efficiency demonstrated during challenge testing that is conducted according to the criteria set forth in subsections (a)(2) through (a)(9). A factor of safety equal to 1-log for individual bag or cartridge filters and 0.5-log for bag or cartridge filters in series must be applied to challenge testing results to determine removal credit. A supplier may use results from challenge testing conducted prior to January 5, 2006 if the prior testing was consistent with the criteria specified in subsections (a)(2) through (a)(9).

2) Challenge testing must be performed on full-scale bag or cartridge filters, and the associated filter housing or pressure vessel, that are identical in material and construction to the filters and housings the supplier will use for removal of Cryptosporidium. Bag or cartridge filters must be

challenge tested in the same configuration that the supplier will use, either as individual filters or as a series configuration of filters.

3) Challenge testing must be conducted using Cryptosporidium or a surrogate that is removed no more efficiently than Cryptosporidium. The microorganism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate must be determined using a method capable of discreetly quantifying the specific microorganism or surrogate used in the test; gross measurements such as turbidity may not be used.

4) The maximum feed water concentration that can be used during a challenge test must be based on the detection limit of the challenge particulate in the filtrate (i.e., filtrate detection limit) and must be calculated using the following equation:

Maximum Feed Concentration = 1 ×□ 10^4 × □(Filtrate Detection Limit)

5) Challenge testing must be conducted at the maximum design flow rate for the filter as specified by the manufacturer.

6) Each filter evaluated must be tested for a duration sufficient to reach 100 percent of the terminal pressure drop, which establishes the maximum pressure drop under which the filter may be used to comply with the requirements of this Subpart Z.

7) Removal efficiency of a filter must be determined from the results of the challenge test and expressed in terms of log removal values using the following equation:

$$LRV = Log_{10}(C_f) - Log_{10}(C_p)$$

Where:

LRV = log removal value demonstrated during challenge testing
C_f = the feed concentration measured during the challenge test
C_p = the filtrate concentration measured during the challenge test. In applying this equation, the same units must be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, then the term Cp must be set equal to the detection limit.

8) Each filter tested must be challenged with the challenge particulate during three periods over the filtration cycle: within two hours of start-up of a new filter; when the pressure drop is between 45 and 55 percent of the terminal pressure drop; and at the end of the cycle after the pressure drop has reached 100 percent of the terminal pressure drop. An LRV must be calculated for each of these challenge periods for each filter tested. The LRV for the filter (LRV_{filter}) must be assigned the value of the minimum LRV observed during the three challenge periods for that filter.

9) If fewer than 20 filters are tested, the overall removal efficiency for the filter product line must be set equal to the lowest LRV_{filter} among the filters tested. If 20 or more filters are tested, the overall removal efficiency for the filter product line must be set equal to the 10th percentile of the set of LRV_{filter} values for the various filters tested. The percentile is defined by (i/(n+1)) where i is the rank of n individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

10) If a previously tested filter is modified in a manner that could change the removal efficiency of the filter product line, challenge testing to demonstrate the removal efficiency of the modified filter must be conducted and submitted in writing to the Agency.

b) Membrane filtration.

1) A supplier receives Cryptosporidium treatment credit for membrane filtration that meets the criteria of this subsection (b). Membrane cartridge filters that meet the definition of membrane filtration in Section 611.102 are eligible for this credit. The level of treatment credit a supplier receives is equal to the lower of the following values:

A) The removal efficiency demonstrated during challenge testing conducted <u>under</u>~~pursuant to~~ the conditions in subsection (b)(2); or

B) The maximum removal efficiency that can be verified through direct integrity testing used with the membrane filtration process <u>under</u>~~pursuant to~~ the conditions in subsection (b)(3).

2) Challenge testing. The membrane used by the supplier must undergo challenge testing to evaluate removal efficiency, and the supplier must report the results of challenge testing to the Agency. Challenge testing must be conducted according to the criteria set forth in subsections (b)(2)(A) through (b)(2)(G). A supplier may use data from challenge

testing conducted prior to January 5, 2006 if the prior testing was consistent with the criteria set forth in subsections (b)(2)(A) through (b)(2)(G).

A) Challenge testing must be conducted on either a full-scale membrane module, identical in material and construction to the membrane modules used in the supplier's treatment facility, or a smaller-scale membrane module, identical in material and similar in construction to the full-scale module. A module is defined as the smallest component of a membrane unit in which a specific membrane surface area is housed in a device with a filtrate outlet structure.

B) Challenge testing must be conducted using Cryptosporidium oocysts or a surrogate that is removed no more efficiently than Cryptosporidium oocysts. The organism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate, in both the feed and filtrate water, must be determined using a method capable of discretely quantifying the specific challenge particulate used in the test; gross measurements such as turbidity may not be used.

C) The maximum feed water concentration that can be used during a challenge test is based on the detection limit of the challenge particulate in the filtrate and must be determined according to the following equation:

$$\text{Maximum Feed Concentration} = 3.16 \times 10^{6} \times (\text{Filtrate Detection Limit})$$

D) Challenge testing must be conducted under representative hydraulic conditions at the maximum design flux and maximum design process recovery specified by the manufacturer for the membrane module. Flux is defined as the throughput of a pressure driven membrane process expressed as flow per unit of membrane area. Recovery is defined as the volumetric percent of feed water that is converted to filtrate over the course of an operating cycle uninterrupted by events such as chemical cleaning or a solids removal process (i.e., backwashing).

E) Removal efficiency of a membrane module must be calculated from the challenge test results and expressed as a log removal value according to the following equation:

$$LRV = Log_{10}(C_f) - Log_{10}(C_p)$$

Where:

LRV = log removal value demonstrated during the challenge test
C_f = the feed concentration measured during the challenge test
C_p = the filtrate concentration measured during the challenge test. Equivalent units must be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, the term C_p is set equal to the detection limit for the purpose of calculating the LRV. An LRV must be calculated for each membrane module evaluated during the challenge test.

F) The removal efficiency of a membrane filtration process demonstrated during challenge testing must be expressed as a log removal value ($LRV_{C\text{-}Test}$). If fewer than 20 modules are tested, then $LRV_{C\text{-}Test}$ is equal to the lowest of the representative LRVs among the modules tested. If 20 or more modules are tested, then LRVC-Test is equal to the 10th percentile of the representative LRVs among the modules tested. The percentile is defined by (i/(n+1)) where i is the rank of n individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

G) The challenge test must establish a quality control release value (QCRV) for a non-destructive performance test that demonstrates the Cryptosporidium removal capability of the membrane filtration module. This performance test must be applied to each production membrane module used by the supplier that was not directly challenge tested in order to verify Cryptosporidium removal capability. Production modules that do not meet the established QCRV are not eligible for the treatment credit demonstrated during the challenge test.

H) If a previously tested membrane is modified in a manner that could change the removal efficiency of the membrane or the applicability of the non-destructive performance test and associated QCRV, additional challenge testing to demonstrate the removal efficiency of, and determine a new QCRV for, the modified membrane must be conducted and submitted to the Agency.

3) Direct integrity testing. A supplier must conduct direct integrity testing in a manner that demonstrates a removal efficiency equal to or greater than the removal credit awarded to the membrane filtration process and meets the requirements described in subsections (b)(3)(A) through (b)(3)(F). A "direct integrity test" is defined as a physical test applied to a membrane unit in order to identify and isolate integrity breaches (i.e., one or more leaks that could result in contamination of the filtrate).

A) The direct integrity test must be independently applied to each membrane unit in service. A membrane unit is defined as a group of membrane modules that share common valving that allows the unit to be isolated from the rest of the treatment system for the purpose of integrity testing or other maintenance.

B) The direct integrity method must have a resolution of three micrometers or less, where resolution is defined as the size of the smallest integrity breach that contributes to a response from the direct integrity test.

C) The direct integrity test must have a sensitivity sufficient to verify the log treatment credit awarded to the membrane filtration process by the Agency, where sensitivity is defined as the maximum log removal value that can be reliably verified by a direct integrity test. Sensitivity must be determined using the appropriate of the following approaches, considering the type of direct integrity test the supplier uses:

i) For a direct integrity test that uses an applied pressure or vacuum, the direct integrity test sensitivity must be calculated according to the following equation:

$$LRV_{DIT} = Log_{10}\left(\frac{Q_p}{VCF \times Q_{breach}}\right)$$

Where:

LRV_{DIT} = the sensitivity of the direct integrity test

Q_p = total design filtrate flow from the membrane unit

Q_{breach} = flow of water from an integrity breach associated with the smallest integrity test response that can be reliably measured

VCF = volumetric concentration factor. The volumetric concentration factor is the ratio of the suspended solids concentration on the

high pressure side of the membrane relative to that in the feed water; or

ii) For a direct integrity test that uses a particulate or molecular marker, the direct integrity test sensitivity must be calculated according to the following equation:

$$LRV_{DIT} = Log_{10}(C_f) - Log_{10}(C_p)$$

Where:

LRV_{DIT} = the sensitivity of the direct integrity test
C_f = the typical feed concentration of the marker used in the test
C_p = the filtrate concentration of the marker from an integral membrane unit

D) A supplier must establish a control limit within the sensitivity limits of the direct integrity test that is indicative of an integral membrane unit capable of meeting the removal credit awarded by the Agency.

E) If the result of a direct integrity test exceeds the control limit established underpursuant to subsection (b)(3)(D), the supplier must remove the membrane unit from service. The supplier must conduct a direct integrity test to verify any repairs, and it may return the membrane unit to service only if the direct integrity test is within the established control limit.

F) A supplier must conduct direct integrity testing on each membrane unit at a frequency of not less than once each day that the membrane unit is in operation. The Agency may, by a SEP issued pursuant to Section 611.110, approve less frequent testing, based on demonstrated process reliability, the use of multiple barriers effective for Cryptosporidium, or reliable process safeguards.

