Electronic Filing: Received, Clerk's Office 02/24/2023 P.C. #10

 From:
 McGill, Richard

 To:
 Brown, Don

 Cc:
 Horton, Vanessa

Subject: FW: R18-26 proposed first notice changes Date: Monday, February 27, 2023 5:02:55 PM

Attachments: <u>image001.png</u>

<u>35-604 Board responses.pdf</u> <u>35-604RG-P r01 (46-22).pdf</u>

Good evening, Mr. Clerk:

Please docket this email exchange with JCAR, including the two attachments, as a public comment in R18-26.

Thank you.

Richard R. McGill, Jr.
Senior Attorney for Research & Writing
Illinois Pollution Control Board
60 E. Van Buren St., Suite 630
Chicago, Illinois 60605
richard.mcgill@illinois.gov (312) 814-6983



From: McGill, Richard

Sent: Monday, February 27, 2023 4:51 PM **To:** Eastvold, Jonathan C. < Jonathan E@ilga.gov> **Subject:** RE: R18-26 proposed first notice changes

Good evening, Jonathan:

I've attached two documents. The first document contains Board staff responses to your proposed Part 604 changes emailed to me on June 24, 2022. The second document is the JCAR line-numbered r01 referenced in your changes and our responses. Our responses include related changes prompted by your suggestions.

Thank you for your careful review. Please let me know if you have any questions.

Best regards,

Richard

Richard R. McGill, Jr.
Senior Attorney for Research & Writing
Illinois Pollution Control Board
60 E. Van Buren St., Suite 630
Chicago, Illinois 60605

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richard.mcgill@illinois.gov (312) 814-6983



From: Eastvold, Jonathan C. < <u>Jonathan E@ilga.gov</u>>

Sent: Friday, June 24, 2022 9:39 AM

To: McGill, Richard < <u>Richard.McGill@illinois.gov</u>>

Subject: [External] R18-26 proposed first notice changes

Here are some possible technical changes, sorted by Part, for the Board to consider. Any of these changes that you wish to make can be simply copied into your first notice changes document.

Thanks in advance for your consideration.

Sincerely,

Jonathan C. Eastvold, Ph.D. Rules Analyst III

Illinois General Assembly
Joint Committee on Administrative Rules
700 Stratton Building
Springfield IL 62706
217-524-9010

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From: Eastvold, Jonathan C. <Jonathan E@ilga.gov>

Sent: Friday, June 24, 2022 9:39 AM

To: McGill, Richard < Richard. McGill@illinois.gov > **Subject:** [External] R18-26 proposed first notice changes

Here are some possible technical changes, sorted by Part, for the Board to consider. Any of these changes that you wish to make can be simply copied into your first notice changes document.

Thanks in advance for your consideration.

Sincerely,

Jonathan C. Eastvold, Ph.D. Rules Analyst III

Illinois General Assembly Joint Committee on Administrative Rules 700 Stratton Building Springfield IL 62706 217-524-9010

Board staff responses and related changes (2/27/23) appear in bold, red font below.

Rulemaking: Design, Operation and Maintenance Criteria (35 Ill. Adm. Code 604; 46

Ill. Reg. 8676)

Changes:

- 1. In lines 189 and 190, change "14-19" to "17".
 - a. Agree.
 - b. In line 6, after "OPERATION" add a comma.
 - c. In line 41, after "Piping" add a comma.
 - d. In line 178, strike "CROSS CONNECTIONS" and add "CROSS-

CONNECTIONS". See Section 601.105 ("cross-connection" is a defined term).

- e. In line 181, strike "Cross Connections" and add "<u>Cross-Connections</u>". *See* response 1(d).
- f. In lines 182, 183, and 184, strike "Cross Connection" and add "Cross-

Connection". See response 1(d).

- g. In line 199, after "Piping" add a comma.
- 2. In line 238, strike "smooth nosed" and add "smooth-nosed". a. Agree. Strike "18-inches" and add "18 inches". b. Agree.
- 3. In line 240, strike the comma. **Agree.**

- 4. In line 247, strike "corrosion resistant" and add "<u>corrosion-resistant</u>". **Agree.**
- 5. In line 251, after "valves" add a comma. Agree.
- 6. In line 265, after "drop" add a comma. Agree.
- 7. In line 266, after "jet" add a comma. Agree.
- 8. In line 269, after "water" add a comma. Agree.
- 9. In line 270, after "fatigue" add a comma. **Agree.**
- 10. In line 273, after "tape" add a comma. Agree.
- 11. In line 291, after "flanged" add a comma. **Agree.**
- 12. In line 327, strike "1½ inch" and add "1½-inch".

 Agree.
- 13. In lines 327-328, strike "corrosion resistant" and add "<u>corrosion-resistant</u>". **Agree.**
- 14. In line 342, strike "made" and add "<u>installed</u>". **Disagree. After "materials" add "<u>and</u>".**
- 15. In line 343, after "prevent" add "the". **Agree.**
- 16. In lines 355 and 360, after the subsection label add "<u>a</u>". **Agree.**
- 17. In line 367, after "status" add a comma. **Agree.**
- In lines 381, 383, and 385, after the subsection label add "an".
 Agree for lines 381 and 385. Disagree for line 383. In line 383, after the subsection label add "the".

- 19. In line 412, strike "settlers" and add "settler".

 Agree.
- 20. In line 425, strike "back siphonage" and add "back-siphonage". Agree.
- 21. In line 501, strike "cross connections" and add "cross-connections".

 Agree.
- 22. In line 538, after "with" add "<u>a</u>". **Agree.**
- 23. In line 547, strike "on site" and add "<u>on-site</u>". **Agree.**
- 24. In lines 552 and 564, after "solubility" add "of".

 Disagree. Other "less than" and "greater than" formulations in the rules do not add "of".
- 25. In line 566, strike "High density" and add "<u>High-density</u>". **Agree.**
- 26. In line 578, after "solubility" add "<u>of</u>". **Disagree.** *See* response 24.
- 27. In line 600, strike "where" and add "when". **Agree.**
- 28. In line 634, strike "prior to" and add "<u>before</u>". **Agree.**
- 29. In line 655, strike "high rate" and add "high-rate". Agree.
- 30. In line 656, strike "for". **Agree.**
- 31. In line 666, strike "six inch" and add "six-inch".

 Agree.
- 32. In line 667, strike "Agency approved cross connection" and add "<u>Agency-approved cross-connection</u>".

 Agree.
- 33. In line 674, strike "adjustable rate" and add "adjustable-rate". **a. Agree.**

b. In line 715, strike "cross connection" and add "cross-connection".

- 34. In line 718, after "arsenic" add a comma. **Agree.**
- 35. In line 724, strike "if connected to the treated water system,".

 Agree. Strike "back siphonage" and add "back-siphonage".
- 36. In line 725, after "device" add ", if connected to the treated water system".a. Agree.b. In line 730, strike "can" and add "may".
- 37. In line 734, strike "in" and add "<u>into</u>". **Agree.**
- 38. In line 759, strike "utilized" and add "<u>used</u>". **Agree.**
- 39. In line 772, strike "Cross Connection" and add "<u>Cross-Connection</u>". **Agree.**
- 40. In line 778, strike "back flow or back siphonage" and add "backflow or back-siphonage". **Agree.**
- 41. In line 781, delete "educator" and reinstate "eductor".

 Agree.
- 42. In line 809, after "on" add "the". **Agree.**
- 43. In line 830, strike "down flow" and add "downflow".

 Agree.
- 44. In line 832, after "systems" add a comma. a. Agree. After "to" add "the". b. Agree.
- 45. In line 838, after "rinse" add a comma.a. Agree.b. In line 839, strike "back siphonage" and add "back-siphonage".
- 46. In line 861, after "effluent" add a comma. Agree.
- 47. In line 871, strike "corrosion resistant" and add "corrosion-resistant".
 a. Agree.
 b. In line 873, strike "back siphonage" and add "back-siphonage".

48. In line 883, strike "corrosion resistant" and add "<u>corrosion-resistant</u>".

Agree.

Lines 1039-1040: Should the Manual of Water Supply Practices be properly incorporated by reference? No but the introductory signal "See" should be added before the citation, as in the preceding Board Note to indicate a supporting citation. At the beginning of line 1039, add "See".

- 49. In line 1042, after "on" add "the". **Agree.**
- 50. In line 1048, after "indicates" add "<u>a</u>". **Agree.**
- 51. In line 1053, after "indicates" add "<u>a</u>". **Agree.**
- 52. In line 1057, strike "is not applicable" and add "does not apply".

 Agree.
- 53. In line 1061, after "If" add "the". a. Agree. After "using" add "a". b. Agree.
- 54. In lines 1078, 1080, and 1082, add a semicolon at the end of the line.

 Agree.
- 55. In line 1093, after "with" add "the". Agree.
- 56. In line 1133, after "effluent" add a comma. Agree.
- 57. In line 1143, strike "corrosion resistant" and add "<u>corrosion-resistant</u>".

 Agree.
- 58. In line 1143, strike "back siphonage" and add "<u>back-siphonage</u>". **Agree (for line 1145).**
- 59. In lines 1157-1158, strike "corrosion resistant" and add "<u>corrosion-resistant</u>". **Agree.**
- 60. In line 1191, strike "Cross Connection" and add "<u>Cross-Connection</u>". **a. Agree.** After "rinse" add a comma. **b. Agree.**
- In line 1213, after "Detention" add a comma.a. Agree.b. In line 1218, after "ozone" add a comma.

- 62. In line 1230, after "vent" add a comma.

 Disagree. Strike "vent and access hatch" and add "vents, and access hatches".
- 63. In line 1237, after "per" add "the".a. Agree.b. In line 1258, strike "and/or" and add "or".
- 64. In line 1270, after "oxidation" add a comma.a. Agree.b. In line 1276, strike "and/or" and add "or".
- 65. In line 1278, after "manganese" add a comma. **Agree.**
- 66. In line 1298, strike "Corrosion resistant" and add "<u>Corrosion-resistant</u>". **Agree.**
- 67. In line 1309, after "coagulation" add a comma. **Agree.**
- 68. In line 1339, after "measure" add "the". **Agree.**
- 69. In line 1347, strike "in relation to" and add "<u>for the</u>". **Agree.**
- 70. In line 1350, after "in" add "<u>a</u>". **Agree.**
- 71. In line 1365, after "prevent" add "the". Agree.
- 72. In line 1388, strike "Cross connection" and add "<u>Cross-connection</u>". **Agree.**
- 73. In line 1396, strike "airgap" and add "air gap". Agree.
- 74. In line 1399, after "repair" add a comma. Agree.
- 75. In line 1445, after "powders" add a comma. Agree (for the second "powders").
- 76. In line 1448, strike "corrosion resistant" and add "corrosion-resistant".

Agree.

- 77. In line 1477, after "spillage" add a comma. **Agree.**
- 78. In line 1478, after "treatment" add a comma.

 Disagree. Strike the comma and add "or".
- 79. In line 1489, strike the comma. **a. Agree.** After "or" add ", if the liquid level can be observed in a gauge tube or through translucent sidewalls of the tank,". **b. Agree.**
- 80. In lines 1490-1491, strike "if liquid level can be observed in a gauge tube or through translucent sidewalls of the tank".

 Agree.
- 81. In line 1513, strike "color coded" and add "<u>color-coded</u>". **Agree.**
- 82. In line 1521, after "slip-proof" add a comma. **Agree.**
- 83. In lines 1521-1522, strike "well drained" and add "well-drained".

