



MEMORANDUM

To: Nederland Board of Trustees
From: Jason Morrison
Date: January 16, 2014
Re: Staff Report -- Public Works

Collections, Distribution, and Water Treatment Plant

The water plant has been running smoothly. This has allowed us to focus on the quirks at the wastewater plant. The inflow and infiltration (I&I) issues in the collections system still seem to be a major part of the issues we are having. This will be taken care of by spring runoff. A new valve was added at the intersection of Big Springs Drive and Valleyview Road in preparation for replacing the PRV (Pressure Regulating Valve) in the future.

Wastewater Treatment Plant

The most recent updates on the wastewater plant are included in the update memo attached.

Streets and Drainage

As to be expected with snow fall comes vehicle issues. We lost a transfer case on one of the pick-up trucks. It is still covered under warranty, but will be paid only after a bit of arguing with GM over whether or not we can use this truck to plow snow. What it comes down to is that newer-made trucks are not as durable as they used to be made. We purchased a new used plow truck that was traded in from Boulder County. This is an all-wheel drive Mack with a plow on the front and a sand box on the rear. It is a little older but still seems to have a lot of life left in it. It seems to have the power and gearing to handle just about anything we can throw at it. After some haggling over price, I think we got a pretty good deal. Since it came from Boulder County's yard up here, we have a pretty solid maintenance history and answers to any questions we may have.



MEMORANDUM

To: Board of Trustees
Alisha Reis, Town Administrator

From: Utilities Staff

Date: Jan. 7, 2014

Re: Nederland Waste Water Treatment Plant Update

It's been an exciting and challenging first 9 months at the new Nederland Waste Water Treatment Plant. Our new facility offers us the chance to clean water more thoroughly and release a higher quality effluent into Barker Reservoir. This plant has many capabilities that our old treatment system did not. The computer system (the SCADA) continuously monitors flow levels, temperatures and pump cycles. It sends alarms by calling our cell phones when it reaches abnormal levels and allows us the capability of looking at its screen from home. The plant follows the times we have inputted and turns the air and pumps on and off and opens and closes valves when it is told. This is where the term ~~an~~ automated comes from.

Automation

Our ~~an~~ automated plant is quite impressive, but we were all a little surprised with how much human interaction is needed. The plant does not know how to troubleshoot an issue or fix a problem. It does not evaluate the quality of the effluent it puts out. When the timed cycle is finished, the plant will shoot out water no matter what the color, turbidity (haziness due to particulates/sediment), pH level or smell is. This is dangerous for the ecosystem of Barker Reservoir and can result in standards violations for our town. Therefore, constant monitoring is required 7 days per week.

With our more sophisticated plant came higher expectations for the water we are putting out. Our intergovernmental agreement with Boulder County, including contribution of

funds for installation of our sand filters and testing/maintenance has required us to monitor strict phosphorous standards. This requires more time in the lab and tweaking of our %automated+set points. Also, the old system held onto wastes for approximately 28 days. The new plant's retention time is only 28 hours. That's a huge difference. This means we want to test what's going on in each stage.

Testing

We have worked hard building our lab to run many tests on site. The equipment we have purchased allows us to monitor what is in our system and fix issues before our samples go to the State for official testing. Our records will be valuable to predict seasonal changes in the future. Nederland's extreme cold temperatures slow down our healthy bugs and prevent them from doing their jobs effectively. We have also faced dilution problems due to infiltration of groundwater and washout from the floods. Professional consultants we have contacted have offered many different pieces of advice. We have been adjusting our processes based on this advice and our lab testing. It takes at least a year (at least) of operating a new plant to determine the seasonal impacts on the treatment processes, particularly impacts of temperature and other factors on the bacteria.

Currently, it is necessary to have daily human involvement in the plant. We hope that this involvement will decrease over the years as different issues are dialed in and solved, but we will always need someone here to check the daily processes of the plant and watch for abnormalities. Only an operator can make the subjective observations to make sure we are putting out water that is clean, safe and odorless.

Tests we are running:

- pH
- Temperature
- Ammonia Nitrogen
- Phosphorous
- Nitrate
- Sludge measurements
- Visual observations
- Microscopic observation

Tests we are preparing to run and the necessary equipment:

- Biochemical Oxygen Demand (BOD) Test: Indicates you how much food is required for the bugs to thrive, the result the effluent will have on receiving waters, and the amount of oxygen required to oxidize material wastes.
 - 5-day test requiring an incubator (purchased)
- Total Solids Test: Serves as an indicator of abnormalities in the system and allows for timely corrective action to prevent upset in treatment process.
 - Requires an oven, scale, desiccators and vacuum filter (purchased)

- Volatile Solids Test: Indicates treatment plant's effectiveness. The volatile solids total will also tell us our food-to-microorganism ratio.
 - Run with muffle furnace (purchased)
- Mean Cell Residence Time (MCRT): Tells us how long bugs stay in the system from start to finish.
 - Run based on Total Suspended Solids number
- Oxygen-Reduction Potential (ORP): Indicates how much oxygen we need to add to the system.
 - Part of plant design (awaiting for probes from Aslan)

Miscellaneous Challenges

Other issues we have had:

- Blowers needed to be manually reset when the power went out. This problem has now been corrected.
- Caustic lines were freezing. Earlier this month, staff had to warm these with a heat gun. This was dangerous and time consuming. Aslan has now fixed this problem.
- More equipment has required more maintenance. Pumps, valves and machinery must be manually worked on. Pump clogs need to be manually removed.
- Chemical rotation is difficult and time consuming.

Ongoing Warranty Issues:

- Oxygen-Reduction Potential (ORP) probes do not work. This is a warranty issue, and we are working with the general contractor (Aslan) to have them replaced.
- Decant valve is currently freezing. This requires staff to come in at odd hours and open manually. We are working with Aslan to resolve this issue.