20 July 2015

PCH4

Re: R15-22 (Rulemaking – Water)
Public Water Supplies: Proposed Amendments to 35 Ill. Adm. Code Parts 601, 602, and 603
Submittal of Comments/Testimony for Second Hearing to be held August 17, 2015

John Therriault, Clerk
Illinois Pollution Control Board
100 W. Randolph Street, Suite 11-500
Chicago, IL 60601

ORIGINAL

Greetings:

I respectfully submit herewith two (2) copies of my comments/testimony for the referenced docket. I amended this document at 1:00 p.m. on this date. I plan to attend the hearing in Springfield on August 17, 2015.

I am forwarding a copy of my comments/testimony to W. David McMillan, P.G., at Illinois EPA in Springfield.

Please do not hesitate to contact me if you have any questions or wish to give further instructions. Thank you.

Sincerely yours,

Capt. Michael D. Curry, P.E.
803 South Paul Street
Nashville, IL 62263
Work ph. 618-327-8841
mcurry@curryassociates.com

cc with encl: W. David McMillan, P.G., Manager – IEPA Division of Public Water Supplies

PUBLIC WATER SUPPLIES: PROPOSED AMENDMENTS TO 35 ILL. ADM. CODE PARTS 601, 602, AND 603.
R15-22 (Rulemaking – Water)

SECOND HEARING, MONDAY, AUGUST 17, 2015 AT 10:00 A.M.,
IEPA, CHESTNUT ROOM, 1021 N. GRAND AVE. E., SPRINGFIELD, IL

COMMENTS SUBMITTED BY:

Capt. Michael D. Curry, P.E.
As an individual.
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SUBMITTAL DATE: 20 July 2015 (Amended 1:00 p.m. 20 July 2015)

A summary statement of my qualifications and experience is attached at the end of my comments.

PART 601, INTRODUCTION

601.105 Definition of "Official Custodian" … deleting "… ~~who has direct administrative responsibility for the supply~~." ***Who will have administrative responsibility?***

601.105 Definitions. ***Would it be appropriate to add definitions (and criteria?) for "critical review" and "restricted status"?***

601.115 Incorporation by Reference. At c) … No late amendment or editions of the materials listed in subsection (b) are incorporated. ***Except for the AWWA Standards, I agree, since any later amendments or editions of the materials are not subject to public review and comment through the Board.***

AWWA Standards are prepared by "committees" that include stakeholders representing the manufacturers, engineers, water operators, utilities, regulatory agencies, and others from the public sector. Therefore, I do not agree that it is necessary to exclude later amendments or editions of the AWWA Standards from the Board's regulations.

Recommended Standards for Water Works is prepared by the Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers. I do not question the qualifications or integrity of the "Public Health and Environmental Managers". I do note, however, that the document is not subject to public and/or outside peer review and

comment. Before any later amendments or editions are incorporated into the Board's regulations, it is my opinion that the document should be subject to public review and comment before becoming applicable in Illinois.

It is my understanding that the Agency's Division of Public Water Supplies intends to develop and publish the "Illinois Recommended Standards for Water Works", similar to the Agency's Division of Water Pollution Control development of the Illinois Recommended Standards for Sewage Works (Title 35: Environmental Protection; Subtitle C; Water Pollution; Chapter II: Environmental Protection Agency Part 370). Because of this, I am refraining from submitting comments on the 2012 edition of Recommended Standards for Water Works being recommended for adoption with this rule-making.

PART 602, PERMITS

602.104 Emergency Permits. *I commend the Board and the Agency for retaining this provision. I have personally been involved in requesting emergency permits to assist Public Water Supplies that needed this type of permit, and the Agency' responsiveness has been excellent.*

602.106 Restricted Status. *What specific capacity factors are to be used to determine restricted status? I respectfully recommend that capacity factors for determining restricted status be similar to my comments under 602.107.a).*

Once a PWS receives restricted status designation, it should be removed from that status after improvements have been completed to eliminate the capacity deficiency for any component(s) whose 80 percent capacity was exceeded.

If the PWS does not eliminate the capacity deficiency, can it be removed from restricted status if the 80 percent rate exceedance does not occur in a subsequent year? If a PWS elects to seek cooperation of its customers to reduce water use during peak periods in a subsequent calendar year, as an alternative to expending funds to increase raw water supply and/or treatment plant component capacity, I believe that they should be removed from restricted status.

