

Key Largo Wastewater Treatment District Board of Commissioners Meeting Agenda Item Summary

Meeting Date:
February 20, 2018

Agenda Item Number: L-1

Agenda Item Type:
Information / Presentation

Agenda Item Scope:
Review / Discussion

Recommended Action:
Discussion

Department:
Engineering

Sponsor:
Ed Castle

Subject:
Update on H2S Monitoring at Vacuum Stations

Summary of Discussion:

Staff has come up with a method of safely sampling the odor control units at the vacuum stations manually and recommends that the in-line continuous monitoring of H2S be removed from further consideration. This will save the estimated capital expense of \$222,078 and safely achieve the same goals.

Reviewed / Approved

Operations: _____
Administration: _____
Finance: _____
District Counsel: _____
District Clerk: _____
Engineering: _____

Financial Impact

\$ (222,078.00)
Expense
Funding Source:

Budgeted:
Yes

Attachments

1. Memo from WEC with data and details for consideration.
2. Odor Complaint History
3. Copy of memo from December 19, 2017 Board meeting.

Approved By:  Date: 2-12-18
General Manager



MEMORANDUM

To: KLWTD Board
From: Ed Castle, PE
Date: February 6, 2018
Re: Update on H₂S Monitoring at the Vacuum Pump Stations

The H₂S monitoring system project was first presented to the Board at the December 19, 2017 meeting for discussion. The Board provided comments and asked that the proposed project be brought back for further consideration. Since that time, KLWTD staff and WEC have met and discussed alternative ways in which the goal of reduction in the annual cost of activated carbon could be achieved without a large capital investment.

Manual testing of H₂S involves opening a valve that may discharge H₂S into the atmosphere. Since two of the vacuum stations have the odor control systems located inside the vacuum station buildings, the potential exists for H₂S to build up to hazardous levels if the valve were inadvertently left open. This potential for creating a deadly atmosphere was one of the major reasons for proposing continuous monitoring rather than manual sampling.

Ryan Dempsey suggested that the potential hazard could be eliminated by extending the sample piping to the outside of the two vacuum stations with interior odor control systems. If all the sample ports are located in open atmosphere, the potential to create a hazardous atmosphere in a building is eliminated. The modified sample piping can be installed by the Maintenance Department using PVC pipe and fittings at a very low cost, estimated to be under \$500 for each of the two vacuum stations.

Staff recommends that the sample piping be installed at all vacuum stations, with the piping extended to the exterior of the two stations with interior odor control systems, and that a schedule of manual sampling for H₂S be implemented. The same monetary savings will be achieved without the estimated \$222,078 capital investment.

The Board also requested a summary of odor complaints to document if the vacuum stations are a source of odors. The odor complaints received in 2017 are provided in attached table.

The memo from the December 19, 2017 meeting is attached for review.

Odor Complaints in Collection System

Month-Yr	Address	Near Vac Station?	Total Complaints	Vac Station Complaints
Jan-17	6 Atlantic Drive	N	1	0
Feb-17	Lot #325 Calusa	N	6	1
	6 Atlantic Drive	N		
	200 Beach Road	N		
	766 Musa Drive	N		
	Lot #395 Calusa	N		
	Vacuum Station A	Y		
Mar-17	49 Silver Springs Drive	N	3	0
	No address	N		
	2 Avenue D	N		
Apr-17	166 Corrine Place	N	3	0
	29 Mangrove Lane	N		
	330 3rd Road	N		
May-17	Vacuum Station J/K	Y	2	1
	158 Dickie Way	N		
Jun-17	No Complaints		0	0
Jul-17	15 Mockingbird Road	Y	1	1
Aug-17	15 Mockingbird Road	Y	2	1
	1305 Calder Road	N		
Sep-17	8 Andros Road	N	3	2
	21 Mockingbird Road	Y		
	21 Mockingbird Road	Y		
Oct-17	5 Mangrove Lane	N	5	0
	5 Mangrove Lane	N		
	7 Exuma Road	?		
	64 Avenue B	N		
	174 Corrine Place	N		
Nov-17	775 Bostwick Drive	N	3	0
	22 Osprey Road	N		
	236 2nd Road	N		
Dec-17	29 Mangrove Lane	N	2	0
	35 South Drive	N		



MEMORANDUM

To: KLWTD Board

From: Ed Castle, PE

Date: December 12, 2017 (*Corrected version*)

Re: Hydrogen Sulfide Monitoring at the Vacuum Pump Stations

Hydrogen Sulfide (H₂S) is a gas that forms in sewer collection systems. It is highly toxic as well as being one of the major sources of odors in wastewater system. The odor is typically described as a rotten egg smell. H₂S forms whenever there are low levels of oxygen in the wastewater or in the pipes carrying the wastewater.

