



Orem Public Works Advisory Commission Meeting Minutes

7:00 a.m. Tuesday, Apr. 16, 2019
Department of Public Works
Orem Water Reclamation Facility
1797 W 1000 S
Orem, Utah 84057

APPROVED

CONDUCTING: KC Shaw

ATTENDING:

Commission Members: KC Shaw, Drew Clark, Carol Walker, Val Hale, Devin Rich

City Staff: Chris Tschirki, Public Works Director; Neal Winterton, Water Resource Division Manager; Reed Price, Maintenance Division Manager; April Nielson, Public Works Advisory Commission Secretary; Giles Demke, Public Works Reclamation Manager

Commission Members Luke Peterson, Stan Roberts, Tai Riser, and Tod Hadley were excused.

KC Shaw opened the meeting at 7:00 a.m.

Mr. Shaw first invited a motion to approve the PWAC meeting minutes of January 15, 2019. Carol Miller moved to approve the minutes, as presented. Devin Rich seconded the motion. The motion passed unanimously by voice vote.

Mr. Shaw invited Public Works Director, Chris Tschirki, to explain the plans for this meeting. Mr. Tschirki explained that Wastewater Section Manager, Giles Demke, would be making a presentation for the Public Works Advisory Commission. He indicated that due to the rainy weather, the outdoor tour of the Orem Water Reclamation Facility would take place at another time. He indicated that tours by interested parties were always welcome. It was noted that tours were also available for the Pre-Treatment Facility, as well. The Water Reclamation Facility treats sewage for Orem, Lindon, and a small portion of Vineyard. The facility was expanded in 2011 as a result of a grant. Provo has its own facility in East Bay and will be spending around 250 million dollars to re-do its facility. Mr. Tschirki indicated that in addition to the Water Reclamation Facility, Orem City has a water treatment facility. It was noted that about 60 percent of the water that is used by Orem residents goes into the ground to water the landscaping. The remaining 40 percent of the water is collected in homes and other facilities and ends up at the Water Reclamation Facility before it is returned to the environment. The need for public education is ongoing because there are still many misconceptions about how water is produced and transmitted to the residents.

Mr. Tschirki then turned the meeting over to Mr. Demke to make his presentation.

Mr. Demke went through a PowerPoint presentation he had prepared. He began by showing different bottles of water to illustrate how well waste water is cleaned before it is returned to the environment. He noted that waste water is 98 percent water. It's the other two percent about which he is most concerned.

Mr. Demke then showed a short video that emphasizes the stark contrast between countries that have waste water treatment facilities and countries that do not have such facilities.

Mr. Demke said that the Orem Water Reclamation Facility serves around 107,000 people: residential, commercial, and industrial. There are 300 miles of pipe in the ground that range from four-inch to 48-inch diameters. There are seven sewer lift stations on the system, with one more that will soon be constructed.

Mr. Demke clarified that the Water Reclamation Facility is a recycling factory. It takes whatever water is sent to it and then prepares it to return to the environment. With regard to storm water, Mr. Demke explained that storm water is cleaner than sewer water. When a rain event occurs, a waste water treatment facility can be overwhelmed.

Another short video further illustrated the need for water treatment facilities. Without clean water, life would stop.

Mr. Demke noted that the Water Reclamation Facility has 29 employees. Their passion is to ensure that water is clean and safe.

Mr. Demke next showed a PowerPoint slide that provided a historical overview of the facility. It started in the late 1950s, and it underwent a major upgrade in 2011. There is only one waste water treatment plant for all of Orem. Consequently, the facility is in operation continuously throughout the year; it never shuts down. The facility provides primary and secondary treatment. The secondary treatment process is an oxidation ditch. The facility operates under a UPDES permit (Utah Pollutant Discharge Elimination System). It far exceeds the specifications of the permits. Mr. Demke explained that the plant is rated for 13.5 mgd (million gallons per day) average flow. The average daily flow is currently about 8.5 mgd. Its peak hour flow capacity is 21.6 mgd.