4) Indirect integrity monitoring. A supplier must conduct continuous indirect integrity monitoring on each membrane unit according to the criteria in subsections (b)(4)(A) through (b)(4)(E). "Indirect integrity monitoring" is defined as monitoring some aspect of filtrate water quality that is indicative of the removal of particulate matter. A supplier that implements continuous direct integrity testing of membrane units in accordance with the criteria in subsections (b)(3)(A) through (b)(3)(E) is not subject to the

requirements for continuous indirect integrity monitoring. The supplier must submit a monthly report to the Agency summarizing all continuous indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken in each case.

A) Unless the Agency approves an alternative parameter by a SEP ~~issued pursuant to Section 611.110~~, continuous indirect integrity monitoring must include continuous filtrate turbidity monitoring.

B) Continuous indirect integrity monitoring must be conducted at a frequency of no less than once every 15 minutes.

C) Continuous indirect integrity monitoring must be separately conducted on each membrane unit.

D) If continuous indirect integrity monitoring includes turbidity and if the filtrate turbidity readings are above 0.15 NTU for a period greater than 15 minutes (i.e., two consecutive 15-minute readings above 0.15 NTU), direct integrity testing must immediately be performed on the associated membrane unit, as specified in subsections (b)(3)(A) through (b)(3)(E).

E) If indirect integrity monitoring includes an Agency-approved alternative parameter and if the alternative parameter exceeds an Agency-approved control limit for a period greater than 15 minutes, direct integrity testing must immediately be performed on the associated membrane units, as specified in subsections (b)(3)(A) through (b)(3)(E).

c) Second stage filtration. A supplier receives 0.5-log Cryptosporidium treatment credit for a separate second stage of filtration that consists of sand, dual media, GAC, or other fine grain media following granular media filtration if the Agency approves by a SEP ~~issued pursuant to Section 611.110~~. To be eligible for this credit, the first stage of filtration must be preceded by a coagulation step and both filtration stages must treat the entire plant flow taken from a surface water or groundwater under the direct influence of surface water source. A cap, such as GAC, on a single stage of filtration is not eligible for this credit. The Agency must approve the treatment credit based on an assessment of the design characteristics of the filtration process.

d) Slow sand filtration (as secondary filter). A supplier is eligible to receive 2.5-log Cryptosporidium treatment credit by a SEP ~~issued pursuant to Section 611.110~~ for a slow sand filtration process that follows a separate stage of filtration if both

filtration stages treat entire plant flow taken from a surface water or groundwater under the direct influence of surface water source and no disinfectant residual is present in the influent water to the slow sand filtration process. The Agency must approve the treatment credit based on an assessment of the design characteristics of the filtration process. This subsection (d) does not apply to treatment credit awarded to slow sand filtration used as a primary filtration process.

BOARD NOTE: Derived from 40 CFR 141.719 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1020 Requirements for Microbial Toolbox Components: Inactivation Toolbox Components

a) Calculation of CT values.

1) CT is the product of the disinfectant contact time (T, in minutes) and disinfectant concentration (C, in milligrams per liter). A supplier with treatment credit for chlorine dioxide or ozone under~~pursuant to~~ subsection (b) or (c) must calculate CT at least once each day, with both C and T measured during peak hourly flow, as specified in Sections 611.531 and 611.532.

2) A supplier with several disinfection segments in sequence may calculate CT for each segment, where a disinfection segment is defined as a treatment unit process with a measurable disinfectant residual level and a liquid volume. Under this approach, the supplier must add the Cryptosporidium CT values in each segment to determine the total CT for the treatment plant.

b) CT values for chlorine dioxide and ozone.

1) A supplier receives the Cryptosporidium treatment credit listed in Table H to this Part by meeting the corresponding chlorine dioxide CT value for the applicable water temperature, as described in subsection (a).

2) A supplier receives the Cryptosporidium treatment credit listed in Table I to this Part by meeting the corresponding ozone CT values for the applicable water temperature, as described in subsection (a).

c) Site-specific study. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, approve alternative chlorine dioxide or ozone CT values to those listed in Tables H and I to this Part on a site-specific basis. The Agency must base this

approval on a site-specific study conducted by the supplier according to an Agency-approved protocol.

d) Ultraviolet light. A supplier receives Cryptosporidium, Giardia lamblia, and virus treatment credits for ultraviolet (UV) light reactors by achieving the corresponding UV dose values shown in Table J to this Part. The supplier must validate and monitor UV reactors, as described in subsections (d)(2) and (d)(3), to demonstrate that they are achieving a particular UV dose value for treatment credit.

1) UV dose table. The treatment credits listed in Table J to this Part are for UV light at a wavelength of 254 nm as produced by a low-pressure mercury vapor lamp. To receive treatment credit for other lamp types, a supplier must demonstrate an equivalent germicidal dose through reactor validation testing, as described in subsection (d)(2). The UV dose values in this table are applicable only to post-filter applications of UV in a filtered system supplier and to an unfiltered system supplier.

2) Reactor validation testing. A supplier must use UV reactors that have undergone validation testing to determine the operating conditions under which the reactor delivers the UV dose required in subsection (d)(1) (i.e., validated operating conditions). These operating conditions must include flow rate; UV intensity, as measured by a UV sensor; and UV lamp status.

A) When determining validated operating conditions, a supplier must account for the following factors: UV absorbance of the water; lamp fouling and aging; measurement uncertainty of on-line sensors; UV dose distributions arising from the velocity profiles through the reactor; failure of UV lamps or other critical treatment system components; and inlet and outlet piping or channel configurations of the UV reactor.

B) Validation testing must include the following: Full scale testing of a reactor that conforms uniformly to the UV reactors used by the supplier and inactivation of a test microorganism whose dose response characteristics have been quantified with a low pressure mercury vapor lamp.

C) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, approve an alternative approach to validation testing.

3) Reactor monitoring.

A) A supplier must monitor its UV reactors to determine if the reactors are operating within validated conditions, as determined underpursuant to subsection (d)(2). This monitoring must include UV intensity, as measured by a UV sensor; flow rate; lamp status; and other parameters that the Agency has designated by a SEPissued pursuant to Section 611.110 based on UV reactor operation. A supplier must verify the calibration of UV sensors and must recalibrate sensors in accordance with a protocol that the Agency has approved by the SEP issued pursuant to Section 611.110.

B) To receive treatment credit for UV light, a supplier must treat at least 95 percent of the water delivered to the public during each month by UV reactors operating within validated conditions for the required UV dose, as described in subsections (d)(1) and (d)(2). The supplier must demonstrate compliance with this condition by the monitoring required underpursuant to subsection (d)(3)(A).

BOARD NOTE: Derived from 40 CFR 141.720 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1021 Reporting and Recordkeeping Requirements: Reporting Requirements

a) A supplier must report sampling schedules underpursuant to Section 611.1002 and source water monitoring results underpursuant to Section 611.1006 unless it notifies the Agency that it will not conduct source water monitoring because the supplier meets the criteria of Section 611.1001(d).

b) A supplier must report the use of uncovered finished water storage facilities to the Agency, as described in Section 611.1014.

c) A filtered system supplier must report its Cryptosporidium bin classification, as described in Section 611.1010.

d) An unfiltered system supplier must report its mean source water Cryptosporidium level, as described in Section 611.1012.

e) A supplier must report disinfection profiles and benchmarks to the Agency, as described in Sections 611.1008 and 611.1009, prior to making a significant change in disinfection practice.

f) A supplier must report to the Agency in accordance with subsections (f)(1) through (f)(15) for any microbial toolbox options used to comply with treatment

requirements underpursuant to Section 611.1011 or Section 611.1012. Alternatively, the Agency may, by a SEP issued pursuant to Section 611.110, approve a supplier to certify operation within required parameters for treatment credit rather than reporting monthly operational data for toolbox options.

1) A supplier that uses the watershed control program toolbox option must submit the following information on the indicated schedule:

   A) A notice of intention to develop a new or continue an existing watershed control program no later than two years before the applicable treatment compliance date in Section 611.1013;

   B) A watershed control plan no later than one year before the applicable treatment compliance date in Section 611.1013;

   C) An annual watershed control program status report every 12 months, beginning one year after the applicable treatment compliance date in Section 611.1013; and

   D) A watershed sanitary survey report: for a CWS supplier, every three years beginning three years after the applicable treatment compliance date in Section 611.1013 or, for a non-CWS supplier, every five years beginning five years after the applicable treatment compliance date in Section 611.1013.

2) A supplier that uses the alternative source or intake management toolbox option must submit verification that it has relocated the intake or adopted the intake withdrawal procedure reflected in monitoring results no later than the applicable treatment compliance date in Section 611.1013.

3) A supplier that uses the presedimentation toolbox option must submit monthly verification of the information set forth in each of subsections (f)(3)(A) through (f)(3)(D), subject to the limitations of subsection (f)(3)(E).

   A) Continuous basin operation;

   B) Treatment of 100% of the flow;

   C) Continuous addition of a coagulant; and

   D) At least 0.5-log mean reduction of influent turbidity or compliance with alternative Agency-approved performance criteria.

E) Monthly reporting must occur within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in Section 611.1013.

4) A supplier that uses the two-stage lime softening toolbox option must submit monthly verification of the information set forth in each of subsections (f)(4)(A) and (f)(4)(B), subject to the limitations of subsection (f)(4)(C).

A) That chemical addition and hardness precipitation occurred in two separate and sequential softening stages prior to filtration; and

B) That both stages treated 100% of the plant flow.

C) Monthly reporting must occur within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in Section 611.1013.

