Eric Fryson

From: Dana Rudolf [drudolf@sfflaw.com]
Sent: Tuesday, January 17, 2012 4:23 PM
To: Filings@psc.state.fl.us
Cc: Martin Friedman; Bart Fletcher; Martha Brown; reilly.steve@leg.state.fl.us
Subject: Docket No. 110264-WS; Application for increase in water and wastewater rates in Pasco County by Labrador Utilities, Inc.
Attachments: PSC Clerk (Resp to Dec 21st Third Data Request).ltr.pdf

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b) Docket No. 110264-WS
Application for increase in water and wastewater rates in Pasco County by Labrador Utilities, Inc.

c) Labrador Utilities, Inc.

d) 13 pages

e) Response to Staff's December 21, 2011 request for information.

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January 17, 2012

VIA E-FILING

Ann Cole, Commission Clerk
Office of Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0850

Re: Docket No. 110264-WS; Application for increase in water and wastewater rates in Pasco County by Labrador Utilities, Inc.
Our File No.: 30057.199

Dear Ms. Cole:

This correspondence is in response to Staff's December 21, 2011, request for the following information:

1. According to Order No. PSC-09-0711-AS-WS, Attachment A page 1 of 5 (Settlement Agreement between Labrador Utilities, Inc., and Office of Public Counsel), the Utility agreed to work with the customer representatives to study the wastewater treatment plant odor problem and if necessary, propose cost effective measures to address the odor problem. Please describe the steps taken and results achieved to address this problem to date.

RESPONSE:

HEADWORKS:
The Utility staff has continued to change out the carbon media in the carbon filtration units as necessary to maintain the functionality of the carbon media. Two of the four filters will have their media replaced in January. Historically, the filter media lasts about 12 months before the granular carbon becomes saturated and no longer performs satisfactorily. Utility staff also changed the vacuum piping configuration on Surge Tank #2 as well as revamped the tank covers to reduce weight. Additionally, to improve visibility and ease of maintenance, the Utility has installed clear plastic panels so the operator is able to view tank contents. This also reduced the covers' weight so that one man can easily perform necessary maintenance of the tank. This work reflects the evolution of the odor control

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equipment that was designed and constructed as a pilot project to test the efficacy of using granulated carbon filters to treat the gases at the headworks. This pilot study was proven to be successful over the last three years and will continue to be used by the Utility to minimize odor generation. In November, 2011, a contractor removed grit and other inorganic material from the two surge tanks as well as removed floating organic material from those tanks in order to prevent the buildup of precursors of odor generating material.

TREATMENT PROCESS:
The weir and baffle on Clarifier #1 were modified to reduce pop-ups caused by bulking sludge from going over the weir and traveling downstream to the chlorine contact tank. This modification improves the efficiency of the disinfection process as well as preventing a buildup of sludge in the contact chamber. In addition, settled solids were cleaned out of both splitter boxes as a standard maintenance activity.

CUSTOMER INTERACTION:
In April 2011, the Utility staff met on site with Forest Lake Estates Co-Op's ("FLEC") attorney (Richmond Flowers) and engineering consultant (Greg Menniti) who toured the plant and lift station in order to observe the operation of the facilities and identify if plant operations would be contributory to the production of malodors. If the consultant observed the presence of malodors, the consultant was to offer recommendations in his report that addressed the situation (see attached Menniti report). The engineering report generated by Menniti contains no specific recommendations regarding the operation of the Labrador WWTP, which would indicate that the plant was being operated properly. There were no malodors present beyond the property boundary on the day of the site visit nor during recent facility inspections conducted by FDEP staff. In November, 2011, FLEC requested that a joint resolution conference be held to discuss all outstanding issues associated with the civil action initiated by FLEC in 2008. A February date for this conference is in the process of being established. There have been two odor complaints received in the fourth quarter of 2011, both from Eva Rush. On both occasions the on-call operator was dispatched immediately, and in both instances, no odors were present at the site and the plant was operating as designed (no equipment malfunctions were evident).