 Agree.
- 84. In line 1524, after "facilities" add a comma. Agree.
- 85. In line 1534, after "storage" add a comma.

 Agree (for the second "storage").
- 86. In line 1545, after "with" add "an". Agree.
- 87. In line 1547, after "appurtenances" add a comma.
 a. Agree.
 b. In line 1556, strike "CROSS CONNECTIONS" and add "CROSS-CONNECTIONS".
 - c. In line 1558, strike "Cross Connection" and add "Cross-Connection".
- 88. In lines 1560 and 1562, strike "cross connection" and add "<u>cross-connection</u>". **Agree.**
- 89. In line 1575, after "model" add a comma. Agree.
- 90. In line 1580, after "of' add "the".

Agree.

- 91. In line 1593, strike "Cross Connection" and add "<u>Cross-Connection</u>". **Agree.**
- 92. In line 1601, after "530" add "and https://www.siue.edu/ertc". Agree.
- 93. In line 1602, strike "cross connection" and add "cross-connection". **a. Agree.** Strike "device" and add "devices". **b. Agree.** Strike "hands on" and add "hands-on". **c. Agree.**
- 94. In line 1606, strike "complete and submit an application" and add "apply". Agree.
- 95. In line 1633, after "to" add "<u>an</u>". **Agree.**
- 96. In line 1634, after "revoked" add a comma. Agree.
- 97. In line 1640, after "flagrant' add a comma. Agree.
- 98. In line 1641, after "testing" add a comma. **a. Agree.** Strike "cross connection" and add "cross-connection". **b. Agree.**
- 99. In line 1658, strike "on the basis of" and add "<u>based on</u>". **Agree.**
- 100. In line 1661, strike "upon" and add "<u>on</u>". **Agree.**
- 101. In line 1667, strike "Request" and add "<u>A request</u>". **Agree.**
- 102. In line 1672, strike "Should a hearing be" and add "<u>If a hearing is</u>". **Agree.**
- 103. In line 1688, after "wellhouse" add a comma. **Agree.**

| 1 | | TITLE 35: ENVIRONMENTAL PROTECTION |
|----|---------|---|
| 2 | | SUBTITLE F: PUBLIC WATER SUPPLIES |
| 3 | | CHAPTER I: POLLUTION CONTROL BOARD |
| 4 | | |
| 5 | | PART 604 |
| 6 | | DESIGN, OPERATION AND MAINTENANCE CRITERIA |
| 7 | | |
| 8 | | SUBPART A: GENERAL PROVISIONS |
| 9 | | |
| 10 | Section | |
| 11 | 604.100 | Purpose |
| 12 | 604.105 | General Requirements |
| 13 | 604.110 | Location |
| 14 | 604.115 | Usage |
| 15 | 604.120 | Piping Identification |
| 16 | 604.125 | Automatic Equipment |
| 17 | 604.130 | Operational Testing Equipment |
| 18 | 604.135 | Repair Work and Emergency Operation |
| 19 | 604.140 | Nitrification Action Plan |
| 20 | 604.145 | Exceptions for Community Water Supplies |
| 21 | 604.150 | Protection of Community Water Supply Structures |
| 22 | 604.155 | Electrical Controls and Standby Power |
| 23 | 604.160 | Safety |
| 24 | 604.165 | Monthly Operating Report |
| 25 | 604.170 | Security |
| 26 | | |
| 27 | | SUBPART B: SOURCE DEVELOPMENT |
| 28 | | |
| 29 | Section | |
| 30 | 604.200 | General Requirements |
| 31 | 604.205 | Surface Water Quantity |
| 32 | 604.210 | Surface Water Quality |
| 33 | 604.215 | Surface Water Structures |
| 34 | 604.220 | Invasive Mussel Control |
| 35 | 604.225 | Reservoirs |
| 36 | 604.230 | Groundwater Quantity |
| 37 | 604.235 | Groundwater Quality |
| 38 | 604.240 | General Well Construction |
| 39 | 604.245 | Well Testing and Records |
| 40 | 604.250 | Aquifer Types and Construction Methods |
| 41 | 604.255 | Well Pumps, Discharge Piping and Appurtenances |
| 42 | | |
| 43 | | SUBPART C: SOURCE WATER PROTECTION PLAN |

| 4.4 | | |
|----------|---------|---|
| 44 45 | Castian | |
| | Section | Dumass |
| 46 | 604.300 | Purpose Savrag Water Protection Plan Requirement and Contents |
| 47 | 604.305 | Source Water Protection Plan Requirement and Contents |
| 48 | 604.310 | Vision Statement |
| 49 | 604.315 | Source Water Assessment |
| 50 | 604.320 | Source Water Protection Plan Objectives |
| 51 | 604.325 | Action Plan |
| 52 | 604.330 | Submission |
| 53 | 604.335 | Agency Approval |
| 54 | 604.340 | Evaluation and Revision |
| 55 | | |
| 56 | | SUBPART D: AERATION |
| 57 | | |
| 58 | Section | |
| 59 | 604.400 | General Requirements for Aeration |
| 60 | 604.405 | Forced or Induced Draft Aeration |
| 61 | 604.410 | Spray Aeration |
| 62 | 604.415 | Pressure Aeration |
| 63 | 604.420 | Packed Tower Aeration |
| 64 | 604.425 | Other Methods of Aeration |
| 65 | | |
| 66 | | SUBPART E: CLARIFICATION |
| 67 | | |
| 68 | Section | |
| 69 | 604.500 | General Clarification Requirements |
| 70 | 604.505 | Coagulation |
| 71 | 604.510 | Flocculation |
| 72 | 604.515 | Sedimentation |
| 73 | 604.520 | Solids Contact Unit |
| 74 | 604.525 | Tube or Plate Settlers |
| 75 | 604.530 | Other High Rate Clarification Processes |
| 76 | | <u> </u> |
| 77 | | SUBPART F: FILTRATION |
| 78 | | |
| 79 | Section | |
| 80 | 604.600 | Filtration |
| 81 | 604.605 | Rapid Rate Gravity Filters |
| 82 | 604.610 | Rapid Rate Pressure Filters |
| 83 | 604.615 | Deep Bed Rapid Rate Gravity Filters |
| 84 | 604.620 | Biologically Active Filtration |
| 85 | | |
| 86 | | SUBPART G: DISINFECTION |
| | | |

| 0.5 | | |
|-----|----------|---|
| 87 | | |
| 88 | Section | |
| 89 | 604.700 | Disinfection Requirement |
| 90 | 604.705 | Chlorination Equipment |
| 91 | 604.710 | Points of Application |
| 92 | 604.715 | Contact Time |
| 93 | 604.720 | Inactivation of Pathogens |
| 94 | 604.725 | Residual Chlorine |
| 95 | 604.730 | Continuous Chlorine Analyzers |
| 96 | 604.735 | Chlorinator Piping |
| 97 | | |
| 98 | | SUBPART H: SOFTENING |
| 99 | | |
| 100 | Section | |
| 101 | 604.800 | Lime or Lime-soda Process |
| 102 | 604.805 | Cation Exchange Process |
| 103 | | |
| 104 | | SUBPART I: STABILIZATION |
| 105 | | |
| 106 | Section | |
| 107 | 604.900 | General Stabilization Requirements |
| 108 | 604.905 | Carbon Dioxide Addition |
| 109 | 604.910 | Phosphates |
| 110 | 604.915 | Split Treatment |
| 111 | | |
| 112 | | SUBPART J: OTHER TREATMENT |
| 113 | | |
| 114 | Section | |
| 115 | 604.1000 | Presedimentation |
| 116 | 604.1005 | Anion Exchange |
| 117 | 604.1010 | Iron and Manganese Control |
| 118 | 604.1015 | Taste and Odor Control |
| 119 | 604.1020 | Powdered Activated Carbon |
| 120 | | |
| 121 | | SUBPART K: CHEMICAL APPLICATION |
| 122 | | |
| 123 | Section | |
| 124 | 604.1100 | General Chemical Application Requirements |
| 125 | 604.1105 | Feed Equipment and Chemical Storage |
| 126 | 604.1110 | Protective Equipment |
| 127 | 604.1115 | Chlorine Gas |
| 128 | 604.1120 | Acids and Caustics |
| 129 | 604.1125 | Chlorine Dioxide |
| | | |

| 130 | 604.1130 | Sodium Chlorite |
|-----|----------|---|
| 131 | 604.1135 | Sodium Hypochlorite |
| 132 | 604.1140 | Ammonia |
| 133 | 604.1145 | Potassium Permanganate |
| 134 | 604.1150 | Fluoride |
| 135 | | |
| 136 | | SUBPART L: PUMPING FACILITIES |
| 137 | | |
| 138 | Section | |
| 139 | 604.1200 | General |
| 140 | 604.1205 | Pumping Stations |
| 141 | 604.1210 | Pumps |
| 142 | 604.1215 | Booster Pumps |
| 143 | 604.1219 | Automatic and Remote-Controlled Stations |
| 144 | 604.1225 | Appurtenances |
| 145 | 004.1223 | Appurchances |
| 146 | | SUBPART M: STORAGE |
| 147 | | SODIARI M. STORAGE |
| 148 | Section | |
| 149 | 604.1300 | General Storage Requirements |
| 150 | 604.1305 | Overflow |
| 151 | 604.1310 | Access to Water Storage Structures |
| 152 | 604.1315 | Vents |
| 153 | 604.1313 | Level Controls |
| 154 | 604.1325 | Roof and Sidewalls |
| | | |
| 155 | 604.1330 | Painting and Cathodic Protection |
| 156 | 604.1335 | Treatment Plant Storage |
| 157 | 604.1340 | Elevated Storage |
| 158 | 604.1345 | Hydropneumatic Storage |
| 159 | 604.1350 | Combination Pressure Tanks and Ground Storage |
| 160 | | |
| 161 | | SUBPART N: DISTRIBUTION |
| 162 | ~ . | |
| 163 | Section | |
| 164 | 604.1400 | General Distribution System Requirements |
| 165 | 604.1405 | Installation of Water Mains |
| 166 | 604.1410 | Materials |
| 167 | 604.1415 | System Design |
| 168 | 604.1420 | Valves |
| 169 | 604.1425 | Hydrants |
| 170 | 604.1430 | Air Relief Valves |
| 171 | 604.1435 | Valve, Meter and Blow Off Chambers |
| 172 | 604.1440 | Sanitary Separation for Finished Water Mains |
| | | |