5) A supplier that uses the bank filtration toolbox option must submit the following information on the indicated schedule:

A) An initial demonstration of the following no later than the applicable treatment compliance date in Section 611.1013:

i) The existence of unconsolidated, predominantly sandy aquifer; and

ii) A setback distance of at least 25 ft. (0.5-log credit) or 50 ft. (1.0-log credit).

B) If the monthly average of daily maximum turbidity is greater than 1 NTU, then the supplier must report that result and submit an assessment of the cause within 30 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in Section 611.1013.

6) A supplier that uses the combined filter performance toolbox option must submit monthly verification of combined filter effluent (CFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of the four-hour CFE measurements taken each month. Monthly reporting must occur within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in Section 611.1013.

7) A supplier that uses the individual filter performance toolbox option must submit monthly verification of the information set forth in each of subsections (f)(7)(A) and (f)(7)(B), subject to the limitations of subsection (f)(7)(C).

A) That individual filter effluent (IFE) turbidity levels were less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter; and

B) That no individual filter measured greater than 0.3 NTU in two consecutive readings 15 minutes apart.

C) Monthly reporting must occur within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in Section 611.1013.

8) A supplier that uses the demonstration of performance toolbox option must submit the information set forth in each of subsections (f)(8)(A) and (f)(8)(B) on the indicated schedule:

A) Results from testing following an Agency-approved protocol no later than the applicable treatment compliance date in Section 611.1013; and

B) As required by the Agency, monthly verification of operation within conditions of Agency approval for demonstration of performance credit within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in Section 611.1013.

9) A supplier that uses the bag filters and cartridge filters toolbox option must submit the information set forth in each of subsections (f)(9)(A) and (f)(9)(B) on the indicated schedule:

A) A demonstration, no later than the applicable treatment compliance date in Section 611.1013, that the following criteria are met:

i) It must demonstrate that the process meets the definition of bag or cartridge filtration; and

ii) It must demonstrate that the removal efficiency established through challenge testing that meets criteria in this Subpart Z; and

B) Monthly verification, within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in Section 611.1013, that 100% of plant flow was filtered.

10) A supplier that uses the membrane filtration toolbox option must submit the following information on the indicated schedule:

A) Results of verification testing no later than the applicable treatment compliance date in Section 611.1013 that demonstrate the following:

i) It must demonstrate that the removal efficiency established through challenge testing that meets criteria set forth in this Subpart Z; and

ii) It must demonstrate the integrity test method and parameters, including resolution, sensitivity, test frequency, control limits, and associated baseline; and

B) A monthly report within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in Section 611.1013, that summarizes the following:

i) It must summarize all direct integrity tests above the control limit; and

ii) If applicable, it must summarize any turbidity or alternative Agency-approved indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken.

11) A supplier that uses the second stage filtration toolbox option must submit monthly verification within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in Section 611.1013, that 100% of flow was filtered through both stages and that first stage was preceded by coagulation step.

12) A supplier that uses the slow sand filtration (as secondary filter) toolbox option must submit monthly verification within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in Section 611.1013, that both a slow sand filter and a preceding separate stage of filtration treated 100% of flow from Subpart B sources.

13) A supplier that uses the chlorine dioxide toolbox option must submit a monthly summary of CT values for each day within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in Section 611.1013, as described in Section 611.1020.

14) A supplier that uses the ozone toolbox option must submit a monthly summary of CT values for each day within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in Section 611.1013, as described in Section 611.1020.

15) A supplier that uses the UV toolbox option must submit the following information on the indicated schedule:

A) Validation test results no later than the applicable treatment compliance date in Section 611.1013, that demonstrate operating conditions that achieve required UV dose.

B) A monthly report summarizing the percentage of water entering the distribution system that was not treated by UV reactors operating within validated conditions for the required dose within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in Section 611.1013, as specified in Section 611.1020(d).

BOARD NOTE: Derived from 40 CFR 141.721 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

SUBPART AA: REVISED TOTAL COLIFORM RULE

Section 611.1053 General Monitoring Requirements for all PWSs

a) Sample siting plans.

1) A supplier must develop a written sample siting plan that identifies sampling sites and a sample collection schedule that are representative of water throughout the distribution system. These plans are subject to

Agency review and revision. The supplier must collect total coliform samples according to the written sample siting plan. Monitoring required by Sections 611.1054 through 611.1058 may take place at a customer's premises, a dedicated sampling station, or another designated compliance sampling location. Routine and repeat sample sites and any sampling points necessary to meet the requirements of Subpart S must be reflected in the sampling plan.

2) A supplier must collect samples at regular time intervals throughout the month, except that systems that use only ground water and serve 4,900 or fewer people may collect all required samples on a single day if they are taken from different sites.

3) A supplier must take at least the minimum number of required samples even if the system has had an E. coli MCL violation or has exceeded the coliform treatment technique triggers in Section 611.1059(a).

4) A supplier may conduct more compliance monitoring than is required by this Subpart AA to investigate potential problems in the distribution system and use monitoring as a tool to assist in uncovering problems. A supplier may take more than the minimum number of required routine samples and must include the results in calculating whether the coliform treatment technique trigger in Section 611.1059(a)(1)(A) and (a)(1)(B) has been exceeded only if the samples are taken in accordance with the existing sample siting plan and are representative of water throughout the distribution system.

5) A supplier must identify repeat monitoring locations in the sample siting plan. Unless the provisions of subsection (a)(5)(A) or (a)(5)(B) are met, the supplier must collect at least one repeat sample from the sampling tap where the original total coliform-positive sample was taken, and at least one repeat sample at a tap within five service connections upstream and at least one repeat sample at a tap within five service connections downstream of the original sampling site. If a total coliform-positive sample is at the end of the distribution system, or one service connection away from the end of the distribution system, the supplier must still take all required repeat samples. However, the Agency may grant a SEP ~~pursuant to Section 611.110~~ that allows an alternative sampling location in lieu of the requirement to collect at least one repeat sample upstream or downstream of the original sampling site. Except as provided for in subsection (a)(5)(B), a supplier required to conduct triggered source water monitoring under~~pursuant to~~ Section 611.802(a) must take ground water source samples in addition to repeat samples required under this Subpart AA.

A) A supplier may propose repeat monitoring locations to the Agency that the supplier believes to be representative of a pathway for contamination of the distribution system. A supplier may elect to specify either alternative fixed locations or criteria for selecting repeat sampling sites on a situational basis in a standard operating procedure (SOP) in its sample siting plan. The supplier must design its SOP to focus the repeat samples at locations that best verify and determine the extent of potential contamination of the distribution system area based on specific situations. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, modify the SOP or require alternative monitoring locations as the Agency determines is necessary.

B) A GWS supplier that serves 1,000 or fewer people may propose repeat sampling locations to the Agency that differentiate potential source water and distribution system contamination (e.g., by sampling at entry points to the distribution system). A GWS supplier that has a single well and which is required to conduct triggered source water monitoring may, as allowed by a SEP ~~issued pursuant to Section 611.110~~, take one of its repeat samples at the monitoring location required for triggered source water monitoring <u>under</u>~~pursuant to~~ Section 611.802(a). The supplier must justify an Agency determination that the sample siting plan remains representative of water quality in the distribution system. If approved by a SEP ~~issued pursuant to Section 611.110~~, the supplier may use that sample result to meet the monitoring requirements in both Section 611.802(a) and this Section.

i) If a repeat sample taken at the monitoring location required for triggered source water monitoring is E. coli-positive, the supplier has violated the E. coli MCL and must also comply with Section 611.802(a)(3). If a supplier takes more than one repeat sample at the monitoring location required for triggered source water monitoring, the supplier may reduce the number of additional source water samples required under Section 611.802(a)(3) by the number of repeat samples taken at that location that were not E. coli-positive.

ii) If a supplier takes more than one repeat sample at the monitoring location required for triggered source water monitoring under Section 611.802(a), and more than one repeat sample is E. coli-positive, the supplier has violated

the E. coli MCL and must also comply with Section 611.803(a)(1).

iii) If all repeat samples taken at the monitoring location required for triggered source water monitoring are E. coli-negative and a repeat sample taken at a monitoring location other than the one required for triggered source water monitoring is E. coli-positive, the supplier has violated the E. coli MCL, but is not required to comply with Section 611.802(a)(3).

6) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, review, revise, and approve, as appropriate, repeat sampling proposed by a supplier under~~pursuant to~~ subsections (a)(5)(A) and (a)(5)(B). The supplier must justify an Agency determination that the sample siting plan remains representative of the water quality in the distribution system. The Agency may determine that monitoring at the entry point to the distribution system (especially for undisinfected ground water systems) is effective to differentiate between potential source water and distribution system problems.

b) Special purpose samples. Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, must not be used to determine whether the coliform treatment technique trigger has been exceeded. Repeat samples taken under~~pursuant to~~ Section 611.1058 are not considered special purpose samples, and must be used to determine whether the coliform treatment technique trigger has been exceeded.

c) Invalidation of total coliform samples. A total coliform-positive sample invalidated under this subsection (c) does not count toward meeting the minimum monitoring requirements of this Subpart AA.

1) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, invalidate a total coliform-positive sample only if the conditions of subsection (c)(1)(A), (c)(1)(B), or (c)(1)(C) are met.

A) The laboratory establishes that improper sample analysis caused the total coliform-positive result.

B) The Agency, on the basis of the results of repeat samples collected as required under Section 611.1058(a), determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem. The Agency cannot

invalidate a sample on the basis of repeat sample results unless all repeat samples collected at the same tap as the original total coliform-positive sample are also total coliform-positive, and all repeat samples collected at a location other than the original tap are total coliform-negative (e.g., a Agency cannot invalidate a total coliform-positive sample on the basis of repeat samples if all the repeat samples are total coliform-negative, or if the system has only one service connection).