In summary, the operation of the Labrador WWTP over the last 12 months has been the best it has ever been, and as a result, the Utility has had a very positive 12-month period in terms of operational issues. Customer odor complaints have been minimal over that time period, and when they have occurred, staff has been responsive. The Utility continues to operate and maintain carbon filter equipment located at the headworks to the plant in order to reduce or eliminate the carry of odors beyond the site boundary. The installed odor control equipment has proven to be very cost effective and easy to use. In addition, the Utility continues to apply Bioxide, an odor control chemical, to the wastewater flow at the pump discharge piping at Lift Station #1. Also, the Utility continues to utilize Siemens' services on a monthly basis to measure air quality for hydrogen sulfide at the site boundary in order to confirm that Bioxide is being fed at an adequate dosage rate. Siemens is routinely unable to detect any hydrogen sulfide along the fence line, which indicates that the combination of chemical addition, headworks odor control equipment, plant operations, and housekeeping efforts continue to be successful.

If you have any questions, please do not hesitate to contact me by phone at (407) 830-6331 or by e-mail at mfriedman@sfflaw.com.

Very truly yours,

MARTIN S. FRIEDMAN
For the Firm

MSF/mp
Enclosure

cc: Bart Fletcher, Division of Economic Regulation (w/enc. - via e-mail)
Martha Brown, Esquire, Office of General Counsel (w/enc. - via e-mail)
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Prepared at the Request of Counsel

Recommendation Report

Date:	27 September 2011
To:	Kenneth M. Curtin, Esq. – Forest Lake Estates Co-Op, Inc.
From:	Greg Menniti, P.E. (PA,OH,WV) – Geosyntec Consultants
Copies to:	J. Chris Herin, P.G. – Geosyntec Consultants
Subject:	Inspection of the Wastewater System for Forest Lake's Mobile Home Park
Subject Site:	Forest Lake Estates, 6429 Forest Lake Drive, Zephyrhills, Florida

Forest Lake Estates Co-Op, Inc. (FLEC) retained Geosyntec Consultants, Inc. (Geosyntec) to provide environmental consulting services. Geosyntec understands that FLEC is concerned with an odor nuisance caused by the Labrador Utilities, Inc. (LUI) wastewater facility which is adjacent to the Forest Lake Estates Community. Geosyntec's primary assignment has been to review and tour LUI's wastewater facility from an engineering perspective in an effort to uncover operational issues which could contribute to the odor nuisance concerns caused by LUI, including, for example, where the LUI facility may be in need of updating. The review was also to address whether LUI's facility was functioning in a way which can be considered adequate for servicing the Forest Lake Estates Community. If it was found not to be adequate, then Geosyntec was also to provide recommendations for updating the LUI facility with the goal of it being better equipped to meet the needs of the Forest Lake Estates Community without causing objectionable odors.

Pursuant to the above, this report incorporates recommendations, and also addresses what may be done to reduce odor from the LUI facility.

To date, Geosyntec has conducted the following services for the Client:

- **Review of Additional Site-Related Data** – Geosyntec reviewed Site information provided by you. This information included correspondence with involved agencies and with LUI regarding the LUI facility. Aside from correspondence, Geosyntec reviewed permit-related documentation (influent/effluent flow information, discharge monitoring reports, etc.), recent operation reports, and recent inspection documentation (including notices of violations issued by the State) for the LUI facility, together with correspondence of residents' complaint regarding the odor issues at the facility.

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- **Visit the Subject Site – Mr. Greg Menniti** visited the Subject Site and the LUI facility on April 28, 2011 to become better familiar with Site features and perform an onsite engineering review of the facility.

INTRODUCTION

Odors have been rated as the foremost concern of the public relative to the implementation of wastewater-treatment facilities. The control of odors has become a major consideration in the design and operation of wastewater – collection, treatment, and disposal facilities, especially with respect to the public acceptance of these facilities [1].

Odorous substances include a large variety of compounds. The reduced sulfur family of compounds is the major problem in most wastewater systems, and hydrogen sulfide (H_2S) is often the most common offender. Microbial processes occur in wastewater conveyance and treatment systems that result in compounds associated with foul odors. In the absence of adequate available dissolved oxygen (D.O.), in temperate as well as tropical climates organically polluted wastewater is typically metabolized by sulfate reducing bacteria and problems of H_2S generation can be prevalent.

