110042-WS

RECEIVED-FPSC

11 SEP 16 AM 10:22

COMMISSION
CLERK

ENGINEERING EVALUATION

For

FLOW METER INSTALLATION

PINE RIDGE PARK
WASTEWATER TREATMENT FACILITY

OKEECHOBEE, FLORIDA
OKEECHOBEE COUNTY

FDEP ID No: FLA013928
FDEP PERMIT No: FLA013928

PREPARED BY:

William M. Cummings, MSCE, PE
CUMMINGS ASSOCIATES, Inc.
12864 SQUIRREL TREE COURT
JACKSONVILLE, FLORIDA
(904) 220-0270
Florida Board of Professional Engineers Certificate of Authorization 25885

50389
9/5/11

AUGUST 2011

DOCUMENT NUMBER-DATE
06684 SEP 16 =
FPSC-COMMISSION CLERK

History

The actual date that this facility was installed is unknown, but appears to be at least 30 years old. The facility consists of a main lift station with alternating pumps, four 5,000 gallon aeration tanks, one circular clarifier with a surface area of 53 ft^2 and a weir length of 23 lineal feet, and a 500 gallon baffled chlorine contact tank with chlorinated discharge to a 12,200 ft^2 single cell percolation pond. A staff gauge for measuring percolation pond levels was installed sometime prior to February 2008. Effluent metering has been calculated by pumping rate and elapsed time. The pumping rates and time meter have been determined and checked annually by Florid Rural Waters Mr. Roger Kastel, Alan Slater and Tom Stirtzinger all pumping rates were determined using a Dynasonics portable flow meter. There have been no major changes to the plant processes other than pump replacement. The permitted capacity of this facility is 0.020 mgd (TMADF).

During the permit renewal in 2003, it was determined that there was an infiltration/inflow problem in the collection system. The problems that were found poor mobile home connections, cracked cleanout caps, manhole problems and a cracked sewer line, these were corrected during 2004. The sludge build up in the bottom of the aeration tanks at that time appeared to be only in aeration basins #2 and #4 and was considered to be the result of clogged diffusers causing a lack of mixing capability to keep the solids in suspension. Correction of the diffuser problem was assumed would put the solids back into suspension, treat and settle them in the clarifier for wasting to the digesters and then for hauling for final disposal. Apparently this did not completely solve the problem as the new operator Mr. Jim Witteck who started operating the plant in December 2006 cleaned all four tanks in February 2009 and advised that the tanks each had a very large volume of sand and grit. The tanks were probed August 31, 2011 with not more than inch of sludge in the tank bottoms and there was no sand or grit in the mixture.

For some unknown reason, new pumps were installed in December, 2005. Mr. Allen Slater of Florida Rural Water conducted a pumping rate calibration on December 28, 2005 indicating that pump #1 was calibrated at 259 gpm and pump #2 was calibrated at 133 gpm. It was realized that these instantaneous flow rates were probably excessive causing overloading of the clarifier with possible solids carry over. To correct this problem a bypass valve was installed on each pump discharge line to decrease the instantaneous flow to the plant. The annual pumping rate calibration on September 10, 2007 was performed by Mr. Tom Stirtzinger of Florida Rural Water Association who advised that all annual pumping rate calibrations were measured in the force main between the bypass and the wastewater plant. The flow rates measured in 2007 indicated a decrease in the instantaneous flow rate of each pump reaching the plant. It should be explained that the flow measurement taken after the bypass will give accurate readings as the flow being bypassed back into the lift station is not measured until it is discharged through the force main to the plant. The two pumps were replaced with smaller discharging pumps in May 2008, both pumps were calibrated at 94 gpm by Mr. Tom Stirtzinger on April 28, 2010 and at 94 and 109 gpm on February 16, 2011. The bypass valves were closed in February 2008. There was no bypass line from any of the aeration tanks to the lift station as mentioned in Mr. Warren H. Spurge II, P.E. of George F.

Young, Inc. in his "Engineering Evaluation" of February 11, 2008. It appears that the bypass line he mentioned was in fact the bypass valves on the pump discharge lines.

Rain Data

The Rain to Pond Correlation Charts were also reviewed comparing rain gauge readings with the daily flows for the period January 2010 to July 2011. It should be noted that the flow column has no flow listed for a number of days of the month. The flow recording is only required 5 times per week. The flow number following the missing flow data is the cumulative flow for that time period. The number of times rain as recorded the wastewater flows decreased 17 times, remained the same 10 times, while the flows increased 27 times. The range of flow variation for the period ranged from a decrease in 11,000 gpd to an increase of 18,000 gpd. For a rainfall of 0.1 to 0.5 inches which occurred 13 times, 11 times the flow decreased, 6 times there was no change and 14 times the flow increased, the range was a decrease in 8,000 gpd to an increase of 8,000 gpd. Rainfall of 0.6 inches to 1.0 inches occurred 9 times, 3 times it decreased, 1 time it remained unchanged and 5 times it increased, the range was from a decrease 4,000 gpd to an increase of 6,000 gpd. Rainfall ranging from 1.1 to 2.0 inches which also occurred 9 times producing a range of a decrease of 4,000 gpd to an increase of 10,000 gpd: flows decreased once, remained unchanged 3 times and increased 5 times. There were 3 times rainfall measured between 2.1 to 3.0 inches, twice the flows decreased and it increased once, flows ranged from a decrease of 11,000 gpd to an increase of 1,000 gpd. The highest rainfall events were 4.6 and 5.5 inches the daily flow increased 17,000 gpd and 18,000 gpd respectively.