> *I recall several years ago when it was reported that Madison, Wisconsin was able to postpone expenditures for capacity increase by obtaining the cooperation of its customers to alternate lawn watering days (such as even number street addresses could water lawns on Mondays, Wednesdays, and Fridays; odd number street addresses could water lawns on Tuesdays, Thursdays, and Saturdays; no lawn watering on Sundays).*

602.107. a) Critical Review. "... approaching a violation shall include, but not be limited to exceeding 80 percent of the rate of any of the quantity regulations used to make a restricted status determination ..." ***What time interval/duration is to be used for determination of the 80 percent rate exceedance? Does the 80 percent rate exceedance apply to one day of operation, one consecutive week of operation, or one month of operation? Prior discussions with the Agency implied that the 80 percent rate exceedance would be based on the average day during the maximum week (I presumed 7 consecutive days?) production period.***

I respectfully recommend that the 80 percent rate exceedance apply to average day treated raw water volume during the maximum consecutive seven day production period during any calendar year, except for high service pumps that deliver treated water from the treatment plant to the distribution system. I respectfully recommend that the 80 percent rate exceedance for the high service pumps apply to average day treated water pumpage into the distribution system during the maximum consecutive seven day production period during any calendar year.

Do "quantity regulations" include, for example, raw water or high serviced pump capacity with the largest unit out of service?

I respectfully recommend that the specific criteria be included with the Board's regulations, and the specific capacity criteria should be made available for public review prior to final adoption.

602.109 Fees. ***I have experienced a project where the Agency's Permit Section Engineer has requested submittal of fees for a raw water main. I respectfully recommend that clarification be added to indicate that fees apply only to mains carrying treated water within the distribution system, and to clarify that the fees do not apply to process piping and treated water mains at the treatment plant site.***

602.113 . c) Duration. ***I respectfully recommend that the algicide permits be issued for a fixed term of 5 years, and eliminate the "not to exceed" language. If the Board and Agency feel that a permit duration less than 5 years is needed, it would be helpful to identify the criteria that would be employed in the Agency's decision-making process to select a period less than 5 years.***

Lessening the frequency required to obtain an algicide permit is in the best interest of the public. Small systems seem to view the permitting process as an additional "hassle" due to expense and time for submitting and obtaining the permit. Many surface water supplies need to annually apply an algicide to minimize algae blooms that can adversely impact water quality in the following manner. My recent personal experience suggests that many small to medium size communities (up to the 5 mgd range) have increasingly discontinued algicide treatment of

their water supply impoundments. The reason for the decline in algicide use is not clear, but the permitting process may be a contributing factor?

I respectfully include the following information to support my concern about timely application of an algicide in surface water supply impoundments and the justification to request lessening the frequency of obtaining an algicide permit.

Compounds associated with objectionable taste and odor (geosmin, MIB) are caused by algae blooms. Algae decay products include phenolic compounds that also contribute to objectionable taste and odor.

Algae can release cyanotoxins into the water. Cyanotoxins may adversely impact public health, and USEPA is considering regulatory limitations for cyanotoxins in drinking water.

Blue-green algae are especially objectionable because they form micropollutant T&O (Taste & Odor) precursors such as geosmin (trans-1,10-dimethyl-trans-9-decalol) and MIB (2-methylisoborneol). Geosmin and MIB are metabolites of cyanobacteria (blue-green algae) and actinomycetes bacteria. Algae can form cyanotoxins (Microcystin-LR, Anatoxin-a, Cylindrospermospin) that can contribute to adverse health effects (damage neuromuscular systems, liver, kidneys, gastrointestinal system, and skin) if present at objectionable levels. USEPA has included cyanotoxins on the "contaminant candidate list" for potential establishment of an MCL (Maximum Contaminant Level) in drinking water. The WHO (World Health Organization) recommends that Microcystin-LR not exceed 1 ug/L (1 microgram/liter, or 1 part per billion). Enforceable limits of 1.5 ug/L and 1.0 ug/L have been established for Microcystin-LR by Canada, and by France and Poland, respectively.

A recent experience with cyanotoxins in Ohio called national attention to presence of the pollutant in drinking water. The City of Toledo issued a "do not use the water" warning to its 500,000 customers due to a bloom of blue-green algae and a "worrying" high level of algal cyanotoxins.

Algae are precursors that can contribute to formation of DBPs (Disinfection By-Products, including 4 trihalomethanes and 5 haloacetic acids that are regulated in drinking water). Algae is likely the greatest precursor associated with formation of DBPs during the growing season. (Ref. Controlling Disinfection By-Products and Microbial Contaminants in Drinking Water, EPA/600/R-01/110, December 2001. p. 3-4: Matthew L. Magnuson, Edward T. Urbansky, Kathleen M. Schenck, Michael S. Elovitz; p. 4-15: Michael Borst, Maureen Krudner, Marie L. O'Shea, Joyce M. Perdeck, Donald Reasoner, Michael D. Royer.)