Mr. Demke next explained the term BOD5 (5 day Biochemical Oxygen Demand). It refers to things that cannot be seen in the water because it is carbon. It can be measured by how much oxygen it consumes. The facility can pull out 40,000 pounds of BOD per day.

Mr. Demke then explained TSS (Total Suspended Solids), which can be seen, thus making it easier to remove. The facility can remove 40,000 pounds of TSS per day. In addition, the plant can pull 4,500 pounds of ammonia per day. Ammonia is a by-product of the sewer system.

The next PowerPoint slide illustrated how many five-gallon buckets it would take to equal 13.5 million gallons, which would equal 31 five-gallon buckets per second when the facility is running at capacity. He noted that the Orem plant is not large compared to more urban plants.

The next PowerPoint slides provided an overview of the sewage treatment process. He noted that all sorts of things get flushed down the toilet or sent into the sewer system. First off, a step screen filters out large objects. He noted that toilet paper dissolves. However, flushable wipes do not dissolve and can plug up pipes and equipment. Miscellaneous discussion ensued on how the public could be educated on what they can flush and what they should not flush down their toilets.

Once the inorganic products are removed from the sewer water, the water can be treated through a primary clarification process, in which the heavy products are allowed to sink to the bottom and then pumped out. The water that goes off the edge of the clarifiers is 60 percent cleaner than the water that enters the center. The primary clarification process holds out about 65 percent of TSS and about 35 percent of BOD.

The next stop is the secondary treatment process, which uses oxidation ditches to deal with activated sludge and biological nutrient removal (BNR). The BNR process removes total nitrogen (TN) and total phosphorus (TP). Orem City has three oxidation ditches, each with a capacity of 3.8 million gallons. There are three separate zones. The anaerobic zone has no oxygen and is where phosphorus removal takes place. The next tank is anoxic. It has oxygen, but it is in the form of nitrates and nitrites, so it's available to the bugs. That tank is where nitrogen removal takes place. The third zone is the aerobic zone. It is specifically designed for BOD, or carbon, removal. Air is supplied for the micro-organisms. Mr. Demke answered clarifying questions on the process.

Mr. Demke next explained what makes an oxidation ditch work. He then showed a PowerPoint slide of microscopic organisms, called the "bugs," which include nematodes, water bears, amoebae, free-swimming ciliates, flagellates, and stalked ciliates. These bugs are the key to the success of the treatment process because they remove BOD (carbon). The problem is that they don't know when to stop eating and to stop reproducing. At that point they die, so the water can no longer be treated. Consequently, the workers have a process of removing the bugs so that they don't overpopulate, overeat, and then die. Mr. Demke clarified that the bugs are microscopic and invisible to the naked eye.

Mr. Demke explained that the facility is called a mechanical treatment plant because pumps and aerators to move the water around. However, the process is primarily natural and biological. He noted, however, that though nature is good at cleaning water, it cannot clean water at the scale at which humans are producing unclean water. The water treatment facilities greatly intensify the natural process for cleaning water.

Mr. Demke next showed a PowerPoint slide of the aeration blowers that are used to oxidate the water. There are six blowers and are 200 horsepower. They are just under two years old. The pumps are NexTurbo and are performing flawlessly. The previous blowers were far inferior to the blowers now in use. Each pump costs around 170,000 dollars. The City does maintenance on the blowers, which to date has consisted only of greasing the motors. They will undergo an oil change at two years.

Discussion ensued on taking a tour. However, since it was raining, a tour was not feasible during this meeting because the majority of the plant is outside.

Mr. Demke's next PowerPoint slide included a picture of a secondary clarifier. The water is chocolate milk brown. Once it hits the edge of the tank, it is clear and is finished. The water next goes to the disinfection site, which entails the use of ultra-violet light (UV) to render bacteria, viruses, and protozoa incapable of reproducing and infecting, thereby making them harmless. Prior to 2012, the facility used chlorine to disinfect. He explained that the switch was made because UV is safer for the community.