Conclusions on Inflow/Infiltration

The rainfall data indicates an inflow/infiltration problem for rainfall events in excess of 4 inches, however the instances of this high amount of rainfall is considered extraordinary, fairly rare and beyond design requirements for small collection systems. Further the probing of the aeration tanks indicates that a minimal amount of sand has entered the collection system in over 2½ years since the last cleaning of the tanks furthering the conclusion that any inflow/infiltration is not major. It should be noted that the capacity of this facility appears not to have been exceeded since December 2003, January and February of 2004 prior to the completion of the corrective measures found during the inflow/infiltration study.

Percolation Pond Levels

The staff gauge reads 36.00 feet at its lowest point which is not the bottom of the pond and 33.00 is the approximate elevation of the bottom of the emergency overflow. The readings that show below gauge means the pond level is below 33.00 ft, but not at the bottom. The 0 reading indicates that the pond was dry. From January 2010 to April 2011, the pond level only changed 0.1 of a foot from 33.77 to 33.17; the monthly rain accumulation per month went for a low of 0 inches to 13.2 inches per month. The month

of June 2011 3.9 inches of rain fell, the daily flow ranged from 11,000 to 18,000 gpd and the pond remained dry. The rainfall and daily flow rates to the plant appear to be handled by the percolation capacity of the pond. It is further felt that the pond level is influenced by ground water elevation; the pond went dry after 6 months of fairly dry weather. It should also be noted that the accumulated sludge on the bottom of the pond was not more than ½ inch along the edges of the pond which is further indication of the ponds ability to handle the flow to the plant and that the pond is influenced by ground water levels.

Effluent Flow Meter

The reasons for the recommendation for the installation of an effluent flow meter in Mr. Warren H. Spurge II, P.E. in his report "Engineering Evaluation" appear to be the pipe that connects an aeration tank back to the lift station that allows the flow rate to the plant to be adjusted which "undermines the accuracy and reliability of historical flows." As stated above there is no known or evidence of a pipe between the lift station and one of the aeration tanks. A pipe hydraulically cannot alter the flow rate to the plant; the pump discharge sets the flow rate. As stated above, there were two bypass valves installed on the pump discharge lines. By opening these valves, the flow rate to the plant can be lowered. This was done to reduce the hydraulic surge of the large pumps that were installed in 2005. This will not undermine the accuracy of flow measurement as long as the pumping rate is determined between the bypass valve and the first aeration tank. Mr. Tom Stirtzinger has advised that the pumping flow rates were measured on the force main between the bypass valves and the first aeration. The flow that is returned to the lift station is not included in the pumping rate; it just takes longer for the pump to evacuate the lift station. Therefore, the accuracy of using the pumping rates and elapsed time meters is not undermined. It may be that Mr. Spurge misunderstood someone mentioning a bypass, assuming that a pipe was being used.

Under the Conclusions it is stated that "A flow meter should be installed in the effluent line to the percolation pond to accurately and reliably (sic) measure total flow from the plant. Flows and peak factors forward will then be accurate and representative." It is agreed that a flow meter would more accurately measure total flow and peaking factors could be more accurately calculated. However, as FDEP Rules and Regulations indicate, pumping rates and elapsed time meters are adequate for total flow measurement for wastewater treatment plants under 100,000 gpd [Rule62-601.200(17)] and there are no references of the need for peaking factors. As also stated above, flow measurement using pumping rates and elapsed time meters are considered accurate. Peaking factors using Ten States Standards have been calculated in previous Updated Capacity Analysis Report submitted during the last permit renewal and was calculated as 4.1 based on the design population at 100% occupancy.

It should also be noted that Mr. Tom Stirtzinger when asked as to the installation of a flow meter, he stated that he did not see the necessity of its installation as he felt the flow measurement is accurate for a 20,000 gpd facility.

Effluent Quality

PINE RIDGE MANAGEMENT CORP.
P.O. Box 307
Lake Placid, FL 33862-0307

UNITED STATES POSTAL SERVICE

1000

32399

U.S. POSTAGE
PAID
LAKE PLACID,FL
33852
SEP 14, 11
AMOUNT

$0.44
00065171-01

Office of Commission Clerk
2540 Shumard Oak Blvd.
Tallahassee, FL 32399-0850

Att Robert Simpson
Docket No: 110042-WS

32399$0850