Carbon dioxide is consumed from the raw water during algae's photosynthesis cycle, which increases pH. If pH is too high, coagulants containing aluminum become less

effective and soluble aluminum can pass through the filters to cause a violation of turbidity standards. Alum (aluminum sulfate) is a commonly-used coagulant, and it is most effective at pH 5.5 to 6.8 (and sometimes up to pH 7.5 depending on the degree of mineralization).

Supplemental Background Information

Scientists with the Illinois State Water Survey at the University of Illinois recommend that the pH of lakes used for public water supplies be maintained below 7.8 to minimize impact of algae with respect to algae growth and death. (Ref. "Using Copper Sulfate to Control Algae in Water Supply Impoundments", Miscellaneous Publication 111, Illinois State Water Survey.)

Photosynthesis is the process whereby organisms are able to grow utilizing the sun's radiant energy for fixation of atmospheric carbon dioxide and subsequently provide the reducing power to convert the carbon dioxide to organic compounds. The following represents the biochemical reactions that occur during photosynthesis and respiration by algae.

Photosynthesis:

Carbon Dioxide + Water ----------> Cells + Water + Oxygen

Carbon dioxide concentration is reduced and oxygen concentration is increased during daylight hours. As carbon dioxide concentration is reduced, the pH of the water is increased.

Respiration:
Cells + Oxygen ----------> Carbon Dioxide + Water
Oxygen is reduced and carbon dioxide concentration is increased in absence of light.
As carbon dioxide concentration is increased, the pH of the water is decreased.

In the presence of sunlight, respiration and photosynthesis can occur simultaneously in algae. However, the respiration rate is low compared with the photosynthesis rate, resulting in a net consumption of carbon dioxide and production of oxygen. (The pH increases.)

In the absence of sunlight, algal respiration continues while photosynthesis stops, resulting in a net consumption of oxygen and production of carbon dioxide. (The pH decreases.)

602.117 Existence of Permit No Defense. ***If a PWS constructs a project with all components in accord with the documents that formed the basis for the approved Construction Permit, how does this apply if the construction permit approved components not in compliance with Recommended Standards for Water Works?***

602.119 Revocations (of permits). ***If a construction permit is issued for a project component that does not comply with the Recommended Standards for Water Works, or absence of a required component, is the permit to be revoked?***

An example: A construction permit was issued for a clarification unit that did not comply with the Recommended Standards for Water Works, and the treatment plant project included only a single clearwell compartment for a plant using a surface water source. The non-conforming clarification unit subsequently delivered sub-standard performance which adversely impacted efficiency of the downstream filtration units. Recommended Standards for Water Works requires at least two separate clearwell compartments, but only one clearwell compartment was approved with the construction permit.

Is the permit to be revoked in this type of situation?

A path for corrective action needs to be identified?

602.200. b) 3) … permit required for adding new chemicals … ***Recently the Agency has indicated that a permit was not required since the "new chemical" was deemed by the Agency to be similar to a chemical that was already permitted. To me, "new chemical" means "new chemical", without exception, and a permit should be required?***

The Agency has issued "no permit required" letters for a change of chemical ("new chemical") that the Agency deemed to be similar to a previously permitted chemical – but I do

not understand the regulatory justification for waiving the permit requirement for the "new chemical".

There are numerous polymer coagulant aids on the market for use by Public Water Supplies, most of which are NSF-approved for drinking water applications. Having to obtain a permit for a routine change using an alternative NSF-approved polymer product is costly and delays the opportunity for the PWS to employ the different product that in some cases has the ability to improve water quality.

I respectfully recommend that the Board eliminate the construction permit requirement to use a different polymer coagulant aid chemical so long as the ROIC maintains adequate records demonstrating NSF-certification for the water treatment chemical being used in the coagulation process or as a filter-aid.

If permits are going to continue to be required and the Agency is to retain the right to waive the permit for "new chemicals similar to existing chemicals", the Board's regulations should address the procedures to be followed. Provisions for making routine product changes need to be incorporated, including the requirement for the ROIC to maintain records documenting that the product is NSF-certified for potable water supply applications.

