NAME:

John M. Asplund Wastewater Treatment Facility

LOCATION

Anchorage, Alaska

PLANT SIZE:

58 mgd

INFRASTRUCTURE:

Fine screens; grit removal; primary clarification; thickening; belt presses; incinerator with scrubber system; scum concentrators; standby generator; and SCADA

Incinerator and control building.

Polymix system.

Control room.

By Jeff Zagoudis

The Next Generators

Alaskan wastewater plant protects community and environment with onsite chlorine gas generation

In the past decade, the John M. Asplund Wastewater Treatment Facility (WWTF) in Anchorage, Alaska, has undergone a number of improvements. These include new scum concentrators, a new standby generator and a SCADA system to increase operational efficiency. In 2011, the plant began revamping its disinfection process, with an eye toward revising the role of chlorine gas.

Safety First

As with most locations, Alaska presents its fair share of unique challenges to water treatment. At Asplund, high tidal ranges scoured the discharge area in Cook Inlet, with fast currents causing complete vertical mixing of the inlet waters.

The Asplund WWTF is the largest such facility in the state, serving all of Anchorage and receiving solid waste from the nearby Girdwood and Eagle River facilities. Anchorage Water and Wastewater Utility (AWWU) oversees all three facilities.

AWWU had been using chlorine gas for decades, applying it in both water and wastewater applications. The utility switched it out on the water side first almost a decade ago. The gas did the job, but there were other factors that led Plant Superintendent Todd Brunner and AWWU Treatment Division Director Richard Steckel to pursue alternatives for the wastewater facility.

The primary issue was how the plant received the gas. With limited suppliers in the area, the chlorine had to be shipped up to Anchorage in 1-ton containers; once it arrived, it was carried across town on the back of a truck. This was not economical, and it carried the risk of a leak.

"We are on the outland, so we are not right in town," Brunner said. "The biggest concern is the hauling of it. Environmentally, there have been a lot of studies on the potential for harmful side effects of chlorine in the receiving waters."

Steckel, Brunner and others with AWWU were thorough when evaluating their options. "We had a bunch of our engineers set up our own tables of why we use the gas and what would be better," Brunner said. "We included the cost of salt, the cost of water usage—the big drive was the potential for not being able to get chlorine because everything has to be shipped up here."

Ultimately, they selected Klorigen K-Series generators from Electrolytic Technologies Corp. (ETC). The new system will produce a 12.5% hypochlorite solution, generating chlorine gas as a byproduct of the process. With onsite generation, AWWU can eliminate the need to have chlorine gas shipped up to and through Anchorage. The K-Series—the larger of two units from ETC—can produce anywhere from 100 to 2,500 lb of hypochlorite solution and chlorine gas per day. Brunner estimates that the plant currently uses approximately 2,000 lb of chlorine gas per day.

"We went with the Klorigen unit because of its footprint and because of the amount of production," Brunner said. He also cited lower costs of salt, electricity and water associated with the system.

Testing the Waters

With the centerpiece selected, work has begun on designing the systems around the new generator. Asplund WWTF staff also has been working to ensure the new equipment works properly. Steckel and Brunner have been using the 0.8% solution to test the capabilities of their acquisition.

"We wanted to see what the handling characteristics were, how much dust it generated, how easy it was to load into a brine tank," Steckel said, "and find some of the issues that go along with this very fine, table-grade salt."

Some of the results were surprising, according to Steckel. "We have learned there are many differences in salt," he said. In one instance, a shipment of salt fouled up the new generators, requiring substantial cleaning before they could be used again.

Steckel continued: "99.96% pure salt is not all necessarily the same. The impurities that are in it can cause a lot of heartache and grief with the amount of cleaning you have to do with the cells and your ability to generate a good, strong solution."

In addition, the hypochlorite proved volatile and corrosive—an unforeseen combination. In an early test, it ignited inside the generation cells.

"The hydrogen gas was trapped in them, it wasn't fully submerged. We put power to them and blew them up," Steckel said. "The 0.8% is supposed to be very stable, and we are still figuring out what stable is."

In another instance, the hypochlorite dissolved a vinyl garden hose when it was being used for disinfection.

Upon installation, Asplund WWTF will be the last AWWU facility to make use of the chlorine gas containers. Girdwood stopped receiving them in December 2011, and the Eagle River has moved to ultraviolet disinfection. Brunner expects the new generators to be installed and fully operational by the end of 2013. WWD

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