C) The Agency has substantial grounds to believe that a total coliform-positive result is due to a circumstance or condition that does not reflect water quality in the distribution system. In this case, the system must still collect all repeat samples required under Section 611.1058(a), and use them to determine whether a coliform treatment technique trigger in Section 611.1059 has been exceeded. To invalidate a total coliform-positive sample under this subsection (c)(1), the decision and supporting rationale must be documented in writing and approved and signed by the Agency, as a SEP ~~issued pursuant to Section 611.110~~. The Agency must make this document available to USEPA and the public. The written documentation must state the specific cause of the total coliform-positive sample, and what action the supplier has taken, or will take, to correct this problem. The Agency may not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative.

2) A laboratory must invalidate a total coliform sample (unless total coliforms are detected) if the sample produces a turbid culture in the absence of gas production using an analytical method where gas formation is examined (e.g., the multiple-tube fermentation technique), produces a turbid culture in the absence of an acid reaction in the presence-absence (P–A) coliform test, or exhibits confluent growth or produces colonies too numerous to count with an analytical method using a membrane filter (e.g., membrane filter technique). If a laboratory invalidates a sample because of such interference, the supplier must collect another sample from the same location as the original sample within 24 hours of being notified of the interference problem, and have it analyzed for the presence of total coliforms. The supplier must continue to re-sample within 24 hours and have the samples analyzed until it obtains a valid result. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, waive the 24-hour time limit on a case-by-case basis. Alternatively, the Agency or any interested person may file a petition for rulemaking, under~~pursuant to~~ Sections 27 and 28 of the Act [415 ILCS 5/27 and 28], to establish criteria

for waiving the 24-hour sampling time limit to use in lieu of case-by-case extensions.

BOARD NOTE: Derived from 40 CFR 141.853 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1054 Routine Monitoring Requirements for Non-CWSs That Serve 1,000 or Fewer People Using Only Groundwater

a) General.

1) This Section applies to non-CWS suppliers that use only groundwater (except groundwater under the direct influence of surface water, as defined in Section 611.102) and which serve 1,000 or fewer people.

2) Following any total coliform-positive sample taken under~~pursuant to~~ this Section, a supplier must comply with the repeat monitoring requirements and E. coli analytical requirements in Section 611.1058.

3) Once all monitoring required by this Section and Section 611.1058 for a calendar month has been completed, a supplier must determine whether any coliform treatment technique triggers specified in Section 611.1059 have been exceeded. If any trigger has been exceeded, the supplier must complete assessments as required by Section 611.1059.

4) For the purpose of determining eligibility for remaining on or qualifying for quarterly monitoring under the provisions of subsections (f)(4) and (g)(2), respectively, for transient non-CWS suppliers, the Agency may elect to not count monitoring violations under Section 611.1060(c)(1) if the missed sample is collected no later than the end of the monitoring period following the monitoring period in which the sample was missed. The supplier must collect the make-up sample in a different week than the routine sample for that monitoring period and should collect the sample as soon as possible during the monitoring period. The Agency may not use this provision under subsection (h). This authority does not affect the provisions of Sections 611.1060(c)(1) and 611.1061(a)(4) ~~of this Part~~.

b) Monitoring frequency for total coliforms. A supplier must monitor each calendar quarter that the supplier provides water to the public, except for a seasonal system supplier or as provided under subsections (c) through (h) and (j). A seasonal system supplier must meet the monitoring requirements of subsection (i).

c) Transition to this Subpart AA. The Agency must perform a special monitoring evaluation during each sanitary survey to review the status of the supplier's

system, including the distribution system, to determine whether the supplier is on an appropriate monitoring schedule. After the Agency has performed the special monitoring evaluation during each sanitary survey, the Agency may modify the supplier's monitoring schedule, as the Agency determines is necessary, or the Agency may allow the supplier to stay on its existing monitoring schedule, consistent with the provisions of this Section. The Agency may not allow a supplier to begin less frequent monitoring under the special monitoring evaluation unless the supplier has already met the applicable criteria for less frequent monitoring in this Section. For a seasonal system supplier on quarterly or annual monitoring, this evaluation must include review of the approved sample siting plan, which must designate the time periods for monitoring based on site-specific considerations (e.g., during periods of highest demand or highest vulnerability to contamination). The seasonal system supplier must collect compliance samples during these time periods.

d) Annual site visits. A supplier on annual monitoring, including a seasonal system supplier, must have an initial and recurring annual site visit by the Agency that is equivalent to a Level 2 assessment or an annual voluntary Level 2 assessment that meets the criteria in Section 611.1059(b) to remain on annual monitoring. The periodic required sanitary survey may be used to meet the requirement for an annual site visit for the year in which the sanitary survey was completed.

e) Criteria for annual monitoring. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, reduce the monitoring frequency for a well-operated GWS supplier from quarterly routine monitoring to no less than annual monitoring, if the supplier demonstrates that it meets the criteria for reduced monitoring in subsections (e)(1) through (e)(3), except for a supplier that has been on increased monitoring under the provisions of subsection (f). A supplier on increased monitoring under subsection (f) must meet the provisions of subsection (g) to go to quarterly monitoring and must meet the provisions of subsection (h) to go to annual monitoring.

1) The supplier's system has a clean compliance history for a minimum of 12 months;

2) The most recent sanitary survey shows that the supplier's system is free of sanitary defects or has corrected all identified sanitary defects, has a protected water source, and meets Agency-approved construction standards; and

3) The Agency has conducted an annual site visit within the last 12 months, and the supplier has corrected all identified sanitary defects. The supplier may substitute a Level 2 assessment that meets the criteria in Section 611.1059(b) for the Agency annual site visit.

f) Increased monitoring requirements for suppliers on quarterly or annual monitoring. A supplier on quarterly or annual monitoring that experiences any of the events identified in subsections (f)(1) through (f)(4) must begin monthly monitoring the month following the event. A supplier on annual monitoring that experiences the event identified in subsections (f)(5) must begin quarterly monitoring the quarter following the event. The supplier must continue monthly or quarterly monitoring until the requirements in subsection (g) for quarterly monitoring or subsection (h) for annual monitoring are met. A supplier on monthly monitoring for reasons other than those identified in subsections (f)(1) through (f)(4) is not considered to be on increased monitoring for the purposes of subsections (g) and (h).

1) The supplier's system triggers a Level 2 assessment or two Level 1 assessments under the provisions of Section 611.1059 in a rolling 12-month period.

2) The supplier's system has an E. coli MCL violation.

3) The supplier's system has a coliform treatment technique violation.

4) The supplier's system has two Subpart AA monitoring violations or one Subpart AA monitoring violation and one Level 1 assessment under the provisions of Section 611.1059 in a rolling 12-month period for a system on quarterly monitoring.

5) The supplier's system has one Subpart AA monitoring violation for a system on annual monitoring.

g) Requirements for returning to quarterly monitoring. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, reduce the monitoring frequency for a supplier on monthly monitoring triggered under subsection (f) to quarterly monitoring if the supplier's system meets the criteria in subsections (g)(1) and (g)(2).

1) Within the last 12 months, the supplier must have a completed sanitary survey or a site visit of its system by the Agency or a voluntary Level 2 assessment of its system by a party approved by the Agency, the supplier's system must be free of sanitary defects, and the supplier's system must have a protected water source; and

2) The supplier's system must have a clean compliance history for a minimum of 12 months.

h) Requirements for a supplier on increased monitoring to qualify for annual monitoring. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~,

reduce the monitoring frequency for a supplier on increased monitoring under subsection (f) if the supplier's system meets the criteria in subsection (g) and the criteria in subsections (h)(1) and (h)(2).

1) An annual site visit by the Agency and correction of all identified sanitary defects. The supplier may substitute a voluntary Level 2 assessment by a party approved by the Agency for the Agency annual site visit in any given year.

2) The supplier must have in place or adopt one or more of the following additional enhancements to the water system barriers to contamination:

A) Cross connection control, as approved by the Agency.

B) An operator certified by an appropriate Agency certification program or regular visits by a circuit rider certified by an appropriate Agency certification program.

C) Continuous disinfection entering the distribution system and a residual in the distribution system in accordance with criteria specified by the Agency.

D) Demonstration of maintenance of at least a four-log removal or inactivation of viruses as provided for under Section 141.403(b)(3).

E) Other equivalent enhancements to water system barriers as approved by the State.

i) Seasonal systems.

1) All seasonal system suppliers must demonstrate completion of an Agency-approved start-up procedure, which may include a requirement for startup sampling prior to serving water to the public.

2) A seasonal system supplier must monitor every month that it is in operation unless it meets the criteria in subsections (i)(2)(i) through (iii) to be eligible for monitoring less frequently than monthly, except as provided under subsection (c).

A) Seasonal a system supplier monitoring less frequently than monthly must have an approved sample siting plan that designates the time period for monitoring based on site-specific considerations (e.g., during periods of highest demand or highest

vulnerability to contamination). A seasonal system supplier must collect compliance samples during this time period.

B) To be eligible for quarterly monitoring, the supplier must meet the criteria in subsection (g).

C) To be eligible for annual monitoring, the supplier must meet the criteria under subsection (h).

3) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, exempt any seasonal system supplier from some or all of the requirements for seasonal system suppliers if the entire distribution system remains pressurized during the entire period that the supplier's system is not operating, except that a supplier that monitors less frequently than monthly must still monitor during the vulnerable period designated by the Agency.

j) Additional routine monitoring the month following a total coliform-positive sample. A supplier that collects samples on a quarterly or annual frequency must conduct additional routine monitoring the month following one or more total coliform-positive samples (with or without a Level 1 treatment technique trigger). The supplier must collect at least three routine samples during the next month, except that the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, waive this requirement if the conditions of subsection (j)(1), (j)(2), or (j)(3) are met. The supplier may either collect samples at regular time intervals throughout the month or may collect all required routine samples on a single day if samples are taken from different sites. The supplier must use the results of additional routine samples in coliform treatment technique trigger calculations under Section 611.1059(a).

1) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, waive the requirement to collect three routine samples the next month in which the supplier provides water to the public if the Agency, or an agent approved by the Agency, performs a site visit before the end of the next month in which the supplier's system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the Agency to determine whether additional monitoring or any corrective action is needed. The Agency cannot approve an employee of the supplier to perform this site visit, even if the employee is an agent approved by the Agency to perform sanitary surveys.

2) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, waive the requirement to collect three routine samples the next month in which the supplier provides water to the public if the Agency has determined why

the sample was total coliform-positive and has established that the supplier has corrected the problem or will correct the problem before the end of the next month in which the supplier's system serves water to the public. In this case, the Agency must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the Agency official who recommends such a decision, and make this document available to USEPA and public. The written documentation must describe the specific cause of the total coliform-positive sample and what action the supplier has taken or will take to correct this problem.

3) The Agency may not waive the requirement to collect three additional routine samples the next month in which the supplier's system provides water to the public solely on the grounds that all repeat samples are total coliform-negative. If the Agency determines that the supplier has corrected the contamination problem before the supplier takes the set of repeat samples required in Section 611.1058, and all repeat samples were total coliform-negative, the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, waive the requirement for additional routine monitoring the next month.

BOARD NOTE: Derived from 40 CFR 141.854 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1055 Routine Monitoring Requirements for CWSs That Serve 1,000 or Fewer People Using Only Groundwater

a) General.

1) This Section applies to CWS suppliers that use only ground water (except ground water under the direct influence of surface water, as defined in Section 611.102) and which serve 1,000 or fewer people.

2) Following any total coliform-positive sample taken under the provisions of this Section, the supplier must comply with the repeat monitoring requirements and E. coli analytical requirements in Section 611.1058.

3) Once all monitoring required by this Section and Section 611.1058 for a calendar month has been completed, the supplier must determine whether any coliform treatment technique triggers specified in Section 611.1059 have been exceeded. If any trigger has been exceeded, the supplier must complete assessments as required by Section 611.1059.

b) Monitoring frequency for total coliforms. The monitoring frequency for total coliforms is one sample per month, except as provided for under subsections (c) through (f).

c) Transition to Subpart AA. The Agency must perform a special monitoring evaluation during each sanitary survey to review the status of the supplier's system, including the distribution system, to determine whether the system is on an appropriate monitoring schedule. After the Agency has performed the special monitoring evaluation during each sanitary survey, the Agency may, by a SEP issued pursuant to Section 611.110, modify the supplier's monitoring schedule, as necessary. Alternatively, the Agency may allow the supplier to stay on its existing monitoring schedule, consistent with the provisions of this Section. The Agency may not allow a supplier to begin less frequent monitoring under the special monitoring evaluation unless the supplier has already met the applicable criteria for less frequent monitoring in this Section.

d) Criteria for reduced monitoring.

1) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, reduce the monitoring frequency from monthly monitoring to no less than quarterly monitoring if the supplier is in compliance with Agency-certified operator provisions and demonstrates that it meets the criteria in subsections (d)(1)(A) through (d)(1)(C). A supplier that loses its certified operator must return to monthly monitoring the month following that loss.

A) The supplier has a clean compliance history for a minimum of 12 months.

B) The most recent sanitary survey shows the supplier is free of sanitary defects (or has an approved plan and schedule to correct them and is in compliance with the plan and the schedule), has a protected water source, and meets Agency-approved construction standards.

C) The supplier meets at least one of the following criteria:

i) An annual site visit by the Agency that is equivalent to a Level 2 assessment or an annual Level 2 assessment by a party approved by the Agency and correction of all identified sanitary defects (or an approved plan and schedule to correct them and is in compliance with the plan and schedule).

ii) Cross connection control, as approved by the Agency.

iii) Continuous disinfection entering the distribution system and a residual in the distribution system in accordance with criteria specified by the Agency.

iv) Demonstration of maintenance of at least a 4-log removal or inactivation of viruses as provided for under Section 611.803(b)(3).

v) Other equivalent enhancements to water system barriers as approved by the Agency.

2) This subsection (d)(2) corresponds with 40 CFR 141.855(d)(2), which USEPA has marked "reserved." This statement maintains structural consistency with the corresponding federal provision.

e) Return to routine monthly monitoring requirements. A supplier on quarterly monitoring that experience any of the events in subsections (e)(1) through (e)(4) must begin monthly monitoring the month following the event. The supplier must continue monthly monitoring until it meets the reduced monitoring requirements in subsection (d).

1) The supplier triggers a Level 2 assessment or two Level 1 assessments in a rolling 12-month period.

2) The supplier has an E. coli MCL violation.

3) The supplier has a coliform treatment technique violation.

4) The supplier has two Subpart AA monitoring violations in a rolling 12-month period.

f) Additional routine monitoring the month following a total coliform-positive sample. A supplier collecting samples on a quarterly frequency must conduct additional routine monitoring the month following one or more total coliform-positive samples (with or without a Level 1 treatment technique trigger). A supplier must collect at least three routine samples during the next month, except that the Agency may, by a SEP issued under~~pursuant to~~ Section 611.110, waive this requirement if the conditions of subsection (f)(1), (f)(2), or (f)(3) are met. A supplier may either collect samples at regular time intervals throughout the month or may collect all required routine samples on a single day if samples are taken from different sites. A supplier must use the results of additional routine samples in coliform treatment technique trigger calculations.

1) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, waive the requirement to collect three routine samples the next month in which the

supplier's system provides water to the public if the Agency, or an agent approved by the Agency, performs a site visit before the end of the next month in which the supplier's system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the Agency to determine whether additional monitoring or any corrective action is needed. The Agency cannot approve an employee of the supplier to perform this site visit, even if the employee is an agent approved by the Agency to perform sanitary surveys.

2) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, waive the requirement to collect three routine samples the next month in which the supplier's system provides water to the public if the Agency has determined why the sample was total coliform-positive and has established that the supplier has corrected the problem or will correct the problem before the end of the next month in which the supplier's system serves water to the public. In this case, the Agency must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the Agency official who recommends such a decision, and make this document available to USEPA and the public. The written documentation must describe the specific cause of the total coliform-positive sample and what action the supplier has taken or will take to correct this problem.

3) The Agency may not waive the requirement to collect three additional routine samples the next month in which the supplier's system provides water to the public solely on the grounds that all repeat samples are total coliform-negative. If the Agency determines that the supplier has corrected the contamination problem before the supplier takes the set of repeat samples required in Section 611.1058, and all repeat samples were total coliform-negative, the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, waive the requirement for additional routine monitoring the next month.

BOARD NOTE: Derived from 40 CFR 141.855 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1056 Routine Monitoring Requirements for Subpart B Systems That Serve 1,000 or Fewer People

a) General.

1) The provisions of this Section apply to a Subpart B system supplier that serves 1,000 or fewer people.

2) Following any total coliform-positive sample taken under the provisions of this Section, a supplier must comply with the repeat monitoring requirements and E. coli analytical requirements in Section 611.1058.

3) Once all monitoring required by this Section and Section 611.1058 for a calendar month has been completed, a supplier must determine whether any coliform treatment technique triggers specified in Section 611.1059 have been exceeded. If any trigger has been exceeded, the supplier must complete assessments as required by Section 611.1059.

4) Seasonal system suppliers.

A) All seasonal system suppliers must demonstrate completion of an Agency-approved start-up procedure, which may include a requirement for start-up sampling prior to serving water to the public.

B) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, exempt any seasonal system supplier from some or all of the requirements for seasonal system suppliers if the supplier's entire distribution system remains pressurized during the entire period that the supplier's system is not operating.

b) Routine monitoring frequency for total coliforms. A Subpart B system supplier (including a consecutive system supplier) must monitor monthly. A supplier may not reduce monitoring.

c) Unfiltered Subpart B system suppliers. A Subpart B system supplier that does not practice filtration in compliance with Subparts B, R, X, and Z ~~of this Part~~ must collect at least one total coliform sample near the first service connection each day that the turbidity level of the source water, measured as specified in Section 611.532(b), exceeds 1 NTU. When one or more turbidity measurements in any day exceed 1 NTU, the supplier must collect this coliform sample within 24 hours after the first exceedance, unless the Agency determines that the supplier, for logistical reasons outside the supplier's control, cannot have the sample analyzed within 30 hours after collection, and the Agency identifies an alternative sample collection schedule. Sample results from the coliform monitoring required by this subsection (c) must be included in determining whether the coliform treatment technique trigger in Section 611.1059 has been exceeded.

BOARD NOTE: Derived from 40 CFR 141.856 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1057 Routine Monitoring Requirements for PWSs That Serve More Than 1,000 People

a) General.

1) The provisions of this Section apply to public water systems serving more than 1,000 persons.

2) Following any total coliform-positive sample taken under the provisions of this Section, the supplier must comply with the repeat monitoring requirements and E. coli analytical requirements in Section 611.1058.

3) Once all monitoring required by this Section and Section 611.1058 for a calendar month has been completed, a supplier must determine whether any coliform treatment technique triggers specified in Section 611.1059 have been exceeded. If any trigger has been exceeded, the supplier must complete assessments as required by Section 611.1059.

4) Seasonal systems.

A) A seasonal system supplier must demonstrate completion of an Agency-approved start-up procedure, which may include a requirement for start-up sampling prior to serving water to the public.