602.200. c) 5) … permit is not needed for equivalent replacement of chemical feeders, pumps, controls, etc. ***I respectfully recommend that this be modified to read: "… is not needed for 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". (Emphasis added.) In some instances, a PWS may desire to replace a positive displacement chemical feed metering pump with a peristaltic pump with the same rated capacity, and it should not be necessary to obtain a permit for such a change so long as the rated capacity does not change.***

602.205. b) If preliminary plans are submitted, the documents shall include a description of alternate solutions, a discussion of the alternatives and reasons for selecting the alternative recommended.

The selection and review of alternate solutions is a matter that should not involve the State of Illinois. This is a local decision between the PWS and its consulting engineers. So long as the selected solution complies with the Board's regulations, the Agency should not intervene in the treatment process component or equipment selection process.

If the State of Illinois is providing financial assistance, then this requirement may be applicable to protect the State's financial interest in the project. Otherwise, alternative selection should not be subject to review by the State.

602.210. h) Construction Permit Applications. ***I respectfully request that "for new community water supplies" be inserted after the word specified. Section 602.103 applies only***

to new community water supplies and noting this requirement at 602.210.h) is simply an amplification.

602.225 Engineer's Report. ***I respectfully request that the following be incorporated: <u>The engineer's report requirements set forth in Section 1.1 of Recommended Standards for Water Works shall</u> <u>not be applicable.</u>***

The Agency may request a report for specific types of projects not listed in the regulations. Are there other types of projects that the Agency can identify now for inclusion with this regulation?

Submitting the engineer's report with the construction permit seems to be out of sequence, since the final plans and specifications for the project components also have to be submitted with the construction permit application. If a report is needed, it should be submitted for Agency review <u>before</u> proceeding with preparation of final plans and specifications that must accompany an application for a construction permit.

602.225. d) justification for the project where two or more solutions exist …
Comment for Section 602.205.b) also applies to this section.

602.225. e) 1) ***… should add requirement that the 100 year flood stage elevation and/or high water elevation of record be provided.***

> *Note: In many locations, the high water elevation of record is not available unless there is a USGS stream gaging station nearby. And, in many locations throughout the State, neither FEMA nor IDOT has established the 100 year flood stage elevation. It is my understanding that the Illinois State Water Survey (ISWS) will assist in determining the 100 year flood elevation for a nominal fee, so long as the entity requesting the elevation furnishes field survey information requested by the ISWS. The 100 year flood stage elevation can be obtained even though it may require additional time.*

602.225. e) 2) ***… should add requirement that the 100 year flood stage elevation and/or high water elevation of record be provided. See Note under 602.225. e) 1).***

602.225. f) ***… should add requirement that the 100 year flood stage elevation and/or high water elevation of record be provided. See Note under 602.225. e) 1).***

602.225. l) ***… suggest clarify that water plant waste treatment facilities be addressed in the report <u>only</u> for addition of a new process or an increase in treatment plant capacity.***

602.235 Specifications. ***Are the "Standard Specifications for Water and Sewer Main Construction in Illinois" acceptable for water main extensions? I respectfully***

recommend that use of the Standard Specifications remain permissible as part of the construction permit application for treated water mains, and this acceptability needs to be stated in the Board's regulations.

602.245. a) 3) *As a minimum, protection shall be provided from the 100 year flood stage elevation. The 100 year flood stage elevation may be higher than the flood of record, depending on the duration of river stage gaging. Flood stage records are not always available, especially at locations where USGS does not maintain a gaging station. The ISWS has assisted in determining the 100 year flood stage if it is not available through FEMA and/or IDOT.*

602.245. a) 12) *I respectfully request that the requirement to name the pump manufacturer be deleted. The name of the pump manufacturer may not be available until after receipt of competitive bids. The PWS should not be required to limit its purchasing options to a single manufacturer. For permitting, the pump capacity and duty condition (X gpm at Y total dynamic head) and compliance with applicable AWWA standards are the items of concern during permit review. The PWS should be able to have flexibility in selection of the manufacturer, and should not be tied-down to a single manufacturer named in a permit application.*

It is customary to utilize the "or equal" clause during the bidding process and for selecting major items of equipment. Bid forms are typically configured to solicit competitive bids from more than one manufacturer. If a PWS "sole sources" equipment selection, the costs are generally higher than if competitive bidding is sought from a pre-approved list of acceptable manufacturers.