| | 1st Notic | <u>e</u> | | JCAR350604-2208676r01 | | | | | |
|-----|---|----------|---|-------------------------------------|--|--|--|--|--|
| 173 | 604.1445 | Sanita | ary Separation for Raw Water Mains | | | | | | |
| 174 | 604.1450 | | | | | | | | |
| 175 | 604.1450 Surface Water Crossings 604.1455 Water Service Line | | | | | | | | |
| 176 | 604.1460 | Water | Loading Stations | | | | | | |
| 177 | | | | | | | | | |
| 178 | | | SUBPART O: CROSS CONNE | ECTIONS | | | | | |
| 179 | | | | | | | | | |
| 180 | Section | | | | | | | | |
| 181 | 604.1500 | Cross | Connections | | | | | | |
| 182 | 604.1505 | Cross | Connection Control Program | | | | | | |
| 183 | 604.1510 | | Connection Control Device Inspectors | | | | | | |
| 184 | 604.1515 | Agen | cy Approved Cross Connection Control | Measures | | | | | |
| 185 | 604.1520 | | D-19 Emergency Provisions (Repealed | | | | | | |
| 186 | | | | _ | | | | | |
| 187 | 604.TABLE | A | Steel Pipe | | | | | | |
| 188 | | | • | | | | | | |
| 189 | AUTHORIT | Y: Imp | lementing Section 14-19 and authorized | by Section 27 of the Illinois | | | | | |
| 190 | Environmenta | al Prote | ction Act [415 ILCS 5/14-19 and 27]. | • | | | | | |
| 191 | | | | | | | | | |
| 192 | SOURCE: A | dopted | in R18-17 at 43 Ill. Reg. 8064, effectiv | e July 26, 2019; emergency | | | | | |
| 193 | amendment in | n R20-2 | 0 at 44 Ill. Reg. 7777, effective April 1 | 7, 2020, for a maximum of 150 days; | | | | | |
| 194 | | | at 44 III. Reg. 14736, effective August 2 | | | | | | |
| 195 | | | ective | | | | | | |
| 196 | _ | | | | | | | | |
| 197 | | | SUBPART B: SOURCE DEVEL | LOPMENT | | | | | |
| 198 | | | | | | | | | |
| 199 | Section 604.2 | 255 W | ell Pumps, Discharge Piping and App | ourtenances | | | | | |
| 200 | | | | | | | | | |
| 201 | a) | Wher | e line shaft pumps are used: | | | | | | |
| 202 | | | | | | | | | |
| 203 | | 1) | the casing must be firmly connected t | o the pump structure or have the | | | | | |
| 204 | | , | casing inserted into a recess extending | | | | | | |
| 205 | | | base; | 1 1 | | | | | |
| 206 | | | | | | | | | |
| 207 | | 2) | the pump foundation and base must b | e at least six inches above the | | | | | |
| 208 | | , | finished floor elevation; and | | | | | | |
| 209 | | | • | | | | | | |
| 210 | | 3) | lubricants must comply with Section | 604.105(f). | | | | | |
| 211 | | • | • • | | | | | | |
| 010 | 1. | X X 71 | 1 '11 ' 1 | | | | | | |

Where a submersible pump is used:

b)

212213

1st Notice JCAR350604-2208676r01 214 1) the top of the casing must be effectively sealed to prohibit the entrance of 215 water under all conditions of vibration or movement of conductors or 216 cables; 217 218 2) the electrical cable must be firmly attached to the riser pipe at 20-foot 219 intervals or less; and 220 221 3) mercury seals must not be used when an existing submersible pump is 222 replaced or a new submersible pump is installed. 223 224 c) Discharge Piping 225 226 1) The discharge piping for each well must: 227 228 A) be designed to minimize friction loss; 229 230 B) be equipped with a check valve in or at the well, a shutoff valve, a 231 pressure gauge, and a means of measuring flow; 232 233 C) be protected from the entrance of contamination; 234 235 D) have control valves and appurtenances located above the 236 pumphouse floor when an above-ground discharge is provided; 237 238 be equipped with a smooth nosed sampling tap at least 18-inches E) 239 above the floor to facilitate sample collection, located at a point 240 where positive pressure is maintained, but before any treatment 241 chemicals are applied; 242 243 F) when necessary to remove entrapped air from the well, be 244 equipped with an air release-vacuum relief valve located upstream from the check valve, with exhaust/relief piping terminating in a 245 246 down-turned position at least 18 inches above the floor and covered with a 24 mesh, corrosion resistant screen; 247 248 249 G) be valved to permit test pumping and control of each well; 250 251 H) have all exposed piping, valves and appurtenances protected 252 against physical damage and freezing; 253 254 I) be anchored to prevent movement and be supported to prevent excessive bending forces; 255

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1st Notice JCAR350604-2208676r01 257 J) be protected against surge or water hammer; and 258 259 K) be constructed so that it can be disconnected from the well or well pump to allow the well pump to be pulled. 260 261 262 The well must have a means of pumping to waste that is not directly 2) 263 connected to a sewer. 264 265 3) The discharge, drop or column piping inside the well for submersible, submersible jet and submersible line shaft pumps must: 266 267 268 A) be capable of supporting the weight of the submersible pump, 269 piping, water and appurtenances, and of withstanding the thrust, 270 torque, torque fatigue and other reaction loads created during 271 pumping; and 272 273 B) use lubricants, fittings, brackets, tape or other appurtenances that 274 comply with Section 604.105(f). 275 Pitless Well Units 276 d) 277 278 1) Pitless units must: 279 280 A) be shop-fabricated from the point of connection with the well 281 casing to the unit cap or cover; 282 283 B) be threaded or welded to the well casing; 284 285 C) be of watertight construction throughout; 286 287 be of materials and weight at least equivalent and compatible to the D) 288 casing; 289 290 have field connection to the lateral discharge from the pitless unit E) 291 of threaded, flanged or mechanical joint connection; and 292 293 terminate at least 18 inches above final ground elevation or three F) 294 feet above the 100-year flood level or the highest known flood 295 elevation, whichever is higher. 296 297 The design of the pitless unit must make provision for: 2) 298 299 A) access to disinfect the well;

1st Notice JCAR350604-2208676r01 300 301 B) a properly constructed casing vent meeting the requirements of 302 subsection (e); 303 304 facilities to measure water levels in the well, under subsection (f); C) 305 306 D) a cover at the upper terminal of the well that will prevent the 307 entrance of contamination: 308 309 E) a contamination-proof entrance connection for electrical cable; 310 311 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 312 313 314 G) at least one check valve within the well casing. 315 316 3) If the connection to the casing is by field weld, the shop-assembled unit 317 must be designed specifically for field welding to the casing. The only 318 field welding permitted will be that needed to connect a pitless unit to the 319 casing. 320 321 Casing Vent e) 322 323 1) Well casing must be vented to the atmosphere. 324 325 2) The vent must terminate in a downturned position, at or above the top of 326 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 327 328 resistant screen. 329 330 The pipe connecting the casing to the vent must be of adequate size to 3) 331 provide rapid venting of the casing. 332 333 Where vertical turbine pumps are used, vents may be placed into the side 4) 334 of the casing. 335 336 f) Water Level Measurement 337 338 Each well must be equipped with a means for taking water level 1) 339 measurements.

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1st Notice JCAR350604-2208676r01 341 2) Where pneumatic water level measuring equipment is used, it must be 342 made using corrosion-resistant materials attached firmly to the drop pipe 343 or pump column to prevent entrance of foreign materials. 344 345 Observation wells must meet the requirements in 77 Ill. Adm. Code 920.170. g) 346 (Source: Amended at 46 Ill. Reg. _____, effective 347 348 349 SUBPART C: SOURCE WATER PROTECTION PLAN 350 351 Section 604.315 Source Water Assessment 352 353 The source water assessment must contain the following information: a) 354 355 1) statement of the importance of the source water; 356 357 2) a list of water supplies that obtain water from this community water 358 supply; 359 360 3) delineation of all sources of water used by the community water supply, 361 including: 362 for surface water, description of the watershed, map of the 363 A) 364 watershed, and intake locations; 365 366 for groundwater, the well identification number, well description, B) 367 well status and well depth; a description of setback zones; and a description of the aquifer for each well; 368 369 370 a report on the quality of the source water for all sources of water 4) delineated in subsection (a)(3), including: 371 372 373 A) when and where samples used to determine the quality of the 374 source water were taken. These samples must be tested by a 375 certified laboratory; and

the certified laboratory's results;

identification of potential sources of contamination to the source water;

analysis of the source water's susceptibility to contamination; and

a report on the quality of the finished water;

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382 383 B)

5)

6)

7)

| 384 | | | |
|-----------------|---------------|--------|---|
| 385 | | 8) | explanation of the community water supply's efforts to protect its source |
| 386 | | | water. |
| 387 | | | |
| 388 | b) | - | request, the Agency will provide technical assistance to a community water |
| 389 | | suppl | y in conducting the source water assessment. |
| 390 | | | |
| 391 | c) | | mmunity water supply may use a Source Water Assessment Program Fact |
| 392 | | Sheet | prepared by the Agency to fulfill the requirements of this Section. |
| 393 | | | |
| 394 | (Source | ce: Am | nended at 46 Ill. Reg, effective) |
| 395 | | | |
| 396 | | | SUBPART E: CLARIFICATION |
| 397 | | | |
| 398 | Section 604.5 | 525 Tu | ibe or Plate Settlers |
| 399 | | | |
| 400 | a) | | er units consisting of variously shaped tubes or plates installed in multiple |
| 401 | | - | s and at an angle to the flow may be used for sedimentation, following |
| 102 | | flocci | ulation. |
| 103 | • \ | | |
| 404 | b) | Tube | or plate settlers must meet the following requirements: |
| 105 | | 1) | |
| 106 107 | | 1) | Inlet and outlet design must maintain velocities suitable for settling in the |
| 107 | | | basin and to minimize short-circuiting; |
| 108 | | 2) | |
| 109 | | 2) | Plate units must be designed to minimize maldistribution across the units; |
| 410 | | 2) | Durin mining from sottler units must be sized to facilitate a quiel flush of |
| 411 412 | | 3) | Drain piping from settler units must be sized to facilitate a quick flush of |
| +12 413 | | | the settlers units and to prevent flooding of other portions of the plant; |
| +13 414 | | 4) | Outdoor installations must be protected against freezing, including |
| 41 5 | | 4) | sufficient freeboard above the top of the settlers; |
| 416 | | | sufficient necodard above the top of the settlers, |
| 417 | | 5) | Tubes must have a maximum application rate of 2 gpm per square foot of |
| 418 | | 3) | cross-sectional area, unless higher rates are shown through pilot plant or |
| 419 | | | in-plant demonstration studies; |
| 120 | | | in plant demonstration studies, |
| 121 | | 6) | Plates must have a maximum application rate of 0.5 gpm per square foot, |
| 122 | | 0) | based on 80 percent of the projected horizontal plate area; |
| 123 | | | cases on to percent of the projected nonzontal plate area, |
| 124 | | 7) | Flushing lines must be provided to facilitate maintenance and must be |
| 125 | | ., | properly protected against backflow or back siphonage; |
| 126 | | | rr, r against carries. or own orbitoliago, |

1st Notice JCAR350604-2208676r01 427 8) Inlets and outlets must conform with Section 604.515(b) and (d); 428 429 9) The units' support system must be able to carry the weight of the settler 430 units when the basin is drained plus any additional weight to support 431 maintenance; and 432 433 10) Settler units must accommodate: 434 435 A) A water or air jet system for cleaning their tubes or plates; and 436 437 B) Dropping their water level to allow cleaning with the system 438 identified in subsection (b)(10)(A). 439 440 (Source: Amended at 46 Ill. Reg. _____, effective _____) 441 442 SUBPART F: FILTRATION 443 444 Section 604.605 Rapid Rate Gravity Filters 445 446 The use of rapid rate gravity filters requires pretreatment. a) 447 448 For community water supplies treating surface water, groundwater under the b) 449 direct influence of surface water, or using lime soda softening treatment, unless 450 otherwise approved by the Agency under Section 604.145(b), the nominal 451 filtration rates must not exceed 3 gal/min/ft² of filter area for single media filters and 5 gal/min/ft² for multi-media filters. Filtration rates must be reduced when 452 453 treated water turbidity exceeds the standards in 35 Ill. Adm. Code 611. 454 For community water supplies treating groundwater and not using lime soda 455 c) 456 softening treatment, unless otherwise approved by the Agency under Section 457 604.145(b), the rate of filtration must not exceed 4 gal/min/ft² of filter area. 458 459 d) Number of Filter Units-460 461 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 462 at the approved filtration rate. 463 464 465 2) Where more than two filter units are provided, the filters must be capable 466 of meeting the plant design capacity at the approved filtration rate with one filter removed from service. 467 468

