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DEPARTMENT OF
ENVIRONMENTAL QUALITY

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MEMORANDUM

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FROM: *Barry 10/6/06*
Barry Burhell, Water Quality Division Administrator

SUBJECT: **Drinking Water Rule Interpretation—Pumping Redundancy and Fire Flow**

DATE: October 10, 2006

Proposal: The proposed phase 2 drinking water facility standards rule has sections that address pumping redundancy and fire flow. The proposed rule language, as modified in response to public comments during August, separates fire flow requirements from the more general requirement that public water systems be designed with pumping capabilities sufficient to provide peak demands with the largest pump out of service. **This memo directs DEQ engineers performing plan and specification reviews for public water systems to use the framework agreed upon in the proposed rule before it becomes final in the spring of 2007.**

Current Rule Interpretation: The most literal reading of Recommended Standards for Waterworks (“Ten States”) would require that public water systems be designed with sufficient pumping capacity to supply peak day demand plus fire flow where provided. Any pumping facility within the water system would need to have sufficient redundancy to provide this peak day demand plus fire flow when the largest pump is out of service. DEQ has not been consistent in application and interpretation of this requirement. Most offices have not held to the most literal reading of Ten States. This is understandable by the fact that Ten States makes an assumption that all systems will be designed with storage in the amount of average daily demand. In Idaho, many systems do not install storage and depend upon pumping to supply all of their needs. The challenge of providing fire flow differs substantially between systems that have storage and those that depend on pumping alone.

New Proposed Facility Standards Rule: The proposed rule only requires pumping redundancy for domestic flows. Fire flows are now treated separately in the proposed rule. Public water system owners are allowed to reduce or eliminate redundancy for fire flow systems, if local fire authorities certify that the water system’s fire fighting capabilities are compatible with the water demand of existing and planned fire fighting equipment and fire fighting practices in the area served by the system. The system may be designed to provide slightly lower total flows during a fire event, taking into account the drop in distribution pressure that will occur when fire flow is provided. The proposed rule provides definitions for the terms that refer to design flows and uses these key terms in a consistent manner throughout sections that deal with redundancy criteria.

As a condition for DEQ approval of fire flow designs that do not incorporate full redundancy, the proposed rule language includes a requirement that existing or potential customers be informed of the system’s firefighting capabilities and the acceptance of these capabilities by the local fire authority. Although there was some

opposition to this provision, this requirement is consistent with similar language negotiated for the proposed rule section dealing with standby power. In both situations, the operative principle is that systems that obtain approval for a reduction in reliability or redundancy should be willing to inform customers of this fact. This notification does not need to be stated in negative terms, because the system design is in compliance with regulation. In this interim time, prior to the proposed rule becoming effective, DEQ will waive the notice requirement so long as the system complies with Section 501.17(b)(i), as quoted in the Attachment to this memo. Once the proposed rule becomes effective, the notice requirement must be met as part of the plan review.

Summary: The framework provided in the proposed rule is consistent with past practices in Idaho and allows for system designs that provide a reasonable level of redundancy. The proposed rule establishes a standard for redundancy that is consistent with Ten States and then provides for departures from that standard when doing so is acceptable to the local fire authority and does not compromise the ability of the water system to reliably meet domestic flows. Standardizing around this approach will help to improve consistency in the way these requirements are implemented around the state.

BNB:jt

Attachment

Summary of Proposed Facility Standards Rule Language Dealing with Pumping Redundancy and Fire Flows

1. The terms used to describe design flows in the rule are average day demand, peak hour demand, maximum day demand, and fire flow capacity. These terms may be assigned slightly different meanings in various engineering references. Because these terms are of key importance in interpreting the rule requirements, they are defined as follows.

Average Day Demand. The volume of water used by a system on an average day based on a one (1) year period.

Peak Hour Demand. The highest hourly flow, excluding fire flow, a water system or distribution system pressure zone is likely to experience in the design year.

Maximum Day Demand. The average rate of consumption for the twenty-four (24) hour period in which total consumption is the largest for the design year.

Fire Flow Capacity. The water system capacity, in addition to maximum day demand, that is available for fire fighting purposes within the water system or distribution system pressure zone. Adequacy of the water system fire flow capacity is determined by the local fire authority.

2. The above terms are then used throughout those sections of the rule that deal with redundancy requirements. The pertinent sections are shown below. Highlighting is used to emphasize the key terms. These excerpts may be viewed in context by accessing a copy of the proposed rule through DEQ's website at http://www.deq.idaho.gov/rules/drinking_water/58_0108_0602_proposed.cfm or by calling Tom John at 373-0191.

513. FACILITY AND DESIGN STANDARDS - NUMBER OF GROUND WATER SOURCES REQUIRED. New community water systems served by ground water and constructed after July 1, 1985, or existing community water systems served by ground water that are substantially modified after July, 2002, shall have a minimum of two (2) sources if they are intended to serve more than twenty-five (25) homes or equivalent. Under normal operating conditions, with any source out of service, the remaining source or sources shall be capable of providing either the peak hour demand of the system or maximum day demand plus equalization storage. See section 501.17 for general design requirements concerning fire flow capacity. for the purpose of section 513 only, the department shall consider a system to be "substantially modified" when there is a combined increase of twenty-five percent (25%) or more above the system's existing configuration in the following factors:

541.02. Pumping Units. At least two (2) pumping units shall be provided for raw water and surface source pumps. Pumps using seals containing mercury shall not be used in public drinking water system facilities. With any pump out of service, the remaining pump or pumps shall be capable of providing the peak hour demand or maximum day demand plus equalization storage. See Section 501.17 for general design requirements concerning fire flow capacity. The pumping units shall meet the following requirements: [Remaining language from this subsection is not listed because it does not deal with redundancy]

541.04. c. Each booster pumping station shall contain not less than two (2) pumps with capacities such that peak hour demand, or maximum day demand plus equalization storage, can be satisfied with the largest pump out of service. See Section 501.17 for general design requirements concerning fire flow capacity.

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544.01. Sizing. Storage facilities shall have sufficient capacity, as determined from engineering studies that consider peak flows, fire flow capacity, and analysis of the need for various components of finished storage as defined under the term “Components of Finished Water Storage” in Section 003. The requirement for storage may be reduced when the source and treatment facilities have sufficient capacity with standby power to supply peak demand of the system.

3. Finally, a new provision in General Design Considerations (Section 501) to address the requirements and exceptions that apply to fire flow capacity.

501.17. Redundant Fire Flow Capacity.

a. Public water systems that provide fire flow shall be designed to provide maximum day demand plus fire flow instead of peak hour demand plus fire flow. This allowance is made because distribution pressures can be expected to fall during a fire event and overall demand would be less than peak hour. Pumping systems supporting fire flow capacity must be designed so that fire flow may be provided with the largest pump out of service.

b. The requirement for redundant pumping capacity specified in 501.17.a. may be reduced to the extent that storage is provided in sufficient quantity to meet some or all of fire flow demands. Where storage is not provided, the requirement for fire flow pumping redundancy may be reduced or eliminated if the following conditions are met:

i. The local fire authority states in writing that the fire flow capacity of the system is acceptable and is compatible with the water demand of existing and planned fire fighting equipment and fire fighting practices in the area served by the system.

ii. In a manner appropriate to the system type and situation, positive notification is provided to customers that describes the design of the system’s fire fighting capability and explains how it differs from the requirements of 501.17.a. The notice shall indicate that the local fire authority has provided written acceptance of the system’s fire flow capacity.