B) The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, exempt any seasonal system supplier from some or all of the requirements for seasonal system suppliers if the supplier's entire distribution system remains pressurized during the entire period that the supplier's system is not operating.

b) Monitoring frequency for total coliforms. The monitoring frequency for total coliforms is based on the population served by the supplier's system, as follows:

TOTAL COLIFORM MONITORING FREQUENCY FOR PUBLIC WATER SYSTEMS SERVING MORE THAN 1,000 PEOPLE

Population served	Minimum number of samples per month
1,001 to 2,500	2
2,501 to 3,300	3

3,301 to 4,100	4
4,101 to 4,900	5
4,901 to 5,800	6
5,801 to 6,700	7
6,701 to 7,600	8
7,601 to 8,500	9
8,501 to 12,900	10
12,901 to 17,200	15
17,201 to 21,500	20
21,501 to 25,000	25
25,001 to 33,000	30
33,001 to 41,000	40
41,001 to 50,000	50
50,001 to 59,000	60
59,001 to 70,000	70
70,001 to 83,000	80
83,001 to 96,000	90
96,001 to 130,000	100
130,001 to 220,000	120
220,001 to 320,000	150
320,001 to 450,000	180
450,001 to 600,000	210
600,001 to 780,000	240

780,001 to 970,000	270
970,001 to 1,230,000	300
1,230,001 to 1,520,000	330
1,520,001 to 1,850,000	360
1,850,001 to 2,270,000	390
2,270,001 to 3,020,000	420
3,020,001 to 3,960,000	450
3,960,001 or more	480

c) Unfiltered Subpart B systems. A Subpart B system supplier that does not practice filtration in compliance with Subparts B, R, X, and Z ~~of this Part~~ must collect at least one total coliform sample near the first service connection each day that the turbidity level of the source water, measured as specified in Section 611.532(b), exceeds 1 NTU. When one or more turbidity measurements in any day exceed 1 NTU, the supplier must collect this coliform sample within 24 hours after the first exceedance, unless the Agency determines that the supplier, for logistical reasons outside the supplier's control, cannot have the sample analyzed within 30 hours after collection, and the Agency identifies an alternative sample collection schedule. Sample results from this coliform monitoring must be included in determining whether the coliform treatment technique trigger in Section 611.1059 has been exceeded.

d) Reduced monitoring. A supplier may not reduce monitoring, except for a non-CWS supplier that uses only ground water (and not ground water under the direct influence of surface water) and which serves 1,000 or fewer people in some months and more than 1,000 persons in other months. In months when more than 1,000 persons are served, the supplier must monitor at the frequency specified in subsection (a). In months when the supplier serves 1,000 or fewer people, the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, reduce the monitoring frequency, in writing, to a frequency allowed under Section 611.1054 for a similarly situated supplier that always serves 1,000 or fewer people, taking into account the provisions in Section 611.1054(e) through (g).

BOARD NOTE: Derived from 40 CFR 141.857 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1058 Repeat Monitoring and E. coli Requirements

a) Repeat monitoring.

1) If a sample taken under Sections 611.1054 though 611.1057 is total coliform-positive, the supplier must collect a set of repeat samples within 24 hours after being notified of the positive result. The supplier must collect no fewer than three repeat samples for each total coliform-positive sample found. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, extend the 24- hour limit on a case-by-case basis if the supplier has a logistical problem in collecting the repeat samples within 24 hours that is beyond its control. Alternatively, the Agency may implement criteria for the supplier to use in lieu of case-by-case extensions. In the case of an extension, the Agency must specify how much time the supplier has to collect the repeat samples. The Agency cannot waive the requirement for a supplier to collect repeat samples in subsections (a)(1) through (a)(3).

2) The supplier must collect all repeat samples on the same day, except that the Agency may, by a SEP ~~issued pursuant to Section 611.110~~, allow a supplier with a single service connection to collect the required set of repeat samples over a three-day period or to collect a larger volume repeat samples in one or more sample containers of any size, as long as the total volume collected is at least 300 mℓ.

3) The supplier must collect an additional set of repeat samples in the manner specified in subsections (a)(1) through (a)(3) if one or more repeat samples in the current set of repeat samples is total coliform-positive. The supplier must collect the additional set of repeat samples within 24 hours after being notified of the positive result, unless the Agency extends the limit as provided in subsection (a)(1). The supplier must continue to collect additional sets of repeat samples until either total coliforms are not detected in one complete set of repeat samples or the supplier determines that a coliform treatment technique trigger specified in Section 611.1059(a) has been exceeded as a result of a repeat sample being total coliform-positive and notifies the Agency. If a trigger identified in Section 611.1059 is exceeded as a result of a routine sample being total coliform-positive, the supplier is required to conduct only one round of repeat monitoring for each total coliform-positive routine sample.

4) After a supplier collects a routine sample and before it learns the results of the analysis of that sample, if the supplier collects another routine sample from within five adjacent service connections of the initial sample, and the initial sample, after analysis, is found to contain total coliforms, then the

system may count the subsequent sample as a repeat sample instead of as a routine sample.

5) Results of all routine and repeat samples taken under Sections 611.1054 through 611.1058 not invalidated by the Agency must be used to determine whether a coliform treatment technique trigger specified in Section 611.1059 has been exceeded.

b) Escherichia coli (E. coli) testing.

1) If any routine or repeat sample is total coliform-positive, the supplier must analyze that total coliform-positive culture medium to determine if E. coli are present. If E. coli are present, the supplier must notify the Agency by the end of the day when the supplier is notified of the test result, unless the supplier is notified of the result after the Agency office is closed and the Agency does not have either an after-hours phone line or an alternative notification procedure, in which case the supplier must notify the Agency before the end of the next business day.

2) The Agency has the discretion to allow a supplier, on a case-by-case basis, to forego E. coli testing on a total coliform-positive sample if that supplier assumes that the total coliform-positive sample is E. coli-positive. Accordingly, the supplier must notify the Agency as specified in subsection (b)(1) and the provisions of Section 141.63(c) apply.

BOARD NOTE: Derived from 40 CFR 141.858 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.1059 Coliform Treatment Technique Triggers and Assessment Requirements for Protection Against Potential Fecal Contamination

a) Treatment technique triggers. A supplier must conduct assessments in accordance with subsection (b) after exceeding treatment technique triggers in subsections (a)(1) and (a)(2).

1) Level 1 treatment technique triggers.

A) For a supplier taking 40 or more samples per month, the supplier exceeds 5.0% total coliform-positive samples for the month.

B) For a supplier taking fewer than 40 samples per month, the supplier has two or more total coliform-positive samples in the same month.

C) The supplier fails to take every required repeat sample after any single total coliform-positive sample.

2) Level 2 treatment technique triggers.

A) An E. coli MCL violation, as specified in Section 611.1060(a).

B) A second Level 1 trigger as defined in subsection (a)(1), within a rolling 12-month period, unless the Agency, by a SEP ~~issued pursuant to Section 611.110~~, has determined a likely reason that the samples that caused the first Level 1 treatment technique trigger were total coliform-positive and has established that the supplier has corrected the problem.

C) For a supplier with approved annual monitoring, a Level 1 trigger in two consecutive years.

b) Requirements for assessments.

1) A supplier must ensure that Level 1 and Level 2 assessments are conducted in order to identify the possible presence of sanitary defects and defects in distribution system coliform monitoring practices. Level 2 assessments must be conducted by parties approved by the Agency.

2) When conducting assessments, the supplier must ensure that the assessor evaluates minimum elements that include review and identification of inadequacies in sample sites; sampling protocol; sample processing; atypical events that could affect distributed water quality or indicate that distributed water quality was impaired; changes in distribution system maintenance and operation that could affect distributed water quality (including water storage); source and treatment considerations that bear on distributed water quality, where appropriate (e.g., small ground water systems); and existing water quality monitoring data. The supplier must conduct the assessment consistent with any Agency directives that tailor specific assessment elements with respect to the size and type of the system and the size, type, and characteristics of the distribution system.

3) Level 1 assessments. A supplier must conduct a Level 1 assessment consistent with Agency requirements if the supplier exceeds one of the treatment technique triggers in subsection (a)(1).

A) The supplier must complete a Level 1 assessment as soon as practical after any trigger in subsection (a)(1). In the completed assessment form, the supplier must describe sanitary defects detected, corrective actions completed, and a proposed timetable

for any corrective actions not already completed. The assessment form may also note that no sanitary defects were identified. The supplier must submit the completed Level 1 assessment form to the Agency within 30 days after the supplier learns that it has exceeded a trigger.

B) If the Agency reviews the completed Level 1 assessment and determines that the assessment is not sufficient (including any proposed timetable for any corrective actions not already completed), the Agency must consult with the supplier. If the Agency, by a SEP ~~issued pursuant to Section 611.110~~, requires revisions after consultation, the supplier must submit a revised assessment form to the Agency on an agreed-upon schedule not to exceed 30 days from the date of the consultation.

C) Upon completion and submission of the assessment form by the supplier, the Agency must determine if the supplier has identified a likely cause for the Level 1 trigger and, if so, establish that the supplier has corrected the problem, or has included a schedule acceptable to the Agency for correcting the problem.

4) Level 2 assessments. A supplier must ensure that a Level 2 assessment consistent with Agency requirements is conducted if the supplier exceeds one of the treatment technique triggers in subsection (a)(2). The supplier must comply with any expedited actions or additional actions required by the Agency, by a SEP ~~issued pursuant to Section 611.110~~, in the case of an E. coli MCL violation.