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| 469 470 471 472 | | 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. |
|--------------------------|----|------|---|
| 473 474 | e) | | ctural Details and Hydraulics. The filter structure must be designed to provide the following: |
| 475 476 | | 1) | vertical walls within the filter; |
| 477 478 | | 2) | no protrusion of the filter walls into the filter media; |
| 479 480 481 | | 3) | cover by superstructure; |
| 482 483 | | 4) | head and walking room to permit normal inspection and operation; |
| 484 485 | | 5) | minimum depth of filter box of 8.5 feet; |
| 486 487 | | 6) | minimum water depth over the surface of the filter media of 3 feet; |
| 488 489 | | 7) | trapped effluent to prevent backflow of air to the bottom of the filters; |
| 490 491 | | 8) | prevention of floor drainage to the filter with a minimum 4-inch curb around the filters; |
| 492 493 494 | | 9) | prevention of flooding by providing overflow; |
| 495 496 | | 10) | maximum velocity of treated water in pipe and conduits to filters of 2 ft/sec; |
| 497 498 499 | | 11) | cleanouts and straight alignment for influent pipes or conduits where solids loading is heavy, or following lime soda softening; |
| 500 501 502 | | 12) | construction to prevent cross connections, short-circuiting, or common walls between potable and non-potable water; and |
| 503 504 505 | | 13) | wash water drain capacity to carry maximum flow. |
| 506 507 | f) | Wasł | n water troughs must be constructed such that: |
| 508 509 | | 1) | the bottom elevation is above the maximum level of expanded media during washing; |
| 510 511 | | 2) | a 2-inch freeboard is provided at the maximum rate of wash; |

1st Notice JCAR350604-2208676r01 512 513 3) the top edge is level and is all at the same elevation; 514 515 4) troughs are spaced so that each trough serves the same number of square 516 feet of filter area: and 517 518 5) the maximum horizontal travel of suspended particles to reach the trough 519 does not exceed 3 feet. 520 521 The filter media must be composed of clean silica sand or other natural or g) synthetic media free from detrimental chemical or bacterial contaminants and 522 523 must meet the following requirements: 524 525 1) a total depth of not less than 24 inches; 526 527 a uniformity coefficient of the smallest material not greater than 1.65; 2) 528 529 3) a minimum of 12 inches of media with an effective size range of 0.45 mm 530 to 0.55 mm; 531 532 4) filter media specifications: 533 534 A) Filter anthracite must consist of hard, durable anthracite coal 535 particles of various sizes. Blending of non-anthracite material is 536 not acceptable. Anthracite must have: 537 538 i) an effective size of 0.45 mm to 0.55 mm with uniformity 539 coefficient not greater than 1.65 when used alone; 540 541 an effective size of 0.8 mm to 1.2 mm with a uniformity ii) 542 coefficient not greater than 1.7 when used as a cap; 543 544 iii) an effective size less than 0.8 mm for anthracite used as a 545 single media on potable groundwater for iron and 546 manganese removal only (effective sizes greater than 0.8 mm may be approved based upon on site pilot plant 547 548 studies); 549 550 a specific gravity greater than 1.4; iv) 551 552 an acid solubility less than 5 percent; and

v)

vi)

a Moh's scale of hardness greater than 2.7.

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| 555 | | | | |
|-----|----|-------|---------|---|
| 556 | | B) | Sand | must have: |
| 557 | | | | |
| 558 | | | i) | an effective size of 0.45 mm to 0.55 mm; |
| 559 | | | | |
| 560 | | | ii) | a uniformity coefficient of not greater than 1.65; |
| 561 | | | | |
| 562 | | | iii) | a specific gravity greater than 2.5; and |
| 563 | | | | |
| 564 | | | iv) | an acid solubility less than 5 percent. |
| 565 | | | | |
| 566 | | C) | High | density sand must consist of hard, durable, and dense grain |
| 567 | | | garne | t, ilmenite, hematite or magnetite, or associated minerals of |
| 568 | | | those | ores that will resist degradation during handling and use, and |
| 569 | | | must: | |
| 570 | | | | |
| 571 | | | i) | contain at least 95 percent of the associated material with a |
| 572 | | | | specific gravity of 3.8 or higher; |
| 573 | | | | |
| 574 | | | ii) | have an effective size of 0.2 to 0.3 mm; |
| 575 | | | | |
| 576 | | | iii) | have a uniformity coefficient of not greater than 1.65; and |
| 577 | | | | |
| 578 | | | iv) | have an acid solubility less than 5 percent. |
| 579 | | | | • |
| 580 | | D) | Granı | ular activated carbon as a single media may be considered for |
| 581 | | | filtrat | ion only after pilot or full-scale testing and with prior |
| 582 | | | appro | val of the Agency. The design must include the following: |
| 583 | | | | |
| 584 | | | i) | The media must meet the basic specifications for filter |
| 585 | | | | media in subsections $(g)(1)$ through $(g)(3)$. |
| 86 | | | | |
| 587 | | | ii) | There must be provisions for a free chlorine residual and |
| 588 | | | | adequate contact time in the water following the filters and |
| 589 | | | | prior to distribution. |
| 590 | | | | • |
| 591 | | | iii) | Provisions must be made for frequent replacement or |
| 592 | | | | regeneration. |
| 593 | | | | |
| 594 | | E) | Other | media types or characteristics must be approved by the |
| 595 | | , | Agen | ** |
| 596 | | | J | • |
| 597 | 5) | suppo | rting m | nedia designed as follows based on the type of filter material: |

| 598 | | | | | | | |
|-----|----|----------|-----------------|-----------|---------------------|-------------------|--------------------------------|
| 599 | | | A) | A three | e-inch layer of to | rpedo sand must | t be used as a supporting |
| 600 | | | | media | for filter sand wh | ere supporting | gravel is used, and must |
| 601 | | | | have: | | | _ |
| 602 | | | | | | | |
| 603 | | | | i) | an effective size | of 0.8 mm to 2. | .0 mm; and |
| 604 | | | | | | | |
| 605 | | | | ii) | a uniformity coe | fficient not grea | ater than 1.7. |
| 606 | | | | | | | |
| 607 | | | B) | Gravel | | | |
| 608 | | | | | | | |
| 609 | | | | i) | When gravel is u | used as the supp | oorting media, it must |
| 610 | | | | | consist of cleane | ed and washed, h | hard, durable, rounded |
| 611 | | | | | silica particles ar | nd must not incl | lude flat or elongated |
| 612 | | | | | particles. | | |
| 613 | | | | | | | |
| 614 | | | | ii) | The coarsest gra | vel must be 2.5 | inches in size when the |
| 615 | | | | | gravel rests direc | ctly on a lateral | system, and must extend |
| 616 | | | | | above the top of | the perforated l | laterals. |
| 617 | | | | | | | |
| 618 | | | | iii) | Not less than for | ır layers of grav | vel must be provided in |
| 619 | | | | | accordance with | the following s | size and depth distribution: |
| 620 | | | | | | | |
| 621 | | | | | Size | | Depth |
| 622 | | | | | 2½ to 1 | 1½ inches | 5 to 8 inches |
| 623 | | | | | 1½ to 3 | 3/4 inches | 3 to 5 inches |
| 624 | | | | | 3/4 to 1/2 | inches | 3 to 5 inches |
| 625 | | | | | | 16 inches | 2 to 3 inches |
| 626 | | | | | 3/16 to | 3/32 inches | 2 to 3 inches |
| 627 | | | | | | | |
| 628 | | | | iv) | Reduction of gra | avel depths and | other size gradations may |
| 629 | | | | | be approved by t | the Agency upor | on justification for slow sand |
| 630 | | | | | filtration or whe | n proprietary fil | lter bottoms are specified. |
| 631 | | | | | | | |
| 632 | h) | Filter E | 3 ottoms | s and Sta | rainer Systems | | |
| 633 | | | | | | | |
| 634 | | 1) | | | | - | e of porous plate bottoms to |
| 635 | | | preven | ıt cloggi | ng and failure of | the underdrain | system. |
| 636 | | | | | | | |
| 637 | | 2) | The de | sign of | manifold type co | llection systems | s must: |
| 638 | | | | | | | |
| 639 | | | A) | minim | ize loss of head in | n the manifold a | and laterals; |
| 640 | | | | | | | |

1st Notice JCAR350604-2208676r01 641 B) ensure even distribution of washwater and even rate of filtration 642 over the entire area of the filter; 643 644 provide the ratio of the area of the strainer systems' final openings C) 645 to the area of the filter at about 0.003; 646 647 D) provide the total cross-sectional area of the laterals at about twice 648 the total area of the final openings; 649 provide the cross-sectional area of the manifold at 1.5 to 2 times 650 E) the total area of the laterals; and 651 652 653 F) direct lateral perforations without strainers downward. 654 655 3) The Agency may approve departures from these standards for high rate 656 filters and for propriety bottoms. 657 i) 658 The following appurtenances must be provided for every filter: 659 660 1) influent and effluent sampling taps; 661 662 2) a gauge indicating loss of head; 663 664 3) a meter indicating the instantaneous rate of flow; 665 666 4) a pipe for filtering to waste that has a six inch or larger air gap, or other 667 Agency approved cross connection control measure; 668 669 5) a continuously recording Nephelometer capable of measuring and 670 recording filter effluent turbidity at maximum 15-minute intervals, and with alarm capability to notify the operator if filtered water turbidity 671 672 exceeds 0.3 NTU (Nephelometric Units); 673 674 an adjustable rate valve to allow the operator to gradually control the flow 6) 675 rate increase when placing the filters back into operation; and 676 a hose and storage rack for washing filter walls. 677 7) 678 679 Backwash. Provisions must be made for washing filters as prescribed in this j) 680 subsection. 681

1st Notice JCAR350604-2208676r01 682 1) The community water supply must use filtered water provided at the 683 required rate by washwater tanks or a dedicated washwater pump to wash 684 the filters. 685 686 2) Backwash rate must meet the following requirements: 687 a minimum rate of 15 gal/min/ft², consistent with water 688 A) 689 temperatures and specific gravity of the filter media; 690 a rate sufficient to provide for a 50 percent expansion of the filter 691 B) 692 bed; and 693 a reduced rate of 10 gal/min/ft² for full depth anthracite or granular 694 C) 695 activated carbon filters, upon approval by the Agency. 696 697 Washwater pumps in duplicate must be provided unless an alternate means 3) 698 of obtaining washwater is available. 699 700 4) The main washwater line must have a regulator or valve to obtain the 701 desired rate of filter wash with the washwater valves on the individual 702 filters open wide. 703 704 5) The main washwater line or backwash waste line must have a rate of flow 705 indicator, preferably with a totalizer, located so that it can be easily read 706 by the operator during the washing process. 707 708 6) Rapid changes in backwash water flow must be prevented. 709 710 7) Backwash must be completed with an operator in attendance to initiate the 711 backwash cycle and to control the return-to-service procedure to assure 712 that the effluent turbidity is less than 0.3 NTU when the filter is placed 713 back into operation for discharge to the clearwell. 714 715 Appropriate measures for cross connection control must be provided. 8) 716 Surface or subsurface wash facilities are required except for filters used 717 k) 718 exclusively for iron, radionuclides, arsenic or manganese removal. Wash 719 facilities may include a system of fixed nozzles or a revolving-type apparatus. All 720 devices must be designed: 721

to provide water pressures of at least 45 psi;