Odor complaints from residents living near to the District's vacuum pump stations (VPSs) are fairly infrequent. However, the District is committed to having zero odor complaints. The Field Operations staff works diligently to ensure that the odor control units at the VPSs are not emitting odorous air.

The odor control systems at the VPSs are dual stage, consisting of an Iron Sponge media tank followed by an activated carbon tank. The intent of the design is for the Iron Sponge media to react with the H₂S, removing it from the air stream prior to final polishing of other odorous compounds in the activated carbon tank.

Activated carbon will also take out H₂S, so any H₂S that passes through the Iron Sponge is adsorbed by the activated carbon. However, activated carbon is expensive, and adsorbing H₂S causes the activated carbon to be exhausted more quickly. The Iron Sponge is placed in front of the activated carbon so that H₂S is removed before reaching the more expensive activated carbon system. However, like activated carbon, the Iron Sponge media also has a limited ability to remove H₂S. Once the Iron Sponge media is exhausted, the H₂S passes through to the activated carbon tank.

The most economical means of operating the odor control system, while still striving for zero odor complaints, would be to let the Iron Sponge remove H₂S. Then as soon as the Iron Sponge media is exhausted and H₂S begins to discharge, the Iron Sponge media would be changed, extending the life of the more expensive activated carbon.

Based on the expected useful life of the Iron Sponge media and the activated carbon media, removing H₂S in the Iron Sponge units would save approximately \$35,000 per year in media costs. Currently, the District is spending over \$50,000 per year on

activated carbon. Effective use of the Iron Sponge units would reduce the annual cost of replacement media to about \$15,000. Effective use of the Iron Sponge units depends on knowing when the media needs to be regenerated.

Currently, the District has no way to determine when the Iron Sponge media is exhausted and needs to be regenerated. A gas detector can be used to test for H₂S in the piping between the Iron Sponge and the activated carbon tank. The gas detectors can be either manual or in-line.

Manual testing would require that a sample port be installed. A staff member would be required to open the port and insert the gas detector probe to perform the test. While a port could be designed that would allow manual testing without allowing H₂S to escape into the VPS, there would be the potential for someone to inadvertently leave a valve open, discharging H₂S into the VPS. Since a number of the odor control systems are installed inside the VPS, there is a potential for a deadly buildup of H₂S in the building should a leak occur.

A safer alternative would be to permanently install an in-line H₂S tester at each VPS, reducing the potential for human error. The estimated cost for installing an in-line H₂S meter at every VPS and integrating it into the existing SCADA is approximately \$222,100. With an annual savings in media cost of \$35,000, the payback period would be 6.4* years.

The table below summarizes some of the benefits and risks of the two alternatives for H₂S monitoring.

In-Line H₂S Monitoring	Manual H₂S Monitoring
Saves \$35,000/year in media replacement	Saves \$35,000/year in media replacement
Helps achieve zero odor complaints	Helps achieve zero odor complaints
Functional 24/7, with automatic notification of H ₂ S bleed-through	Occurs at frequency established by District, 1/day or 1/week, no automatic notification of bleed-through
No need for staff to open valves, low potential for H ₂ S leaks into VPS	Staff must open and close valves to insert probe, creating potential for H ₂ S leaks into VPS

The third alternative is the No Monitoring alternative. If this option is chosen, it is recommended that a regular schedule of regeneration or replacement of the Iron Sponge media be established based on theoretical calculations of the useful life of the Iron Sponge media.

**Note: The original memo was presented to the Board with an incorrect calculation of payback period. This is a corrected version reflecting the actual payback period.*