Temperature and time will help determine how soon fermentation and sulfate reduction will begin in wastewater systems, whether in about one hour in warm climates or one day in colder climates. Malodorous conditions will also ensue because of the volatile nature of H_2S, resulting in its transfer from the wastewater into the air. Wastewater collection systems can reach H_2S concentrations ranging between 10 to 1000 parts-per-million by volume (ppmv) in pump station wet well air space and/or at force mains discharge locations.

Because H_2S is one of the most objectionable odors to humans, with an odor threshold of approximately 0.001 ppmv in air, controlling H_2S formation within the wastewater system at extremely low concentrations presents a formidable challenge. Unfortunately once formed, H_2S does not remain stationary, but impacts life and property far removed from the wastewater conveyance and treatment system.

The importance of odors at low concentrations in human terms is related primarily to the psychological stress these produce. Offensive odors can cause poor appetite for food, lowered water consumption, impaired respiration, nausea and vomiting, and mental perturbation. In extreme situations, offensive odors can lead to the deterioration of personal and community

pride, interfere with human relations, discourage capital investment, lower socioeconomic status, and deter growth. Also, some odorous compounds (e.g., H_2S) are toxic at elevated concentrations. These problems can result in a decline in market and rental property values, tax revenues, payrolls, and sales [1].

ODOR CONTROL PRACTICES

Many wastewater facility operators and engineers believe odor control is synonymous with "foul air treatment." Actually, foul air treatment is often the most costly type of odor control. Other types or categories of odor control should normally be evaluated first to decide if foul air treatment can be avoided.

There are sufficient valid engineering and scientific tools available today to allow fully workable odor control solutions at wastewater facilities. An advisable and cost-effective approach is to conduct a thorough evaluation of potential odor problems and to assess the odor control measures of their effectiveness.

Considerable information is needed to conduct an odor control evaluation, and information about the wastewater entering the treatment facility is crucial. The details of the upstream collection system (including the operation of upstream pumping stations); the sources, kinds, and amounts of wastewater; and other information are all vital.

Where there are chronic odor problems at treatment facilities, approaches to solving these problems may include:

- Control of odor-causing compounds in wastewaters discharged to the collection system and treatment plant that creates odor problems;
- Control of odors generated in the wastewater-collection system;
- Control of odors generated in wastewater treatment facilities;
- Application of chemicals to the liquid (wastewater) phase;
- Installation of odor containment and treatment facilities; and,
- Use of odor masking and neutralizing agents.

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As mentioned earlier, odorous substances include a large variety of compounds and hydrogen sulfide is often the most common offender. But other sulfides, disulfides, and mercaptans are also frequent problem compounds because the associated odor thresholds are almost all in the part-per-billion range or less. Reduced sulfur compounds, amines, aldehydes, ketones, ammonia and various organic acids can also cause odor problems.

The first line of defense against odor problems is to design and operate the entire wastewater system to produce the absolute minimum quantity of odorous compounds. Upstream controls need to be explored because most often it is less costly to solve the odor problem upstream. Control measures could include:

- Pretreatment of specific locations within the system. To use the LUI facility as an example, this could possibly be done at all the pump stations within the Forest Lake Estates sanitary sewer system and at the recreational vehicle area.
- Minimizing slug loads of wastewater into the treatment facility by replacing the constant speed pumps at the pumping stations with variable speed pumps.
- Keeping the wastewater pH well above 7 to minimize hydrogen sulfide off-gassing. A pH of 8 would usually be adequate, but pH 9 may sometime be required.
- Operating upstream pump stations to maintain aerobic conditions in the wastewater.

At the pumping stations there should be minimum turbulence of the wastewater because turbulence promotes off-gassing of odorous compounds. Drop inlets into the wet well can and should be avoided. In stations with constant-speed pumps (like the one at Forest Lake Estates), the use of sloping approach pipes with inverts at or slightly below the low water level are desirable (even though its crown may be submerged at the high water level). However, if the inlet pipe crown remains submerged for an extended period, foul air will be trapped in the influent pipe, and the foul air will be forced out of manholes upstream from the pump stations. Variable-speed pumping is highly desirable because matching water elevations in sewer and wet well allows smooth, nonturbulent entry into the wet well.