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723

1)

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724 2) if connected to the treated water system, to prevent back siphonage by 725 properly installing a vacuum breaker or other approved device; and 726 to provide a rate of flow of 2.0 gpm/ft² of filter area with fixed nozzles or 727 3) 0.5 gpm/ft² with revolving arms. 728 729 730 1) Air scouring can be used in place of surface wash if the air scouring meets the 731 following requirements: 732 Air flow for air scouring the filter must be 3 to 5 ft³f³/min/ft² of filter area 733 1) 734 when the air is introduced in the underdrain; a lower air rate must be used 735 when the air scour distribution system is placed above the underdrains; 736 737 A method to avoid filter media loss during backwashing must be provided; 2) 738 739 Air scouring must be followed by a fluidization wash sufficient to 3) 740 restratify the media; 741 742 4) Air must be free from contamination; 743 744 5) If air scour distribution systems are placed at the media and supporting 745 bed interface, the air scour nozzles must be designed to prevent media 746 from clogging the nozzles or the air entering the air distribution system; 747 748 Piping for the air distribution system must not be flexible hose or other 6) soft material: 749 750 751 Air delivery piping must not: 7) 752 753 A) pass down through the filter media; and 754 755 B) have any arrangement in the filter design that would allow short-756 circuiting between the applied unfiltered water and the filtered 757 water; 758 759 When air scouring is being utilized, the backwash rate must be variable 8) 760 and must not exceed 8 gal/min, unless a higher rate is necessary to remove 761 scoured particles from filter media surfaces; and 762 763 9) Air scouring piping must not be installed in the underdrain unless the 764 underdrain was designed to accommodate the piping. 765 (Source: Amended at 46 Ill. Reg. _____, effective _____) 766

| /6/ | | | |
|------------------------|-------------|---------------|---|
| 768 | | | SUBPART G: DISINFECTION |
| 769 | G 41 604 | = 25 G | |
| 770 | Section 604 | .735 C | hlorinator Piping |
| 771 | 2) | Casa | a Compaction Protection |
| 772 773 | a) | Cros | s Connection Protection- |
| 774 | | 1) | The chlorinator piping must be designed to prevent contamination of the |
| 77 4 775 | | 1) | treated water. |
| 776 | | | ireated water. |
| 777 | | 2) | For all systems required to disinfect under Section 604.700, piping must |
| 778 | | 2) | be arranged to prevent back flow or back siphonage between multiple |
| 779 | | | points of chlorine application. |
| 780 | | | T T T T T T T T T T T T T T T T T T T |
| 781 | | 3) | The water supply to each <u>educator</u> eductor must have a separate shutoff |
| 782 | | , | valve. |
| 783 | | | |
| 784 | b) | Pipe | Material |
| 785 | | | |
| 786 | | 1) | The pipes carrying elemental liquid or dry gaseous chlorine under pressure |
| 787 | | | must be Schedule 80 seamless steel tubing or other materials |
| 788 | | | recommended by The Chlorine Institute in Pamphlet 6, Piping Systems for |
| 789 | | | Dry Chlorine, incorporated by reference in 35 Ill. Adm. Code 601.115. |
| 790 | | | These pipes must not be PVC. |
| 791 | | | |
| 792 | | 2) | Rubber, PVC, polyethylene (PE), or other materials recommended by The |
| 793 | | | Chlorine Institute must be used for chlorine solution piping and fittings. |
| 794 | | 2) | |
| 795 | | 3) | Nylon products are not acceptable for any part of the chlorine solution |
| 796 | | | piping system. |
| 797 | (C av. | 1 | mandad at 46 III Dag affactive |
| 798 799 | (Sou | rce: Ar | mended at 46 Ill. Reg, effective) |
| 199 300 | | | SUBPART H: SOFTENING |
| 300 301 | | | SUBFART II. SOFTENING |
| 301 | Section 604 | 805 C | ation Exchange Process |
| 302 | Section 004 | .005 C | ation Exchange 1 focess |
| 304 | a) | Pre-t | treatment under Section 604.1010(b) or (c) is required when the content of |
| 305 | u) | | manganese, or a combination of the two is 1 mg/L or more. |
| 306 | | 11011, | |
| 307 | b) | Desi | gn requirements must provide: |
| 308 | -, | | C 1rr |
| 309 | | 1) | automatic regeneration based on volume of water softened; and |

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| 810 | | |
|-----|----|--|
| 811 | | 2) a manual override on all automatic controls. |
| 812 | | |
| 813 | c) | The design capacity for hardness removal must not exceed 20,000 grains per |
| 814 | | cubic foot when resin is regenerated with 0.3 pounds of salt per 1000 grains of |
| 815 | | hardness removed. |
| 816 | | |
| 817 | d) | The depth of the exchange resin must not be less than 3 feet. |
| 818 | | |
| 819 | e) | Flow Rates |
| 820 | | |
| 821 | | 1) The rate of softening must not exceed 7 gal/min/ft ² of bed area. |
| 822 | | |
| 823 | | 2) The backwash rate must be 6 to 8 gal/min/ft ² of bed area. |
| 824 | | |
| 825 | | 3) Rate of flow controllers or the equivalent must be installed. |
| 826 | | |
| 827 | f) | The freeboard must be calculated based on the size and specific gravity of the |
| 828 | | resin and the direction of water flow. Unless otherwise approved by the Agency |
| 829 | | under Section 604.145(b), the washwater collector must be 24 inches above the |
| 830 | | top of the resin on down flow units. |
| 831 | | |
| 832 | g) | The bottoms, strainer systems and support for the exchange resin must conform to |
| 833 | | criteria provided for rapid rate gravity filters in Section 604.605(f) and (g). |
| 834 | | |
| 835 | h) | Brine must be evenly distributed over the entire surface of both upflow and |
| 836 | | downflow units. |
| 837 | | |
| 838 | i) | Backwash, rinse and air relief discharge pipes must be installed to prevent any |
| 839 | | possibility of back siphonage. |
| 840 | | |
| 841 | j) | Bypass Piping and Equipment |
| 842 | | |
| 843 | | 1) Bypass must be provided around softening units to produce a blended |
| 844 | | water of desirable hardness. |
| 845 | | |
| 846 | | 2) Totalizing meters must be installed on the bypass line and on each softener |
| 847 | | unit. |
| 848 | | |
| 849 | | 3) The bypass line must have a shutoff valve. An automatic proportioning or |
| 850 | | regulating device is recommended. |
| 851 | | |

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| 852 853 854 | k) | | When the applied water contains a chlorine residual, the cation exchange resin must be a type that is not damaged by residual chlorine. | | | |
|--|----|-------|--|--|--|--|
| 855 856 | 1) | Sampl | ling Taps | | | |
| 857 858 859 | | 1) | Smooth-nosed sampling taps must be provided for the collection of representative samples. | | | |
| 860 861 862 | | 2) | The taps must be located to provide for sampling of the softener influent, effluent and blended water. | | | |
| 863 864 865 | | 3) | The sampling taps for the blended water must be at least 20 feet downstream from the point of blending. | | | |
| 866 867 | | 4) | Petcocks are not acceptable as sampling taps. | | | |
| 868 869 | m) | Brine | and Salt Storage Tanks: | | | |
| 870 871 | | 1) | Salt dissolving or brine tanks and wet salt storage tanks must be covered and must be corrosion resistant. | | | |
| 872 873 874 875 876 877 | | 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. | | | |
| 878 879 880 881 882 | | 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. | | | |
| 883 884 885 886 | | 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. | | | |
| 887 888 | | 5) | The salt must be supported on graduated layers of gravel placed over a brine collection system. | | | |
| 889 890 891 | | 6) | Alternative designs that are conducive to frequent cleaning of the wet salt storage tank may be approved by the Agency. | | | |
| 892 893 894 | | 7) | Total salt storage must provide for at least 30 days of operation. | | | |

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oxidation reduction potential;

936

937

9)

1st Notice JCAR350604-2208676r01 938 10) conductivity; 939 940 11) iron; 941 942 12) manganese; 943 944 13) orthophosphate, if applicable; and 945 946 14) silica, if applicable. 947 948 c) The following may be used to determine the corrosivity of water distributed by a 949 community water supply: 950 Lead and Copper 951 1) 952 953 A) Optimal Corrosion Control Treatment Evaluation Technical 954 Recommendations for Primacy Agencies and Public Water 955 Systems, USEPA (March 2016); Office of Water (4606M); EPA 956 816-B-16-003, incorporated by reference at 35 Ill. Adm. Code 957 601.115; 958 959 Chloride Sulfate Mass Ratio (CSMR), calculated as follows: B) 960 $CMSR = \frac{Cl^{-}, expressed as mg/L}{SO_{4}^{-}, expressed as mg/L};$ 961 962 963 C) Coupon and pipe loop studies. 964 965 2) Iron and Steel 966 Larson-Skold Index (L-SI), calculated as follows: 967 $L\mathring{S}I = (Cl + SO_4) / alkalinity$ 968 969 970 (All parameters expressed as mg/L of equivalent CaCO₃) 971 972 BOARD NOTE: The following equation provides a simplified procedure 973 for calculating L-SI: 974 $LS\check{Q} = \frac{(1.41)(mg/L Cl^{-}) + (1.04)(mg/L SO_{4}^{-2})}{mg/L \text{ alkalinity (as CaCO₂)}}$ 975 976