602.250. f) *Suggest change to read the maximum flood stage elevation of record, or the 100 year flood stage elevation, whichever is higher, for sites subject to flooding.*

602.255. f) *Suggest change to read the maximum flood stage elevation of record, or the 100 year flood stage elevation, whichever is higher, for sites subject to flooding.*

602.260. b) 3) *Plans for treated water mains have historically <u>not</u> included profiles showing the elevations of the water mains. Adding this requirement will increase the cost to prepare engineering drawings without improving protection of public health. Profiles and/or elevation information are normally provided for major crossings at waterways, highways, and railroads.*

Plans for treated water mains should include elevation information (tied to USGS datum or an assumed project site datum) to illustrate that adequate vertical clearance is provided between treated water mains and pipes conveying sewage (wastewater from sanitary conveniences) and/or industrial wastewater.

The Agency's policy pertaining to horizontal and/or vertical clearances between treated water mains and road culverts/storm sewers should be subject to public review and comment and should be incorporated into the Board's regulations?

602.305. a) 1) *Is the Responsible Operator in Charge held responsible for assuring that adequate disinfection has been completed as demonstrated by satisfactory bacteriological samples? I know of instances where the Operator was never informed that disinfection procedures were being undertaken by the contractor and I know of instances where the contractor's water samples for bacteriological analyses were allegedly not taken from the new water mains.*

WHO SIGNS THE OPERATING PERMIT ON BEHALF OF THE PWS? Since the Operator is ultimately held responsible (?), I respectfully recommend that the ROIC signature be required on the operating permit application. If we expect the ROIC to be responsible for bacteriological water quality, the ROIC authority needs to be strengthened. Otherwise, there is no requirement for a signature by the PWS owner or official custodian?

602.310. c) 2) *"...other treatment component" is vague? I respectfully recommend adding reference to exceptions listed at 602.315.*

602.310. d) 1) *Are the samples to indicate no bacterial growth, or no coliform growth? "No bacterial growth" implies complete sterilization. I respectfully recommend that the language be clarified to be in unison with the Revised Total Coliform Rule promulgated by USEPA and likely to be adopted by the Board.*

602.405. Algicide Permit Applications. *Is the signature and seal of an Illinois Registered Professional Engineer required with the algicide permit application? I respectfully recommend that the ROIC be allowed to submit the algicide permit application without requiring an engineer's seal on the application, so long as clear guidance is provided for the ROIC to prepare the permit application and followup with proper procedures in use of the algicide.*

Perhaps a "standards of issuance" for algicide application permits could be developed to clearly guide the Water Operator's application calculations and procedures?

The Illinois State Water Survey has a publication titled "Using Copper Sulfate to Control Algae in Water Supply Impoundments" (Miscellaneous Publication 111) that contains authoritative information that could be incorporated into such a document.

In addition, the application instructions by the algicide product manufacturer should be incorporated into a PWS plan for algicide application..

If the ROIC is furnished with the appropriate guidance on algicide permit applications, then it should not be necessary for the PWS to pay for the services of a Registered Professional Engineer to prepare the application. In general, consulting engineers furnish minor technical assistance at no charge to their PWS clients, and they usually have these resources available to pass along to the ROIC.

The Agency has done an excellent job of furnishing application forms and related information that can be used to "fill in the blanks" in many instances, and perhaps a similar application packet could be developed for the algicide permit applications?

602.410. Sampling. ***What is to be done with the laboratory results? How long should the PWS retain the records? I respectfully recommend that the records of laboratory results be retained by the PWS for a minimum period of 5 years.***

I do not consider it necessary for the PWS to pay a certified lab to perform the copper tests since a spectrophotometer is usually available at surface water treatment plants that would be applying algicide treatment, and a spectrophotometer can be used for the copper testing. I respectfully recommend that the requirement to utilize a certified lab be deleted, and I respectfully recommend adding a requirement that testing for copper concentration be performed in accord with Standard Methods for Examination of Water and Wastewater.

PWS spectrophotometers are routinely used to monitor fluoride ion concentration, chlorine residual, iron, manganese, and other parameters, including copper concentration. Immediate onsite testing of copper can be performed by the ROIC, and delays associated with transporting samples to a private lab and waiting for the results can be eliminated.

602.505. Other Aquatic Pesticide Permit Application Contents. ***Is the signature and seal of an Illinois Registered Professional Engineer required with the aquatic pesticide permit application?***

End Comments

Summary Statement of Qualifications & Experience
Capt. Michael D. Curry, P.E.