The pump station wet well should also be operated to minimize stagnation and the settling of solids. These deposits are anaerobic and produce odorous compounds that diffuse into the liquid above and thence into the air. Stagnation also allows biofilm/bio-slime layers to form on

submerged walls of the wet wells and on wetted surfaces, including the inside surface of the collection sewers and force mains that also can produce odors.

In general, it important to keep the collection system pipe velocities high enough to keep the domestic wastewater aerobic, promote scour, and eliminate odor-producing deposits in the pipes. Force main velocities of 3.4 to 4.0 ft/s occurring at least once per day and frequent wet well cleaning are also advisable to minimize problems.

As evidenced in Patrick Flynn's June 08, 2009 e-mail to Tom Gucciardo regarding Mr. Johnston's odor complaints,

> *"... Mr. Johnston's complaints correlate with the diurnal flow pattern at this time of year. The twice a day peak flow pattern may push raw wastewater to the surge tanks after the wastewater experiences a significant detention time in the collection system, caused primarily by the low occupancy of the community at this time of year but also because individuals are using less water in their homes. ...",*

the minimization of stagnation within the wastewater collection system and pumping station wet wells along with the proper operation of these systems are critically important to minimize the odors from the wastewater facilities at Forest Lake Estates.

Odor Control Practices in the Wastewater-Collection System

There is also a host of chemicals that can be added to wastewater to inhibit or treat odorous compounds, thus minimizing off-gassing and subsequent odor problems. LUI has been applying the Siemens Water Technologies odor control product "Bioxide®" into the wastewater stream at the pump station wet well prior to its delivery to the wastewater treatment facility via a force main.

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As stated in Siemens Bioxide® technical literature,

> *" How BIOXIDE® solution works*
>
> *BIOXIDE® solution is a process which controls hydrogen sulfide odors and corrosion biologically. Introduction of nitrate oxygen via addition of BIOXIDE® solution into a waste stream creates an environment in which certain naturally occurring bacteria thrive. These bacteria utilize the dissolved hydrogen sulfide which is present as a part of their metabolism, thereby cost effectively removing any dissolved hydrogen sulfide from the wastewater. As a result, BIOXIDE® solution both removes dissolved hydrogen sulfide and prevents its formation. ",*

wastewater in sewers is capable of microbial oxidation of dissolved H_2S under anoxic conditions (nitrates present but not D.O), but chemical oxidation is either non-existent or occurs at a very low rate. The observed rate of microbial anoxic sulfide oxidation rates were only 16-21% of aerobic rates (Yang *et al.* 2005). For nitrate to work effectively, at least 2 hours of detention time is needed upstream from the problem area. [3]

Although we were unable to verify the detention time without the design drawings and calculations, which LUI refused to provide, we suspect that there may not be sufficient detention time within the collection system from where the BIOXIDE® solution is added to the wastewater treatment facility for the solution to be fully effective.

Odor Control Practices at the Wastewater-Treatment Facility

LUI's odor management practices also include odor containment and treatment at the wastewater treatment facility. Their odor containment included the installation of covers over the headworks and surge tanks, as well as collection piping and air handling equipment for containing and directing odorous gases to activated-carbon adsorbers.

With the large variation in pollutant concentrations coming to the treatment facility over the course of the day, the containment of foul air is not always easy and simply covering the surge tanks and attempting to pull the foul air through a number of activated-carbon adsorbers is not an effective way of containing and treating the foul air emanating from the LUI wastewater treatment facility.

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A good first step in designing a foul air treatment system is to develop a reliable containment and ventilation system that brings all the foul air to the treatment device. Containment and ventilation is not easily achieved however, because of the large volume of air introduced into the surge tanks purges and dilutes the gases from the wastewater stream (which may be heavier than air). Odor containment of these tanks would require the installation of tightly fitting covers, as well as, air handling and treatment equipment large enough to maintain a slight negative pressure (vacuum) within the containment and is one of the factors why foul air treatment is often the most costly type of odor control and should be avoided unless absolutely necessary.