Cl⁻ expressed as mg/L chloride

977

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SO₄-2 expressed as mg/L sulfate 978 979 980 3) Iron Steel and Concrete 981 982 Calcium Carbonate Precipitation Potential (CCPP), as referenced A) in Method 2330 C Standard Methods for Examination of Water 983 and Wastewater, 22nd edition, incorporated by reference in 35 Ill. 984 985 Adm. Code 611.102. 986 987 B) For water containing phosphates: 988 989 The Alkalinity Difference Technique, as described in i) 990 Method 2330 B.3.b and 2330 C.2.b Standard Methods for Examination of Water and Wastewater, 22nd edition, 991 incorporated by reference in 35 Ill. Adm. Code 611.102. 992 The CCPP is the difference between the initial and 993 994 equilibrated water's alkalinity (or calcium) values, when 995 expressed as CaCO₃. 996 997 The Marble Test, as described in Method 2330 C.2.c ii) 998 Standard Methods for Examination of Water and Wastewater, 22nd edition, incorporated by reference in 35 999 Ill. Adm. Code 611.102. The Marble Test is similar to the 1000 1001 Alkalinity Difference Technique. The CCPP equals the 1002 change in alkalinity (or calcium) values during equilibration, when expressed as CaCO₃. 1003 1004 1005 d) The following may be used to determine deposition of excess CaCO₃ scale: 1006 1007 1) CCPP, as referenced in Method 2330 B Standard Methods for Examination of Water and Wastewater, 22nd edition, incorporated by 1008 reference in 35 Ill. Adm. Code 611.102. 1009 1010 1011 2) For water containing phosphates: 1012 The Alkalinity Difference Technique, as described in Method 2330 1013 A) B.3.b and 2330 C.2.b Standard Methods for Examination of Water 1014 and Wastewater, 22nd edition, incorporated by reference in Section 1015 1016 611.102. The CCPP is the difference between the initial and 1017 equilibrated water's alkalinity (or calcium) values, when expressed 1018 as CaCO₃. 1019

| 1020 | B) The Marble Test as described in Method 2330 C.2.c Standard | | | | |
|------|--|--|--|--|--|
| 1021 | Methods for Examination of Water and Wastewater, 22 nd edition, | | | | |
| 1022 | incorporated by reference in Section 611.102. The Marble Test is | | | | |
| 1023 | similar to the Alkalinity Difference Technique. The CCPP equals | | | | |
| 1024 | the change in alkalinity (or calcium) values during equilibration, | | | | |
| 1025 | when expressed as CaCO ₃ . | | | | |
| 1026 | | | | | |
| 1027 | BOARD NOTE: Calcium Carbonate Precipitation Potential (CCPP) can be calculated | | | | |
| 1028 | using Trussell Technologies software: www.trusselltech.com/downloads?category=6. | | | | |
| 1029 | | | | | |
| 1030 | CCPP does not apply to protection or corrosion of lead and copper plumbing materials or | | | | |
| 1031 | to water containing phosphates. See "Internal Corrosion and Deposition Control", Water | | | | |
| 1032 | Quality & Treatment, A Handbook on Drinking Water, 6 th ed. (2011), American Water | | | | |
| 1033 | Works Association. | | | | |
| 1034 | | | | | |
| 1035 | BOARD NOTE: Estimating Calcium Carbonate Precipitation Potential (CCPP) using the | | | | |
| 1036 | Alkalinity Difference Technique or the Marble Test, both referenced in Standard | | | | |
| 1037 | Methods for Examination of Water and Wastewater, 22 nd edition, incorporated by | | | | |
| 1038 | reference at 35 Ill. Adm. Code 611.102, is described as "Calcium Carbonate Saturation". | | | | |
| 1039 | Simplified Procedures for Water Examination, Manual of Water Supply Practices M12 | | | | |
| 1040 | (5 th ed. 2002), American Water Works Association. | | | | |
| 1041 | | | | | |
| 1042 | Based on results of the "Calcium Carbonate Saturation" test, CCPP can be calculated as: | | | | |
| 1043 | | | | | |
| 1044 | CCPP = Final mg/L alkalinity (as CaCO ₃) - Initial mg/L alkalinity (as CaCO ₃) | | | | |
| 1045 | | | | | |
| 1046 | Water is unsaturated with respect to calcium carbonate and may be corrosive if final | | | | |
| 1047 | alkalinity is greater than initial alkalinity, a positive value in the equation above. If there | | | | |
| 1048 | is alkalinity gain in the final alkalinity test, it indicates tendency to dissolve calcium | | | | |
| 1049 | carbonate scale. | | | | |
| 1050 | | | | | |
| 1051 | Water is oversaturated with calcium carbonate scale and may deposit calcium carbonate | | | | |
| 1052 | coating in the water mains if final alkalinity is less than initial alkalinity, a negative value | | | | |
| 1053 | in the equation above. If there is alkalinity loss in the final alkalinity test, it indicates | | | | |
| 1054 | tendency to precipitate calcium carbonate scale. If final and initial alkalinity are the | | | | |
| 1055 | same, the water is stable and in equilibrium with calcium carbonate. | | | | |
| 1056 | | | | | |
| 1057 | CCPP is not applicable to protection or corrosion of lead and copper plumbing materials. | | | | |
| 1058 | c c | | | | |
| 1059 | Verifying the alkalinity titration endpoint by using a pH meter to verify the pH of the | | | | |
| 1060 | titrated alkalinity sample is recommended, since titration endpoint visual color change | | | | |
| 1061 | may be individually variable. If pH of the sample is not certain, consider using pH of | | | | |
| 1062 | 4.50 to represent the endpoint. See "Alkalinity Test", Standard Methods for Examination | | | | |

| 1063 | of Wa | ater and Wastewater, 22 nd edition, incorporated by reference in 35 Ill. Adm. Code | | | |
|------|---------------|---|---------|---|--|
| 1064 | 611.10 | · · · · · · · · · · · · · · · · · · · | | | |
| 1065 | | | | | |
| 1066 | e) | Acceptable stability treatments include: | | | |
| 1067 | | | | | |
| 1068 | | 1) | carbo | n dioxide addition; | |
| 1069 | | | | | |
| 1070 | | 2) | acid a | ddition; | |
| 1071 | | | | | |
| 1072 | | 3) | phosp | hate addition; | |
| 1073 | | | | | |
| 1074 | | 4) | split t | reatment; | |
| 1075 | | | | | |
| 1076 | | 5) | alkali | chemical: | |
| 1077 | | | | | |
| 1078 | | | A) | hydrated lime | |
| 1079 | | | | | |
| 1080 | | | B) | sodium carbonate | |
| 1081 | | | | | |
| 1082 | | | C) | sodium bicarbonate | |
| 1083 | | | | | |
| 1084 | | | D) | sodium hydroxide; | |
| 1085 | | | | | |
| 1086 | | 6) | carbo | n dioxide reduced by aeration; | |
| 1087 | | | | | |
| 1088 | | 7) | calciu | m hydroxide; and | |
| 1089 | | | | | |
| 1090 | | 8) | sodiui | n silicate addition. | |
| 1091 | | | | | |
| 1092 | f) | When chemical addition is used for stabilization, the community water supply | | | |
| 1093 | | must comply with requirements of Subpart K. | | | |
| 1094 | | | | | |
| 1095 | (Source | rce: Amended at 46 Ill. Reg, effective) | | | |
| 1096 | | | | | |
| 1097 | | | | SUBPART J: OTHER TREATMENT | |
| 1098 | G .4 .604.4 | | | | |
| 1099 | Section 604.1 | 1005 A | nion Ex | kchange | |
| 1100 | | ъ. | | B 1 C 1 C 1 C 1 C 1 C 1 C 1 C 1 C 1 C 1 | |
| 1101 | a) | Pre-treatment Requirements. Pre-treatment under Section 604.1010 is required | | | |
| 1102 | | when | a comb | ination of iron and manganese exceeds 0.5 mg/L. | |
| 1103 | 1 \ | | | | |
| 1104 | b) | Anion Exchange Treatment Design | | | |
| 1105 | | | | | |

1st Notice JCAR350604-2208676r01 1106 1) Automatic regeneration based on volume of water treated must be used 1107 unless manual regeneration is justified and is approved by the Agency. 1108 1109 2) If a portion of the water is bypassed around the units and blended with 1110 treated water, the following requirements must be met: 1111 1112 A) the maximum blend ratio allowable must be determined based on 1113 the highest anticipated raw water nitrate level; and 1114 1115 B) a totalizing meter and a proportioning or regulating device or flow regulating valves must be provided on the bypass line. 1116 1117 1118 3) A manual override must be provided on all automatic controls. 1119 1120 4) Adequate freeboard must be provided to accommodate the backwash flow rate of the unit, ensuring the resin will not overflow. The freeboard must 1121 be calculated based on the size and specific gravity of the resin. 1122 1123 1124 5) The system must be designed to include an adequate under drain and 1125 supporting gravel system and brine distribution equipment. 1126 1127 Sampling Taps 6) 1128 1129 A) Smooth-nosed sampling taps must be provided for the collection of 1130 representative samples. 1131 1132 B) The taps must be located to provide for sampling of the softener influent, effluent and blended water. 1133 1134 1135 C) The sampling taps for the blended water must be at least 20 feet downstream from the point of blending. 1136 1137 1138 D) Petcocks are not acceptable as sampling taps. 1139 1140 7) Brine and Salt Storage Tanks: 1141 1142 Salt dissolving or brine tanks and wet salt storage tanks must be A) covered and must be corrosion resistant. 1143 1144 1145 B) The make-up water inlet must be protected from back siphonage. Water for filling the tank must be distributed over the entire 1146

1147

surface by pipes above the maximum brine level in the tank. An

1st Notice JCAR350604-2208676r01 1148 automatic declining level control system on the make-up water line 1149 is recommended. 1150 1151 C) Wet salt storage basins must be equipped with manholes or 1152 hatchways for access and for direct dumping of salt from truck or railcar. Openings must be provided with raised curbs and 1153 watertight covers having overlapping edges similar to those 1154 1155 required for finished water reservoirs. 1156 Overflows, where provided, must be protected with corrosion 1157 D) resistant screens and must terminate with either a turned downward 1158 1159 bend having a proper free fall discharge or a self-closing flap 1160 valve. 1161 1162 E) The salt must be supported on graduated layers of gravel placed 1163 over a brine collection system. 1164 1165 F) Alternative designs that are conducive to frequent cleaning of the 1166 wet salt storage tank may be approved by the Agency. 1167 1168 G) Total salt storage must provide for at least 30 days of operation. 1169 Exchange Capacity. The design capacity for nitrate removal must not exceed 1170 c) 1171 10,000 grains per cubic foot when the resin is regenerated at 15 pounds of salt per 1172 cubic foot of resin. 1173 1174 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 1175 1176 below the nitrate/nitrite MCL, with one exchange unit out of service. 1177 1178 Type of Media. The anion exchange media must be of the nitrate selective type. e) 1179 1180 f) Flow Rates. Unless otherwise approved by the Agency under Section 604.145(b), 1181 the following flow rates apply: 1182 The treatment flow rate must not exceed 5 gal/min/ft² of bed area. 1183 1) 1184 The backwash flow rate must be between 4.0 and 6.0 gal/min/ft² of bed 1185 2) 1186 area. 1187 The regeneration rate must be approximately 1.0 gal/min/ft² of bed area 1188 3) 1189 with a fast rinse approximately equal to the service flow rate.

| 191 | g) | Cross Connec | tion Control. Backwash, rinse and air relief discharge pipes must be |
|-----|---------------|-----------------|--|
| 192 | | installed to pr | event any possibility of back-siphonage. |
| 193 | | | |
| 194 | h) | Construction | Materials. Pipes and contact materials must be resistant to the |
| 195 | | aggressivenes | s of salt. Plastic and red brass are acceptable materials. Steel and |
| 196 | | concrete must | be coated with a non-leaching protective coating that is compatible |
| 197 | | with salt and | orine. |
| 198 | | | |
| 199 | i) | Housing. Dry | bulk salt storage must be enclosed and separated from other |
| 200 | | operating area | s to prevent damage to equipment. |
| 201 | | | |
| 202 | j) | Preconditioni | ng of the Media. Prior to startup of the equipment, the media must |
| 203 | - | be regenerated | d with no less than two bed volumes of water containing sodium |
| 204 | | chloride follo | wed by an adequate rinse. |
| 205 | | | |
| 206 | (Sourc | e: Amended a | t 46 Ill. Reg, effective) |
| 207 | | | |
| 208 | Section 604.1 | 010 Iron and | Manganese Control |
| 209 | | | |
| 210 | a) | Except as pro | vided in 35 Ill. Adm. Code 611.300(e), treatment is required to meet |
| 211 | | the iron and n | nanganese MCL as stated in Section 611.300(b). |
| 212 | | | |
| 213 | b) | Removal of In | on and Manganese by Oxidation, Detention and Filtration |
| 214 | | | - |
| 215 | | 1) Oxida | tion must be by aeration, as indicated in Subpart D, unless the |
| 216 | | comm | unity water supply demonstrates chemical oxidation provides |
| 217 | | equiva | llent results to aeration. Chemicals that may be used for oxidation |
| 218 | | includ | e chlorine, sodium permanganate, potassium permanganate, ozone |
| 219 | | or chlo | orine dioxide. |
| 220 | | | |
| 221 | | 2) Deten | tion |
| 222 | | , | |
| 223 | | A) | A minimum detention time of 30 minutes must be provided |
| 224 | | , | following aeration to ensure that the oxidation reactions are |
| 225 | | | complete prior to filtration. This minimum detention time may be |
| 226 | | | modified only when a pilot plant study indicates completion of |
| 227 | | | oxidation reactions in less time. |
| 228 | | | |
| 229 | | B) | The reaction tank/detention basin must be provided with an |
| 230 | | , | overflow, vent and access hatch in accordance with Subpart M. |
| 231 | | | , |
| 232 | | 3) Filtrat | ion. Filters must conform to Subpart F. |
| 233 | | , | 1 |
| | | | |