I am 73 years of age, and I am a Registered Professional Engineer in Illinois by examination, in Missouri by reciprocity, and formerly in Iowa as a Civil Engineer by reciprocity and as a Sanitary Engineer by examination. I chose to allow my Iowa registrations to lapse in good standing because I did not intend to do further work in Iowa. I am an Illinois Class *A* Certified Water Operator. I attended Parkland College and the University of Illinois at Champaign-Urbana but did not obtain a degree.

I served on the Water Supply Operators Advisory Board from 1982 to 2000, an appointment by the Governor of Illinois with a recommendation from Illinois EPA. I was Chair of the Illinois Section of the American Water Works Association in 1983-84. In 1983, I received the Clifford E. Fore Award from Illinois Section American Water Works Association. In 1985, I received the Fuller Award from the Illinois Section American Water Works Association in 1985. I received an "award of excellence" from the Illinois Potable Water Supply Operators Association in 2000.

I was the recipient of a national award from American Water Works Association for the "Best Paper of the Year" in the Water Quality Division of Journal AWWA in 1984. I have published various papers in Journal AWWA, OPFLOW, Water & Sewage Works, Journal of Water Supply: Research and Technology (with Vernon L. Snoeyink etal), and other publications. I have presented technical papers pertaining to water treatment and water quality topics at numerous Illinois Section American Water Works Association section meetings, at numerous Illinois Potable Water Supply Operator Conferences, and at various other technical seminars on a nearly annual basis from 1977 through 2014.

In 1979, at the request of IEPA, I prepared the Outline for Advanced Waterworks Operator Courses offered at community colleges statewide, on a voluntary basis. In 1983, I and Sandy Moldovan prepared the Task Analysis for the IEPA Division Public Water Supply Operator Certification Section, covering Classes *D*, *C*, *B*, and *A*, on a voluntary basis. I was an instructor for water supply operator courses between 1970 and 1999 at Greenville College, John A. Logan College, Rend Lake College, Kaskaskia College, Southeastern Illinois College, Environmental Resources Training Center at Southern Illinois University-Edwardsville, and an advanced water operator class for Missouri DNR at the City of St. Louis, Missouri Howard Bend Water Treatment Plant (Missouri River source). Under contract with the Illinois Dept. of Conservation (now IDNR), I conducted various waterworks operations seminars at Starved Rock State Park and at Allerton House for statewide Park Rangers and Park Employees.

In 1980, I served as a "subject matter expert" and was a member of a five person panel from the U.S. and Canada to validate waterworks operation education and certification material for the Association of State Boards of Certification. This one week project at Upland, California was funded by USEPA.

Between 1961 to 1979 I was employed by Sherman Smith & Associates Engineers in Burlington, Iowa; DesMoines County Engineers in Burlington, Iowa; Clark Dietz Painter & Associates in

Urbana, Illinois; HMG Engineers in Carlyle, Illinois, including assignments in their St. Louis, Missouri and Libertyville, Illinois offices; Lawrence Lipe & Associates Engineers in Benton, Illinois; Group III Consultants in Salem, Illinois, including assignments in their Washington, Illinois and Effingham, Illinois offices.

I have been employed by Curry & Associates Engineers, Inc. at Nashville, Illinois from 1979 to date. My duties include design of water supply and wastewater treatment facilities. We routinely assist Water Operators and other engineers to address water quality and treatment problems.

At the request of IEPA in May 2008, I served as coordinator and member of a four person team that performed a Comprehensive Performance Evaluation (CPE) of the Macomb, Illinois water treatment plant that was experiencing persistent violations of the turbidity regulations for drinking water. We identified significant performance-limiting factors and recommended corrective action. The CPE is the first step in a two-step process developed by USEPA, known as "Composite Correction Program (CCP)", which was adopted by the Illinois Pollution Control Board as a regulatory requirement to address chronic violations of drinking water standards.

In 2010, the City of Carbondale requested that I serve as a Technical Advisor for the interview process to select a person to fill the position of Water Operations Manager. Assistance included preparation of standardized questions on how to solve water treatment process operational problems, to be answered by all applicants during the interview process. I participated in all interviews and assisted with evaluation of each applicant's qualifications and responses to the standardized questions.

I am a Life Member of the American Water Works Association and a Life Member of the American Society of Civil Engineers. I am a member of the Illinois Potable Water Supply Operators Association, the Southern Illinois Water Operators Association, the Southwest Central Water Plant Operators Association, and the Missouri Water & Wastewater Conference.

I hold a Merchant Marine 50 Ton Master's license issued by the United States Coast Guard, with a sailing endorsement. I earned a separate certification, by written examination, for Celestial "Ocean" Navigation 500/1600 Gross Tons.

- end -