LUI's odor management practices also include the use of odor masking and/or neutralization at the wastewater treatment facility. This practice involves adding chemicals into the offgases to mask an offensive odor with a less offensive odor. Typically, enough masking chemical is added to try to overpower the offensive odor. Masking chemicals, however, do not modify or neutralize the offensive odors. Neutralization involves finding chemical compounds that can be combined with the odorous gases in the vapor state so that the combined gases cancel each other's odor, produce an odor of lower intensity, or eliminate the odorous compounds. Although odor masking and neutralization may have served as short-term mitigative measures, with varying degrees of success, this approach should not be used to mask toxic gases such as H_2S. The key to long-term odor management is to identify the source(s) of the odors and implement corrective measures beyond odor masking.

Although not observed during our site visit to the LUI facility, other typical significant sources of odors at the wastewater treatment facility could include; the sludge-thickening areas, during times when the aerobic digesters are decanted; the sludge-loadout areas, when the sludge is being processed in the roll-off boxes; and at the grit and screening area, when the LUI facility does not use covered airtight containers to store the grit and screenings, especially in the warmer months. These sources should also be addressed as part of a comprehensive odor control evaluation of the facility during the design phase of any odor control improvement program.

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Movement of Odors from Wastewater Treatment Facilities

There is one additional reference, included within the fourth edition of Metcalf & Eddy, Wastewater Engineering Treatment and Reuse Manual, that describes a meteorological condition that correlated with an overwhelming number of odor complaints from the LUI wastewater treatment facility. This may explain why the odors can be observed throughout the community and not at the wastewater treatment facility.

> *"Under quiescent meteorological conditions, odorous gases that develop at treatment facilities tend to hover over the point of generation, because the odorous gases are more dense than air. Depending on the local meteorological conditions, it has been observed that odors may be measured at undiluted concentrations at great distances from the point of generation. The following events appear to happen: (1) in the evening or early morning hours, under quiescent meteorological conditions, a cloud of odors will develop over the wastewater treatment unit prone to the release of odors; and (2) the concentrated cloud of odors can then be transported (i.e., pushed along) without breaking up, over great distances by the weak evening or early morning breezes, as they develop. In some cases, odors have been detected at distances of up to 25 km from their source. This transport phenomenon has been termed the puff movement of odors (Tchobanoglous and Schroeder, 1985). The puff movement of odors was first described by Wilson (1975). The most common method used to mitigate the effects of the odor puff is to install barriers to induce turbulence, thus breaking up and dispersing the cloud of concentrated odors, and/or to use wind generators to maintain a minimum velocity across the source."* (1)

CONCLUSIONS AND RECOMMENDATIONS

Based on our review, we find there is overwhelming evidence that the operations of the wastewater – collection, treatment, and disposal LUI-operated facility that serve Forest Lake Estates have the potential to generate significant malodorous conditions in the community and that a comprehensive odor control evaluation and improvement program is needed to mitigate the odor issues with the LUI facilities.

The information contained herein provides a general overview of some of the potential improvements needed to the LUI wastewater facility infrastructure regarding the odor issues. Considerably more information is needed to conduct a comprehensive odor control evaluation, and information about the design and operations of the LUI facility (which LUI refused to

provide) and wastewater entering the LUI treatment facility is crucial. The details of the upstream collection system (including the operation of upstream pumping stations); the sources, kinds, and amounts of wastewater; and other information regarding the design and construction of the LUI physical facility are all vital.

There are generally four odor control strategies that should be utilized to control odors at the wastewater facilities. These are, in order of likely effectiveness:

- Minimizing or preventing production of odorous compounds;
- Treating odorous compounds within the liquid phase;
- Containing and treating foul air (treatment should not be just with odor masking measures and especially when toxic gases are the cause of odors); and
- Enhancing atmospheric dispersion of foul air.

The specific method of odor control and treatment that should be applied will vary with local conditions and regulatory requirements. However, because odor-control measures are expensive, the cost of making process changes or modifications to the LUI facilities to eliminate odor development should always be evaluated and compared to the cost of various alternative odor-control measures before adoption is suggested. With thorough attention to details, such as the use of submerged inlets and weirs, the elimination of physical conditions leading to the formation of odors, proper chemical loadings, containment of odor sources, off-gas treatment, and good housekeeping, the routine release of odors at wastewater treatment facilities can be minimized.

* * * * *

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