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| 1 234 1235 | c) | Remo | oval by | Manganese Greensand or Manganese Coated Media Filtration- |
|---------------|----|-------|----------|--|
| 1236 | | 1) | Dorm | anganate or chlorine must be added to the water upstream of the |
| 1230 | | 1) | | per manufacturer's recommendation. |
| 1237 | | | miei, | per manuracturer's recommendation. |
| 1236 | | 2) | Ana | athresite madic can of at least six inches must be provided ever |
| | | 2) | | nthracite media cap of at least six inches must be provided over |
| 1240 | | | mang | anese greensand. |
| 1241 | | 2) | N.T | 11 1 1 4 1 0 1/ 1/62 1/1 61/4 |
| 1242 | | 3) | | nal backwash rate is 8 gal/min/ft ² with filters containing manganese |
| 1243 | | | green | sand and 15 gal/min with manganese coated media. |
| 1244 | | | _ | |
| 1245 | | 4) | Samp | ole taps must be provided: |
| 1246 | | | | |
| 1247 | | | A) | prior to application of permanganate; |
| 1248 | | | | |
| 1249 | | | B) | immediately ahead of filtration; |
| 1250 | | | | |
| 1251 | | | C) | at points between the anthracite media and the manganese |
| 1252 | | | | greensand; |
| 1253 | | | | |
| 1254 | | | D) | halfway down the manganese greensand; and |
| 1255 | | | , | |
| 1256 | | | E) | at the filter effluent. |
| 1257 | | | , | |
| 1258 | d) | Seque | estratio | n of Iron and/or Manganese by Polyphosphates |
| 1259 | / | ~ 1 | | |
| 1260 | | 1) | Seque | estration by polyphosphates must not be used when the combination |
| 1261 | | -/ | _ | n and manganese exceeds 1 mg/L. |
| 1262 | | | or no | ii uita manganese enecedis 1 mg/2. |
| 1263 | | 2) | Phosi | phate solution must be kept covered and disinfected by carrying |
| 1264 | | 2) | - | eximately 10 mg/L free chlorine residual unless the phosphate is not |
| 1265 | | | | o support bacterial growth and the phosphate is being fed from the |
| 1266 | | | | red shipping container. Phosphate solutions having a pH of 2.0 or |
| 1267 | | | | |
| | | | 1688 1 | nay also be exempted from this requirement by the Agency. |
| 1268 | | 2) | Dolem | the combates arrest not be condical about of income and accompany of |
| 1269 | | 3) | | phosphates must not be applied ahead of iron and manganese removal |
| 1270 | | | | nent. The point of application must be prior to aeration, oxidation or |
| 1271 | | | aisini | fection. |
| 1272 | | 45 | | |
| 1273 | | 4) | - | phosphate feed point must be located as far ahead of the oxidant feed |
| 1274 | | | point | as possible. |
| 1275 | | ~ | _ | |
| 1276 | e) | Seau | estratio | of Iron and/or Manganese by Sodium Silicates: |

1277 1278 1) Sequestration by sodium silicate must not be used when iron, manganese 1279 or a combination of iron and manganese exceeds 2 mg/L. 1280 1281 A full-scale demonstration will be required to determine the suitability of 2) 1282 sodium silicate for the particular water and the minimum feed needed. 1283 1284 3) Chlorine or chlorine dioxide addition must accompany the sodium silicate 1285 addition. 1286 1287 4) Sodium silicate must not be applied ahead of iron or manganese removal 1288 treatment. 1289 (Source: Amended at 46 Ill. Reg. _____, effective _____) 1290 1291 1292 SUBPART K: CHEMICAL APPLICATION 1293 1294 Section 604.1105 Feed Equipment and Chemical Storage 1295 1296 a) Solution Feed Equipment-1297 1298 Corrosion resistant containers must be provided for solution feeders. 1) 1299 1300 2) Containers must have non-corrodible covers with overhanging edges. 1301 Openings must be constructed to prevent contamination. 1302 1303 3) Scales or a volumetric measuring device must be provided for determining 1304 the amount of solution fed. 1305 1306 b) Feeder Redundancy 1307 1308 1) When chemical feed is necessary for the protection of the supply, such as 1309 chlorination, coagulation or other essential processes: 1310 1311 A) a minimum of two feeders must be provided with each having adequate capacity to provide the maximum dosage necessary; and 1312 1313 1314 B) the standby unit or a combination of units of sufficient size to meet 1315 capacity must be provided to replace the largest unit when out of 1316 service. 1317 1318 2) A separate feeder must be used for each chemical applied. 1319

1320 3) Each chemical feeder and day tank must be identified with its content. 1321 1322 4) Spare parts must be available on site for all feeders and chemical booster pumps to replace parts that are subject to wear and damage. 1323 1324 1325 Control c) 1326 1327 1) At automatically operated facilities: 1328 1329 A) The automatic controls must be designed to allow override by 1330 manual controls. 1331 1332 B) Chemical feeders must be electrically interconnected with the well 1333 or service pump so that they will not operate if the well or service 1334 pump is not operating. 1335 1336 2) Chemical feed rates must be proportional to the flow stream to achieve the 1337 appropriate dose of chemical application. 1338 1339 A means to measure water flow stream being dosed must be provided to 3) 1340 determine chemical feed rates. 1341 Provisions must be made for measuring the quantities of chemicals used. 1342 4) 1343 1344 Weighing Scales 5) 1345 1346 A) Weighing scales must be capable of providing reasonable precision in relation to average daily dose. 1347 1348 1349 B) Unless otherwise approved by the Agency under Section 604.145(b), treatment chemicals in gaseous state must be weighed; 1350 1351 1352 C) Fluoride solution fed from supply drums or carboys must be 1353 weighed; and 1354 1355 Volumetric dry chemical feeders must be weighed unless D) 1356 otherwise approved by the Agency under Section 604.145(b). 1357 1358 d) Dry chemical feeders must: 1359 1360 measure chemicals volumetrically or gravimetrically; 1) 1361

provide adequate water and agitation of the chemical within the slurry 1362 2) 1363 tank: and 1364 1365 3) completely enclose chemicals to prevent emission of dust to the operating 1366 room. 1367 1368 e) Positive Displacement Solution Pumps 1369 1370 1) Positive displacement type solution feed pumps may be used to feed liquid chemicals, but must not be used to feed chemical slurries. 1371 1372 1373 2) Pumps must be capable of operating at the required maximum rate against 1374 the maximum head conditions found at the point of injection. 1375 1376 3) Calibration tubes or mass flow monitors that allow for direct physical 1377 measurement of actual feed rates must be provided. 1378 1379 f) To ensure that chemical solutions cannot be siphoned or overfed into the water 1380 supply, liquid chemical feeders must: 1381 1382 1) assure discharge at a point of positive pressure; 1383 1384 2) provide vacuum relief; or 1385 1386 3) provide a suitable air gap or anti-siphon device. 1387 1388 Cross connection control must be provided to assure that: g) 1389 1390 1) the make-up water lines discharging to liquid storage tanks must be 1391 properly protected from backflow; 1392 1393 2) no direct connection exists between any sewer and a drain or overflow 1394 from a chemical feed system; and 1395 all overflows and drains from a chemical field system must have an airgap 1396 3) 1397 above the sewer or overflow rim of a receiving sump. 1398 1399 h) Chemical feed equipment location must be readily accessible for servicing, repair 1400 and observation of operation. 1401 1402 i) Make-up-water lines must be: 1403

1st Notice JCAR350604-2208676r01 1404 1) obtained from the finished water supply, or from a location sufficiently 1405 downstream of any chemical feed point to assure adequate mixing; and 1406 1407 2) ample in quantity and adequate in pressure. 1408 1409 i) Storage of Chemicals 1410 1411 Space must be provided for: 1) 1412 1413 A) at least 30 days of chemical supply; 1414 1415 B) convenient and efficient handling of chemicals; 1416 1417 dry storage conditions; and C) 1418 1419 D) a minimum storage volume of 1.5 times the gross shipping volume. 1420 1421 2) Offloading areas must be clearly labeled to prevent accidental cross-1422 contamination. 1423 1424 3) Chemicals must not be stored in confined spaces. 1425 1426 4) Chemicals must be stored in covered or unopened shipping containers, unless the chemical is transferred into an approved storage unit. 1427 1428 1429 Feed equipment and storage chemicals must be stored inside a building 5) 1430 unless otherwise approved by the Agency under Section 604.145(b). 1431 1432 6) Liquid chemical storage tanks must have a liquid level indicator. 1433 1434 Secondary Containment 7) 1435 1436 A) Liquid chemical storage tanks must have secondary containment 1437 consisting of an overflow and a receiving basin capable of 1438 receiving accidental spills or overflows without uncontrolled 1439 discharge. 1440 1441 B) A common receiving basin may be provided for each group of 1442 compatible chemicals that provides sufficient containment volume 1443 to prevent accidental discharge in the event of failure of the largest 1444 tank. Groups of compatible chemicals are as follows: acids, bases, 1445 salts and polymers, absorption powders, oxidizing powders and

compressed gases.