There was discussion on the possible impact water treatment would have on the algae problem that has occurred at Utah Lake. Mr. Demke said that there is a lot of run-off water that goes into the lake that does not undergo any treatment. To try to alleviate the problem, by January 1, 2020, all waste water treatment plants will be required to meet a one-milligram-per-liter threshold of phosphorus that is going into the lake. Currently the facility is running at about two and one-half milligrams per liter. It was noted that there is debate of the origin of the phosphorus that is in Utah Lake. Consequently, both Orem and Provo have been running at a low level of phosphorus, so there is debate regarding the source of the algae blooms in the lake. A study is taking place to try to determine the primary sources of algae in the lake. The cost to consumers statewide to remove phosphorus could potentially increase substantially. However, there are so many factors in nature that impact phosphorus levels in lakes throughout the state that the solution is hard to determine at this point in time. Even pristine lakes that receive no water from waste water treatment facilities have algae problems because nitrogen and phosphorus naturally occur in nature.

Mr. Demke noted that during a major rain event in October 2018, Central Valley, which has a canal that runs through its property, had the University of Utah do some studies on the water in the canal that was dumping into the Jordan River. The researchers discovered that the phosphorus levels in that storm water were at 200 milligrams per liter, as opposed to the 2.5 milligrams per liter that are leaving the Orem Water Reclamation Facility. The nitrogen in that storm water was over 2,000 milligrams per liter, as opposed to just below one milligram per liter that is leaving this facility.

Mr. Demke next addressed the solids that are removed from the water. He presented a PowerPoint slide of the “digesters” that are used to break down the solids. The process is anaerobic, so there is no oxygen. The digesters deal with liquids, solids, and gas. Orem uses a two-stage process: a Thermophilic Anaerobic Digester followed by a Mesophilic Anaerobic Digester. The difference between the two digesters is the temperature. The thermophilic digester runs at about 135 degrees F. The mesophilic digester runs at about 98 degrees F. Waste water comes in at about 55 degrees F, so it has to be heated. The by-product of this process is methane gas, which can then be used to heat the water to heat the digesters.

From the digesters, the sludge goes through the dewatering process. It consists of two belt presses. The material comes in at about one percent and leaves at about 18-20 percent solid coming off the bottom. The rest of the water is returned for further treatment. The material that comes off is called bio-solids. The bio-solids generated by the facility are deemed as Class B solids, so they can be used for land reclamation. The solids generated by the facility are used by the farmers at the south end of the valley for application on alfalfa fields. Class A solids can be used anywhere as fertilizer. The Orem facility could be upgraded to produce Class A solids; however, it would entail an added cost. The facility generates 1,100 tons of Class B solids each year. The farmers love the product because it is high in phosphorus and nitrogen.

The water that has been reclaimed is ultimately put into Utah Lake.

In response to the question regarding the treatment of primary and secondary water, Mr. Gemke explained that primary water goes into homes and ends up in the sewer system. Secondary water is irrigation water and ends up in the storm drain. Right now Orem does not do a secondary system. The facility will produce 4.5 million gallons for secondary water for irrigating various land facilities throughout the City. It will save the City money and water.

Mr. Demke noted that he was happy to do his presentation for any and all interested parties. Mr. Tschirki said that the City was earned many awards for the work being done with water reclamation. In response to the question regarding the capacity of the facility to handle growth in Orem, Mr. Demke said he anticipated the plant should be able to handle growth for the foreseeable future.

Note: Carol Walker was excused from the meeting at 7:50 and Val Hale was excused from the meeting at 7:55.

Mr. Tschirki said that future meetings would deal with upcoming projects, one of which is water re-use.

Drew Clark moved to adjourn the meeting. Devin Rich seconded the motion. The meeting adjourned at 7:58 a.m.