A) The supplier must ensure that a Level 2 assessment is completed by the Agency or by a party approved by the Agency as soon as practical after any trigger in subsection (a)(2). The supplier must submit a completed Level 2 assessment form to the Agency within 30 days after the supplier learns that it has exceeded a trigger. The assessment form must describe sanitary defects detected, corrective actions completed, and a proposed timetable for any corrective actions not already completed. The assessment form may also note that no sanitary defects were identified.

B) The supplier may conduct Level 2 assessments if the supplier has staff or management with the certification or qualifications specified by the Agency unless otherwise directed by the Agency, by a SEP ~~issued pursuant to Section 611.110~~.

C) If the Agency reviews the completed Level 2 assessment and determines that the assessment is not sufficient (including any proposed timetable for any corrective actions not already completed), the Agency must consult with the system. If the Agency requires revisions after consultation, the supplier must submit a revised assessment form to the Agency on an agreed-upon schedule not to exceed 30 days.

D) Upon completion and submission of the assessment form by the supplier, the Agency must determine if the system has identified a likely cause for the Level 2 trigger and determine whether the supplier has corrected the problem, or has included a schedule acceptable to the Agency for correcting the problem.

c) Corrective action. A supplier must correct sanitary defects found through either Level 1 or 2 assessments conducted under subsection (b)~~.~~ For corrections not completed by the time of submission of the assessment form, the supplier must complete the corrective actions in compliance with a timetable approved by the Agency, by a SEP ~~issued pursuant to Section 611.110~~, in consultation with the supplier. The supplier must notify the Agency when each scheduled corrective action is completed.

d) Consultation. At any time during the assessment or corrective action phase, either the water supplier or the Agency may request a consultation with the other party to determine the appropriate actions to be taken. The supplier may consult with the Agency on all relevant information that may impact on its ability to comply with a requirement of this Subpart AA, including the method of accomplishment, an appropriate timeframe, and other relevant information.

BOARD NOTE: Derived from 40 CFR 141.859 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.APPENDIX G NPDWR Violations and Situations Requiring Public Notice

See note 1 at the end of this Appendix G for an explanation of the Agency's authority to alter the magnitude of a violation from that set forth in the following table.

	MCL/MRDL/TT violations[2]		Monitoring and testing procedure violations	
Contaminant	Tier of public notice required	Citation	Tier of public notice required	Citation

I. Violations of National Primary Drinking Water Regulations (NPDWR):[3]

A. Microbiological Contaminants

1a. Corresponding row 1a in appendix A to subpart Q to 40 CFR 141 no longer applies by its own terms. This statement maintains structural consistency with the federal regulations.				
1b. Total coliform (TT violations resulting from failure to perform assessments or corrective actions, monitoring violations, and reporting violations)	2	611.1060(b)(1)	3	611.1060(c)(1) 611.1060(d)(1)
1c. Seasonal system failure to follow State-approved start-up plan prior to serving water to the public or failure to provide certification to the Agency	2	611.1060(b)(2)	3	611.1060(d)(3)
2a. Corresponding row 2a in appendix A to subpart Q to 40 CFR 141 no longer applies by its own terms. This statement maintains structural consistency with the federal regulations.				
2b. E. coli (MCL, monitoring, and reporting violations)	1	611.1060(a)	3	611.1060(c), 611.1060(d)(2)

2c. E.coli (TT violations resulting from failure to perform Level 2 assessments or corrective action)	2	611.1060(b)(1)		
3. Turbidity MCL	2	611.320(a)	3	611.560
4. Turbidity MCL (average of two days' samples greater than 5 NTU)	[5] 2, 1	611.320(b)	3	611.560
5. Turbidity (for TT violations resulting from a single exceedance of maximum allowable turbidity level)	[6] 2, 1	611.231(b), 611.233(b)(1), 611.250(a)(2), 611.250(b)(2), 611.250(c)(2), 611.250(d), 611.743(a)(2), 611.743(b), 611.955(b)(2)	3	611.531(a), 611.532(b), 611.533(a), 611.744, 611.956(a)(1)-(a)(3), 611.956(b)
6. Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max. allowable turbidity level (TT)	2	611.211, 611.213, 611.220, 611.230-611.233, 611.240-611.242, 611.250	3	611.531-611.533
7. Interim Enhanced Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max. turbidity level (TT)	2	[7] 611.740-611.743, 611.950-611.955	3	611.742, 611.744, 611.953, 611.954, 611.956
8. Filter Backwash Recycling Rule violations	2	611.276(c)	3	611.276(b), (d)
9. Long Term 1 Enhanced Surface Water Treatment Rule violations	2	611.950-611.955	3	611.953, 611.954, 611.956

10. LT2ESWTR violations	2	611.1010-611.1020	[19] 2, 3	611.1001-611.1005 and 611.1008-611.1009
11. Groundwater Rule violations	2	611.804	3	611.802(h)

B. Inorganic Chemicals (IOCs)

1. Antimony	2	611.301(b)	3	611.600, 611.601, 611.603
2. Arsenic	2	611.301(b)	3	611.601, 611.603
3. Asbestos (fibers greater than 10 µm)	2	611.301(b)	3	611.600, 611.601, 611.602
4. Barium	2	611.301(b)	3	611.600, 611.601, 611.603
5. Beryllium	2	611.301(b)	3	611.600, 611.601, 611.603
6. Cadmium	2	611.301(b)	3	611.600, 611.601, 611.603
7. Chromium (total)	2	611.301(b)	3	611.600, 611.601, 611.603
8. Cyanide	2	611.301(b)	3	611.600, 611.601, 611.603
9. Fluoride	2	611.301(b)	3	611.600, 611.601, 611.603

10. Mercury (inorganic)	2	611.301(b)	3	611.600, 611.601, 611.603
11. Nitrate	1	611.301(b)	[8] 1, 3	611.600, 611.601, 611.604, 611.606
12. Nitrite	1	611.301(b)	[8] 1, 3	611.600, 611.601, 611.605, 611.606
13. Total Nitrate and Nitrite	1	611.301(b)	3	611.600, 611.601
14. Selenium	2	611.301(b)	3	611.600, 611.601, 611.603
15. Thallium	2	611.301(b)	3	611.600, 611.601, 611.603

C. Lead and Copper Rule (Action Level for lead is 0.015 mg/ℓ, for copper is 1.3 mg/ℓ)

1. Lead and Copper Rule (TT)	2	611.350-611.355	3	611.356-611.359

D. Synthetic Organic Chemicals (SOCs)

1. 2,4-D	2	611.311(c)	3	611.648
2. 2,4,5-TP (silvex)	2	611.311(c)	3	611.648
3. Alachlor	2	611.311(c)	3	611.648
4. Atrazine	2	611.311(c)	3	611.648
5. Benzo(a)pyrene (PAHs)	2	611.311(c)	3	611.648
6. Carbofuran	2	611.311(c)	3	611.648

7. Chlordane	2	611.311(c)	3	611.648
8. Dalapon	2	611.311(c)	3	611.648
9. Di(2-ethylhexyl)adipate	2	611.311(c)	3	611.648
10. Di(2-ethylhexyl)phthalate	2	611.311(c)	3	611.648
11. Dibromochloropropane (DBCP)	2	611.311(c)	3	611.648
12. Dinoseb	2	611.311(c)	3	611.648
13. Dioxin (2,3,7,8-TCDD)	2	611.311(c)	3	611.648
14. Diquat	2	611.311(c)	3	611.648
15. Endothall	2	611.311(c)	3	611.648
16. Endrin	2	611.311(c)	3	611.648
17. Ethylene dibromide	2	611.311(c)	3	611.648
18. Glyphosate	2	611.311(c)	3	611.648
19. Heptachlor	2	611.311(c)	3	611.648
20. Heptachlor epoxide	2	611.311(c)	3	611.648
21. Hexachlorobenzene	2	611.311(c)	3	611.648
22. Hexachlorocyclopentadiene	2	611.311(c)	3	611.648
23. Lindane	2	611.311(c)	3	611.648
24. Methoxychlor	2	611.311(c)	3	611.648
25. Oxamyl (Vydate)	2	611.311(c)	3	611.648
26. Pentachlorophenol	2	611.311(c)	3	611.648
27. Picloram	2	611.311(c)	3	611.648
28. Polychlorinated biphenyls (PCBs)	2	611.311(c)	3	611.648

29. Simazine	2	611.311(c)	3	611.648
30. Toxaphene	2	611.311(c)	3	611.648

E. Volatile Organic Chemicals (VOCs)

1. Benzene	2	611.311(a)	3	611.646
2. Carbon tetrachloride	2	611.311(a)	3	611.646
3. Chlorobenzene (monochlorobenzene)	2	611.311(a)	3	611.646
4. o-Dichlorobenzene	2	611.311(a)	3	611.646
5. p-Dichlorobenzene	2	611.311(a)	3	611.646
6. 1,2-Dichloroethane	2	611.311(a)	3	611.646
7. 1,1-Dichloroethylene	2	611.311(a)	3	611.646
8. cis-1,2-Dichloroethylene	2	611.311(a)	3	611.646
9. trans-1,2-Dichloroethylene	2	611.311(a)	3	611.646
10. Dichloromethane	2	611.311(a)	3	611.646
11. 1,2-Dichloropropane	2	611.311(a)	3	611.646
12. Ethylbenzene	2	611.311(a)	3	611.646
13. Styrene	2	611.311(a)	3	611.646
14. Tetrachloroethylene	2	611.311(a)	3	611.646
15. Toluene	2	611.311(a)	3	611.646
16. 1,2,4-Trichlorobenzene	2	611.311(a)	3	611.646
17. 1,1,1-Trichloroethane	2	611.311(a)	3	611.646
18. 1,1,2-Trichloroethane	2	611.311(a)	3	611.646
19. Trichloroethylene	2	611.311(a)	3	611.646