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| 1447 | | | |
|------|----|---------------------------|---|
| 1448 | | 8) | Vents from storage tanks must have a corrosion resistant 24 mesh screen. |
| 1449 | | | |
| 1450 | k) | Bulk Liquid Storage Tanks | |
| 1451 | | | |
| 1452 | | 1) | A uniform strength of chemical solution must be maintained. Continuous |
| 1453 | | | agitation must be provided to maintain slurries in suspension. |
| 1454 | | | |
| 1455 | | 2) | A means to assure continuity of chemical supply must be provided. |
| 1456 | | | |
| 1457 | | 3) | Means must be provided to measure the liquid level in the tank. |
| 1458 | | | |
| 1459 | | 4) | Liquid storage tanks including any access openings must be kept securely |
| 1460 | | | covered. |
| 1461 | | | |
| 1462 | | 5) | Overflow pipes, when provided, must: |
| 1463 | | | |
| 1464 | | | A) be turned downward, with the end screened; |
| 1465 | | | |
| 1466 | | | B) have a free fall discharge; and |
| 1467 | | | |
| 1468 | | | C) be located where noticeable. |
| 1469 | | | |
| 1470 | | 6) | Liquid storage tanks must be vented, but not through vents in common |
| 1471 | | | with other chemicals or day tanks. |
| 1472 | | | |
| 1473 | | 7) | Each liquid storage tank must be provided with a valved drain in |
| 1474 | | | accordance with subsection (g). |
| 1475 | | | |
| 1476 | | 8) | Solution tanks must be located, and protective curbings provided, so that |
| 1477 | | | chemicals from equipment failure, spillage or accidental drainage do not |
| 1478 | | | enter the water in conduits, treatment or storage basins. Chemicals must |
| 1479 | | | be stored as required by subsection (j)(5). |
| 1480 | | | |
| 1481 | 1) | Day ' | Tanks |
| 1482 | | | |
| 1483 | | 1) | Day tanks must be provided where bulk storage of liquid chemical is |
| 1484 | | | provided. |
| 1485 | | | |
| 1486 | | 2) | Day tanks must meet all the requirements of subsection (k), except that |
| 1487 | | | shipping containers do not require overflow pipes and subsection drains. |
| 1488 | | | |

| 1489 | | 3) | Day tanks must be scale-mounted, or have a calibrated gauge painted or |
|------|-------|---------|--|
| 1490 | | | mounted on the side if liquid level can be observed in a gauge tube or |
| 1491 | | | through translucent sidewalls of the tank. In opaque tanks, a gauge rod |
| 1492 | | | may be used. The ratio of the area of the tank to its height must be such |
| 1493 | | | that unit readings are meaningful in relation to the total amount of |
| 1494 | | | chemical fed during a day. |
| 1495 | | | |
| 1496 | | 4) | Except for fluosilicic acid, hand pumps may be provided for transfer from |
| 1497 | | | a shipping container. When motor-driven transfer pumps are provided, a |
| 1498 | | | liquid level limit switch must be provided. |
| 1499 | | | |
| 1500 | | 5) | Tanks and tank refilling line entry points must be clearly labeled with the |
| 1501 | | | name of the chemical contained. |
| 1502 | | | |
| 1503 | | 6) | Filling of day tanks must not be automated. |
| 1504 | | | |
| 1505 | m) | Feed | l lines must be: |
| 1506 | | | |
| 1507 | | 1) | of durable, corrosion-resistant material; |
| 1508 | | | |
| 1509 | | 2) | protected against freezing; |
| 1510 | | | |
| 1511 | | 3) | designed to prevent clogging; and |
| 1512 | | | |
| 1513 | | 4) | color coded and labeled in accordance with Section 604.120. |
| 1514 | | | |
| 1515 | n) | Hand | dling. Provision must be made for the proper transfer of dry chemicals from |
| 1516 | | shipp | ping containers to storage bins or hoppers, in such a way as to minimize the |
| 1517 | | quan | tity of dust that may enter the room. |
| 1518 | | | |
| 1519 | o) | Hous | sing |
| 1520 | | | |
| 1521 | | 1) | Floor surfaces must be smooth and impervious, slip-proof and well |
| 1522 | | | drained. |
| 1523 | | | |
| 1524 | | 2) | Vents from feeders, storage facilities and equipment exhaust must |
| 1525 | | | discharge to the outside atmosphere above grade and remote from air |
| 1526 | | | intakes. |
| 1527 | | | |
| 1528 | (Sour | rce: Ar | mended at 46 Ill. Reg, effective) |
| 1529 | | | |
| 1530 | | | SUBPART M: STORAGE |
| 1531 | | | |

| 1532 | Section 604. | 1350 C | Combination Pressure Tanks and Ground Storage |
|------|--------------|---------|--|
| 1533 | | | |
| 1534 | | _ | ound storage, hydropneumatic storage and pumps may be considered in |
| 1535 | • | s for m | aintaining pressure on the distribution system. Design of such a system must |
| 1536 | include: | | |
| 1537 | | | |
| 1538 | a) | a min | nimum ground storage volume equivalent to 1.5 times the average daily |
| 1539 | | usage | ; ; |
| 1540 | | | |
| 1541 | b) | | nimum of two pumps, each capable of meeting the peak hourly flow provided |
| 1542 | | | ction 604.115(d). If more than two pumps are proposed, the peak hourly |
| 1543 | | flow | must be met when any pump is out of service; |
| 1544 | | | |
| 1545 | c) | | ectric generator with automatic start capable of providing power to pumps |
| 1546 | | | an produce the peak hourly flow as-provided in Section 604.115(d), plus |
| 1547 | | | cient power to operate all chemical feeders, appurtenances and equipment |
| 1548 | | | tial to plant operation. Consideration must be given to sizing the generator |
| 1549 | | to pro | ovide power for at least one well; and |
| 1550 | | | |
| 1551 | d) | • | ropneumatic tank sized to provide service for a minimum of 10 minutes |
| 1552 | | under | r the peak hourly flow provided in Section 604.115(d). |
| 1553 | | | |
| 1554 | (Sour | ce: Am | nended at 46 Ill. Reg, effective) |
| 1555 | | | |
| 1556 | | | SUBPART O: CROSS CONNECTIONS |
| 1557 | | | |
| 1558 | Section 604. | 1510 C | Cross Connection Control Device Inspectors |
| 1559 | | | |
| 1560 | a) | - | pt as provided in subsection (c), cross connection control devices must be |
| 1561 | | | cted at least annually by a person approved by the Agency or its designee as |
| 1562 | | | ss connection control device inspector (CCCDI). The inspection of |
| 1563 | | mech | anical devices must include physical testing in accordance with the |
| 1564 | | manu | facturer's instructions. |
| 1565 | | | |
| 1566 | | 1) | Records of the annual inspection must be submitted to the community |
| 1567 | | | water supply. |
| 1568 | | | |
| 1569 | | 2) | Each device inspected must have a tag attached listing the date of the most |
| 1570 | | | recent test, name of CCCDI, and type and date of repairs. |
| 1571 | | | |
| 1572 | | 3) | A maintenance log must be maintained at the site of installation and must |
| 1573 | | | include: |
| 1574 | | | |

1st Notice JCAR350604-2208676r01 1575 A) make, model and serial number of the backflow preventer, and its 1576 location at the site: 1577 1578 date of each test; B) 1579 1580 name and approval number of person performing the test; C) 1581 1582 type of test kit used and date of its most recent calibration; D) 1583 1584 E) test results and a brief statement indicating whether the results pass or fail the test; 1585 1586 1587 F) repairs or servicing required; 1588 1589 G) repairs and date completed; and 1590 1591 H) servicing performed and date completed. 1592 1593 Requirements for Cross Connection Control Device Inspector Approval b) 1594 1595 1) Each applicant for CCCDI Approval must: 1596 1597 A) be a person authorized to perform plumbing as described in the Illinois Plumbing License Law [225 ILCS 320/3(1)]. 1598 1599 1600 B) complete a training course offered by the Environmental Resources 1601 Training Center (see 110 ILCS 530) or the Agency's delegate on cross connection control device that includes hands on practice 1602 1603 testing of different types of backflow devices and proper 1604 maintenance and repair. 1605 1606 C) complete and submit an application for CCCDI Approval. 1607 1608 successfully complete both written and performance examinations D) 1609 demonstrating competency in the following: the principles of 1610 backflow and back-siphonage; the hazard presented to a potable 1611 water system; locations that require installation of cross-1612 connection control devices; identifying, locating, 1613 inspecting, testing, maintaining and repairing cross-connection control methods and devices in-line, as located throughout each 1614 system that connects to a community public water supply. The 1615

applicant must successfully complete:

1618 i) the written examination with a minimum score of 75%; and 1619 1620 ii) a performance-based examination by demonstrating competency in testing device procedures on all types of 1621 1622 devices at the examination center. 1623 1624 2) CCCDIs must renew the CCCDI Approval each year between May 1 and 1625 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 1626 1627 renewal year. CCCDIs must complete an eight-hour recertification course 1628 every three years from the date of the original issuance of the CCCDI license. The course must be offered by the Environmental Resources 1629 Training Center or the Agency's delegate and include a written and 1630 1631 practical exam demonstrating competency in backflow prevention testing. 1632 1633 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 1634 1635 more of the following causes: 1636 1637 A) Practice of any fraud or deceit in obtaining or attempting to obtain 1638 a CCCDI Approval, including misrepresentation of approval; 1639 1640 B) Any repeated, flagrant or willful negligence or misconduct in the inspection, testing or maintenance of cross connection control 1641 1642 devices; 1643 1644 C) Falsification of reports required by this Part; 1645 1646 D) Willful violation of the Environmental Protection Act or any rules 1647 adopted under it. 1648 1649 4) Suspension and Revocation Procedures 1650 1651 A) Any person may file with the Agency a written complaint 1652 regarding the conduct of a CCCDI approved under this Part. The 1653 complaint must state the name and address of the complainant, the 1654 name of the CCCDI, and all information that supports the 1655 complaint. 1656 1657 B) The Agency may initiate the suspension or revocation procedure on the basis of any written complaint or on its own motion. The 1658 Agency's decision to institute suspension or revocation 1659

1st Notice JCAR350604-2208676r01 1660 proceedings will be based on the seriousness of the violation and 1661 its potential deleterious impact upon public health and safety. 1662 1663 When the suspension or revocation procedure is initiated, the C) 1664 Agency must notify the CCCDI by certified mail that suspension or revocation is being sought. The notice must specify the cause 1665 upon which suspension or revocation is sought and include the 1666 1667 procedures for requesting a hearing before the Agency. Request for hearing must be made in writing within 14 days after receipt of 1668 the Agency's certified notification. If no hearing is requested, the 1669 Agency will suspend or revoke the CCCDI Approval. 1670 1671 1672 D) Should a hearing be requested, the Director must appoint one or 1673 more Agency employees to chair the proceedings. The hearing must be conducted according to the hearing requirements of 35 Ill. 1674 1675 Adm. Code 168. 1676 1677 E) The Director must make a decision within 30 days after receiving 1678 the hearing transcript. The Director must give written notice of that decision and reasons for the decision to the CCCDI by 1679 1680 certified mail. 1681 1682 F) Within 30 days after receiving a notice of suspension or revocation from the Agency, the CCCDI may appeal the suspension or 1683 1684 revocation to the Pollution Control Board. The suspension or revocation of the CCCDI's Approval must be stayed pending a 1685 1686 final decision on the appeal by the Board. 1687 1688 Backflow preventers located in the treatment plant, wellhouse or booster station c) 1689 of a community public water supply facility must be inspected at least annually by either an approved CCCDI or by a certified water supply operator who has 1690 completed the qualifications listed in subsections (b)(1)(B) and (D). 1691 1692 1693 When the inspection is conducted by a certified water supply operator who 1) 1694 has completed the necessary qualifications, records must be kept as 1695 required by subsection (a)(3). 1696 1697 2) Each device inspected must have a tag attached listing the date of the most 1698 recent test, name of the CCCDI, and type and date of repairs.

Section 604.1520 COVID-19 Emergency Provisions (Repealed)

(Source: Amended at 46 Ill. Reg. _____, effective _____)

1<mark>699</mark> 1700

| 1/03 | |
|------|---|
| 1704 | Due to the public health emergency related to the COVID-19 outbreak, the CCCDI approval |
| 1705 | renewal application deadlines for 2020 pursuant to Section 604.1510(b)(2) are extended. For |
| 1706 | renewal year 2020, CCCDIs must renew their CCCDI Approval between August 31 and October |
| 1707 | 30. An application for CCCDI renewal will be sent by the Agency or its designee and must be |
| 1708 | completed and returned by October 30, 2020. |
| 1709 | |
| 1710 | (Source: Repealed at 46 Ill. Reg, effective) |
| | |