

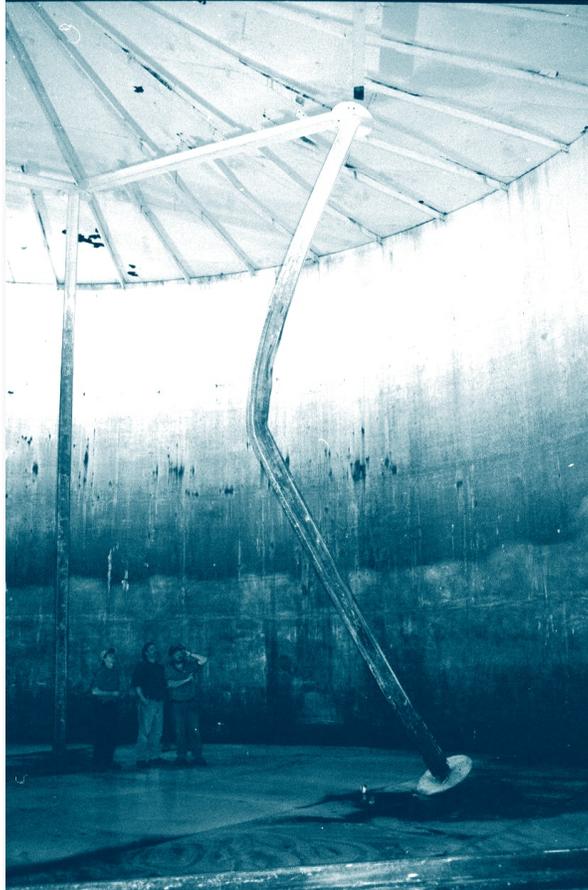
Your Water Storage Tank

The water storage tank (WST) is an integral part of most small water systems. It serves not only as a vessel to store water after it is treated, but also provides time for disinfecting chemicals to act against microorganisms before the water is distributed to consumers. Chlorine is the most popular and widely used disinfecting agent in Alaska. Given enough time to react, chlorine will kill most disease-causing organisms. This "contact time" or "CT", is critical to maintaining safe drinking water supplies. The WST also provides a readily available source of water for fire protection and, during certain times of the year, may be the only source of water available to the community for fire fighting purposes. The WST is critical to the public health and safety of the community.

Many parts of Alaska experience extremely cold temperatures during winter months, presenting a special challenge to small system operators. Most water storage tanks are insulated, but would eventually freeze during Alaska's long winters unless the water is heated and circulated within the tank.

The water is normally circulated from the tank to the treatment plant through an "add-heat system" -- a series of pipes, boilers, heat exchangers and temperature sensors -- and then back to the tank. The water temperatures must be closely

monitored by the system operator to avoid freezing and damage to the tank. The "add-heat system" must also be carefully operated and maintained to avoid potentially catastrophic system failure.



particles settle out of the water forming a layer of sediment at the bottom of the tank that must be removed. This requires draining the tank to gain access, manually removing the material, and cleaning the tank.

Cleaning intervals will vary depending on the quality of the water being treated and the efficiency of the treatment process.

Many systems in Alaska utilize streams and lakes as a source of water. "Surface water" is often less desirable than "groundwater" but in many cases is the best resource available. Surface water has a higher potential for being contaminated than water pumped from underground wells, or "ground water." Surface water has special regulatory requirements if used as a public drinking water supply. It can also introduce more sediments to the storage tank, thereby prompting more frequent cleaning intervals. Water storage tanks are usually cleaned twice a year, but may need to be accessed more often for the

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inspection and maintenance of other internal system components.

Periodic maintenance is required for the storage tank, itself. Material that is too small to be removed during the treatment process will enter the tank. In time, these fine

Large storage tanks will also have a chlorine injection port to enable the operator to maintain a good chlorine residual in the tank. This is especially important when water is pumped during the

summer months and stored for winter use. The chlorine injection port is commonly plumbed into the add-heat line.

Water quality is also an important consideration when using an "add-heat system." Pipes, valves, heat exchangers and even pumps can become clogged with mineral deposits and corrosion.

This build-up of material can be very rapid in some systems, especially in the heat exchanger.

Corrosion warrants special attention to the heat exchanger as well.

Corrosion can quickly erode the tubing walls in the exchanger and threaten the system with glycol contamination.

High water velocity through the exchanger increases tubing erosion, especially in combination with corrosive water. Routine preventive maintenance of these systems is essential to maintaining a safe and reliable water supply. An operator must know the characteristics of the water to develop a scheduled maintenance plan and checklist for the tank and "add-heat system."

Most rural communities have access to a Remote Maintenance Worker (RMW) who can provide assistance with storage tank cleaning and inspection. The RMW can also provide tips regarding other preventive

maintenance activities associated with the storage tank and "add-heat system", as well as the treatment plant.

The following is a general checklist that all operators of small systems that rely on water storage tanks for continuous year round service need to be aware of.



- ✓ Heat exchangers should be inspected frequently. Inspect for restricted flow due to excessive deposits or buildup. Pressure test the exchanger to protect against the introduction of untreated water or contamination.
- ✓ Special safety precautions should be taken to protect workers whenever the tank is entered. Confined space entry regulations must be followed. Personal protective equipment (PPE) should be worn by all

personnel.

- ✓ On initial entry to the tank, make sure the electrical source for lights and equipment is protected by a Ground Fault Circuit Interrupter (GFCI) device to prevent electrocution.

- ✓ Always provide an adequate fresh air supply.

- ✓ Any time the tank is accessed, inspect internal plumbing for damage or blockage. Make sure flow is completely unrestricted in the "add heat system."

- ✓ Ice formation is not uncommon in these tanks. Check structural members for damage caused by the ice.

- ✓ Inspect temperature sensing devices for accuracy and

damage.

- ✓ Take pictures to provide a means to compare internal tank condition from year to year and make note of any discrepancies.

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