20. Vinyl chloride	2	611.311(a)	3	611.646
21. Xylenes (total)	2	611.311(a)	3	611.646

F. Radioactive Contaminants

1. Beta/photon emitters	2	611.330(d)	3	611.720(a), 611.732
2. Alpha emitters	2	611.330(c)	3	611.720(a), 611.731
3. Combined radium (226 and 228)	2	611.330(b)	3	611.720(a), 611.731
4. Uranium	2	611.330(e)	3	611.720(a), 611.731

G. Disinfection Byproducts (DBPs), Byproduct Precursors, Disinfectant Residuals. Where disinfection is used in the treatment of drinking water, disinfectants combine with organic and inorganic matter present in water to form chemicals called disinfection byproducts (DBPs). USEPA sets standards for controlling the levels of disinfectants and DBPs in drinking water, including trihalomethanes (THMs) and haloacetic acids (HAAs).[13]

1. Total trihalomethanes (TTHMs)	2	[11] 611.312(b)	3	Subparts W and Y
2. Haloacetic Acids (HAA5)	2	611.312(b)	3	Subpart Y
3. Bromate	2	611.312(a)	3	611.382(a)-(b)
4. Chlorite	2	611.312(a)	3	611.382(a)-(b)
5. Chlorine (MRDL)	2	611.313(a)	3	611.382(a), (c)
6. Chloramine (MRDL)	2	611.313(a)	3	611.382(a), (c)
7. Chlorine dioxide (MRDL), where any two consecutive daily samples at entrance to distribution system only are above MRDL	2	611.313(a), 611.383(c)(3)	2[12], 3	611.382(a), (c), 611.383(c)(2)

8. Chlorine dioxide (MRDL), where samples in distribution system the next day are also above MRDL	[13] 1	611.313(a), 611.383(c)(3)	1	611.382(a), (c), 611.383(c)(2)
9. Control of DBP precursors—TOC (TT)	2	611.385(a)-(b)	3	611.382(a), (d)
10. Benchmarking and disinfection profiling	N/A	N/A	3	611.742, 611.953, 611.954
11. Development of monitoring plan	N/A	N/A	3	611.382(f)

H. Other Treatment Techniques

1. Acrylamide (TT)	2	611.296	N/A	N/A
2. Epichlorohydrin (TT)	2	611.296	N/A	N/A

II. Unregulated Contaminant Monitoring: [14]

A. Unregulated contaminants	N/A	N/A	3	as required by USEPA pursuant to 40 CFR 141.40
B. Nickel	N/A	N/A	3	611.603, 611.611

III. Public Notification for Relief Equivalent to a SDWA section 1415 Variance or a section 1416 Exemption.

A. Operation under relief equivalent to a SDWA section 1415 variance or a section 1416 exemption	3	[15] 1415, 1416	N/A	N/A
B. Violation of conditions of relief equivalent to a SDWA section 1415 variance or a section 1416 exemption	2	1415, 1416, [16] 611.111, 611.112	N/A	N/A

IV. Other Situations Requiring Public Notification.

A. Fluoride secondary maximum contaminant level (SMCL) exceedance	3	611.858	N/A	N/A
B. Exceedance of nitrate MCL for a non-CWS supplier, as allowed by the Agency	1	611.300(d)	N/A	N/A
C. Availability of unregulated contaminant monitoring data	3	as required by USEPA pursuant to 40 CFR 141.40	N/A	N/A
D. Waterborne disease outbreak	1	611.101, 611.233(b)(2)	N/A	N/A
E. Other waterborne emergency[17]	1	N/A	N/A	N/A
F. Source water sample positive for Groundwater Rule fecal indicators: E. coli, enterococci, or coliphage	1	611.802(g)	N/A	N/A
G. Other situations as determined by the Agency by a SEP ~~issued pursuant to Section 611.110~~	[18] 1, 2, 3	N/A	N/A	N/A

Appendix G—Endnotes

1. Violations and other situations not listed in this table (e.g., failure to prepare Consumer Confidence Reports) do not require notice, unless otherwise determined by the Agency by a SEP ~~issued pursuant to Section 611.110~~. The Agency may, by a SEP ~~issued pursuant to Section 611.110~~, further require a more stringent public notice tier (e.g., Tier 1 instead of Tier 2 or Tier 2 instead of Tier 3) for specific violations and situations listed in this Appendix, as authorized under Sections 611.902(a) and 611.903(a).

2. Definition of the abbreviations used: "MCL" means maximum contaminant level, "MRDL" means maximum residual disinfectant level, and "TT" means treatment technique.

3. The term "violations of National Primary Drinking Water Regulations (NPDWR)" is used here to include violations of MCL, MRDL, treatment technique, monitoring, and testing

procedure requirements.

4. Failure to test for fecal coliform or E. coli is a Tier 1 violation if testing is not done after any repeat sample tests positive for coliform. All other total coliform monitoring and testing procedure violations are Tier 3 violations.

5. A supplier that violates the turbidity MCL of 5 NTU based on an average of measurements over two consecutive days must consult with the Agency within 24 hours after learning of the violation. Based on this consultation, the Agency may subsequently decide to issue a SEP ~~pursuant to Section 611.110~~ that elevates the violation to a Tier 1 violation. If a supplier is unable to make contact with the Agency in the 24-hour period, the violation is automatically elevated to a Tier 1 violation.

6. A supplier with a treatment technique violation involving a single exceedance of a maximum turbidity limit under the Surface Water Treatment Rule (SWTR), the Interim Enhanced Surface Water Treatment Rule (IESWTR), or the Long Term 1 Enhanced Surface Water Treatment Rule are required to consult with the Agency within 24 hours after learning of the violation. Based on this consultation, the Agency may subsequently decide to issue a SEP ~~pursuant to Section 611.110~~ that elevates the violation to a Tier 1 violation. If a supplier is unable to make contact with the Agency in the 24-hour period, the violation is automatically elevated to a Tier 1 violation.

7. The Surface Water Treatment Rule (SWTR) remains in effect for a supplier that serves at least 10,000 persons; the Interim Enhanced Surface Water Treatment Rule adds additional requirements and does not in many cases supersede the SWTR.

8. Failure to take a confirmation sample within 24 hours for nitrate or nitrite after an initial sample exceeds the MCL is a Tier 1 violation. Other monitoring violations for nitrate are Tier 3.

9. Failure to take a confirmation sample within 24 hours for nitrate or nitrite after an initial sample exceeds the MCL is a Tier 1 violation. Other monitoring violations for nitrate are Tier 3.

10. A Subpart B community or non-transient non-community system supplier must comply with new DBP MCLs, disinfectant MRDLs, and related monitoring requirements. A Subpart B transient non-community system supplier that serves10,000 or more persons that uses chlorine dioxide as a disinfectant or oxidant or a Subpart B transient non-community system supplier that serves fewer than 10,000 persons, which uses only groundwater not under the direct influence of surface water, and which uses chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL.

11. Sections 611.312(b)(1) and 611.382(a) and (b) apply until Subpart Y takes effect under the schedule set forth in Section 611.970(c).

12. Failure to monitor for chlorine dioxide at the entrance to the distribution system the day after exceeding the MRDL at the entrance to the distribution system is a Tier 2 violation.

13. If any daily sample taken at the entrance to the distribution system exceeds the MRDL for chlorine dioxide and one or more samples taken in the distribution system the next day exceed the MRDL, Tier 1 notification is required. A failure to take the required samples in the distribution system after the MRDL is exceeded at the entry point also triggers Tier 1 notification.

14. Some water suppliers must monitor for certain unregulated contaminants as required by USEPA under~~pursuant to~~ 40 CFR 141.40.

15. This citation refers to sections 1415 and 1416 of the federal Safe Drinking Water Act. sections 1415 and 1416 require that "a schedule prescribed . . . for a public water system granted relief equivalent to a SDWA section 1415 variance or a section 1416 exemption must require compliance by the system . . .."

16. In addition to sections 1415 and 1416 of the federal Safe Drinking Water Act, 40 CFR 142.307 specifies the items and schedule milestones that must be included in relief equivalent to a SDWA section 1415 small system variance. In granting any form of relief from an NPDWR, the Board will consider all applicable federal requirements for and limitations on the State's ability to grant relief consistent with federal law.

17. Other waterborne emergencies require a Tier 1 public notice under Section 611.902(a) for situations that do not meet the definition of a waterborne disease outbreak given in Section 611.101, but which still have the potential to have serious adverse effects on health as a result of short-term exposure. These could include outbreaks not related to treatment deficiencies, as well as situations that have the potential to cause outbreaks, such as failures or significant interruption in water treatment processes, natural disasters that disrupt the water supply or distribution system, chemical spills, or unexpected loading of possible pathogens into the source water.

18. The Agency may place any other situation in any tier it deems appropriate in writing, based on the prospective threat which it determines that the situation poses to public health, and subject to Board review under~~pursuant to~~ Section 40 of the Act.

19. A failure to collect three or more samples for Cryptosporidium analysis is a Tier 2 violation requiring special notice, as specified in Section 611.911. All other monitoring and testing procedure violations are Tier 3.

BOARD NOTE: Derived from appendix A to subpart Q of 40 CFR 141 (2016).

(Source: Amended at 42 Ill. Reg. _____, effective _____)

Section 611.TABLE C Frequency of RDC Measurement

System Size (Persons Served)			Samples per Day
500	or	fewer	1
501	to	1000	2
1001	to	2,500	3
2501	to	3,300	4

The day's samples cannot be taken at the same time. The sampling intervals are subject to Agency review and approval by a SEP ~~issued pursuant to Section 611.110~~.

BOARD NOTE: Derived from 40 CFR 141.74(b)(5) and (c)(2) (2012).

(Source: Amended at 42 Ill. Reg. _____, effective _____)