TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

PTR SECTION STAFF GUIDANCE

PROTECTION OF AERATORS AND COOLING TOWERS

Rules Affected: 30 TAC §290.42(b)(2)(C) and § 290.42(c)(1)(B)

Background:

The Title 30 of the Texas Administrative Code (30 TAC) rules require that "all exposure of water to atmospheric contamination shall be accomplished in a manner such that insects, birds, and other foreign materials will be excluded from the water. Aerators and all other such openings shall be screened with 16-mesh or finer corrosion-resistant screen." This requirement is addressed in the rules with respect to groundwater, springs, and other water sources. While the main focus of this document is on aerators and cooling towers used for groundwater sources, the same language is contained in the section dealing with springs and other water sources.

Many aerators are used for oxidizing iron and manganese, and for the removal of hydrogen sulfide, trihalomethanes (THMs), carbon dioxide, and other gases occasionally found in groundwater sources. Cooling towers are used with groundwater sources that utilize deep wells that produce water with elevated temperatures. The water from these units is often chlorinated before entering storage, and ultimately, the distribution system.

Many aerators and cooling towers use designs that allow for the proper protection of all openings into the unit; however some are essentially designed to be industrial type cooling towers. Air is drafted in along the sides of the unit by large fans mounted on the top that blow air out in an upward direction. Many of these units have flat roof areas around the fans, with fans being up to 16 feet in diameter or more. The sides and roof area of these units can generally be adequately screened, although there is essentially no roof slope, as would be required of storage tanks.

The problem arises with providing adequate protection of the potable water through the upward facing fan openings. Generally, two-speed fans are used to keep a constant flow of air moving through the fan area—high speed for when the well pump is operating and low speed for when it is not. This works reasonably well in keeping insects, birds, and other foreign materials out of the potable water supply until an electrical power interruption causes the fan motor to cease operation. This interruption can be in the electric power supplied to the water plant or, of more concern, the failure of a component in the fan circuit itself.

Electric generators can be used to automatically provide electric power to the unit when the failure is with the electric service to the water plant. However, this does not work for internal plant component failures. When this happens, the fan is off-line until someone discovers the problem and takes appropriate corrective actions. An internal component failure may not prevent the well pump from operating. At this point, the water is very vulnerable to contamination from outside sources through the upward facing fan opening. If the water plant is remotely located and/or normally unmanned, the opportunity for the entrance of contamination to the water can last for an extended period of time.

Direct screening of the fan opening produces a significant loss of air flow. Automatic louvers do not adequately seal the fan opening and are also subject to operational failures. Screened enclosures for

large cooling towers currently in use could be difficult from a structural soundness standpoint and would likely be expensive.

Guidance:

All new and existing aerators and cooling towers with upward facing fans which are not designed to provide continual protection must be provided with a two-speed fan motor for each fan. Automatic plant shutdowns, an alarm with battery backup and an automatic telephone dialing system to summon operators must be provided to ensure that the water produced is not compromised by the entrance of contaminants from outside sources through the fan opening while the fan unit is off-line.

For constructing these facilities, all aerator openings that expose the water to the atmosphere must be covered with a 16-mesh, corrosion proof screen. All aerator or cooling tower surfaces coming in contact with the water should have a National Sanitation Foundation (NSF) Standard 61 coating to prevent chemicals from leaching. Aerators or cooling towers should be disinfected prior to use.

No water connection from any public drinking water supply system shall be made to condensing, cooling or industrial processes or any other system of non-potable usage over which the public water supply system officials do not have sanitary control, unless additional protection is provided at the meter in the form of an air gap or backflow prevention assembly as required by 30 TAC §290.44(h)(1). Water from such systems cannot be returned to the potable water supply as required in 30 TAC §290.44 (h)(2).

If the public water system is intending to remove trihalomethanes (THMs) using aerators or cooling towers, this is considered an innovative/alternate treatment process for review on an individual basis under 30 TAC §290.42(g). A system must request and receive approval for an exception to this code before construction plans and specifications are submitted.

Finalized and Approved by:

Joel Klumpp, Plans and Technical Review Section Manager, 11/10/2016

If no formal expiration date has been established for this staff guidance, it will remain in effect until superseded or canceled.

Revision History

Date	Action	Action by
5/18/2016	Revised	David Williams, P.E.
9/21/2016	Revised	Marlo Berg, P.E.