From:	Troy Hays
To:	Madden, Melissa; henry.norris@citrusbocc.com
Cc:	Ray Oates; Carol Sawyer; Morris, John R.; Morgan, Steve; Tafuni, Steven
Subject:	RE: Citrus County Central Landfill-Landfill Gas Assessment and Groundwater Delineation
Date:	Wednesday, May 24, 2017 8:56:27 AM
Attachments:	image001.png 2017.05.24_LTR_JMorris_LFG and GW.pdf 03860058Fig-PMN-gw.pdf

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Good Morning Melissa,

We have updated the plan and a pdf of the updated plan is attached to this email. Also attached is a site map that shows all of the existing and proposed monitoring points. Each of FDEP's comments are copied below with a response provided.

1. Landfill Gas Monitoring Probes.
    a. **Map:** The Department requests a single figure which includes all the existing and proposed monitoring points, including gas vents, gas monitoring probes, piezometers and groundwater monitoring wells.
        1. **The Map is attached to this email.**

    b. **Routine Sampling:** Please revise the Plan to indicate that the County will also continue to include the monitor wells and piezometers in the quarterly landfill gas monitoring events.
        1. **All groundwater wells and piezometers will be included with the quarterly landfill gas monitoring events.**

2. Landfill Gas Monitoring Network. During the February 22, 2017 inspection, Department staff observed potential damage to GP-3 (hit by mower) and GP-18 (cap/valve damaged). Please verify that the integrity of GP-3 has been investigated and that it is functioning properly. It is the Department's expectation that the caps and valves on all probes will be replaced as part of the proposed retrofit.
        1. **GP-3 was damaged; the casing appears to have been hit by a mover. Jones Edmunds personnel evaluated the adequacy of this well by lowering a water level indicator into the well which was able to reach the total probe depth of 40 ft bls. Additionally, it just appears that the probe is bent in the protective casing and not broken. The County proposes to cut this probe at the surface and install a new pad with a flush mount cover. All caps will be replaced on the LFG probes.**

3. East Property Boundary.

    a. **GP-21:** It appears the construction details for proposed GP-21 provided in Table 3 (length of solid pipe and screened pipe) are not consistent with the total well depth. Please revise as appropriate.
        1. **The construction details for GP-20 and GP-21 were switched in the original plan. This has been corrected in the attached updated plan.**

    b. **Sampling Procedures:** Please provide a description of the proposed sampling procedures for the new deep gas probes. It is the Department's expectation that tubing will be placed in the probe to collect a sample at depth, just above the water table.
        1. **All of the new LFG Probes will have tubing installed that extends from the cap to the screen interval to ensure that LFG measurements are collected from the appropriate monitoring interval.**

    c. **MW-3:** Based on the high concentrations of landfill gas present in MW-3, additional gas delineation is required outbound of this location to verify that gas is not migrating beyond the property boundary. The Department requests a deep gas

probe be paired with GP-15 constructed similar to proposed GP-20, or as appropriate based on land surface and groundwater elevations.

1. **The updated plan includes these probes.**

3. North Property Boundary.

   a. **MW-2:** Since this Plan was prepared, new information was provided to the Department which indicates the presence of landfill gas in MW-2. Since there are no additional gas probes in the vicinity, this location will be considered to be the compliance point and continued exceedances of the lower explosive limit (LEL) in this area may require remediation to prevent offsite migration of landfill gas. **This comment is for information purposes only, and does not necessarily require a response at this time.**

   b. **GP-4:** In order to delineate the areas west of MW-10/19 and north of PZ-1, which has recently reported presence of elevated gas, the Department also requests new clustered locations adjacent to GP-4 constructed similar to those proposed for GP-1 through GP-3.

      1. **The updated plan includes these probes.**

5. Groundwater Delineation Wells. It was the Department's understanding during the on-site meeting that three new wells would be installed, but that a deep delineation well adjacent to MW-21 was not necessary at this time. However, it was discussed that an even deeper delineation well would be paired with MW-19 (to be named MW-19D) so that the vertical extent could be established. Our notes from these discussion indicate that this well was proposed to be installed at a total depth of 160 ft BLS, with a discreet screened interval of ~5 ft, from 155-160ft. There are no objections to the proposed location and construction details of the vertical delineation well associated with MW-18 (MW-18D) or horizontal ZOD (compliance) well (MW-22).

   1. **The plan is updated to reflect this change.**

The drilling is schedule to start the week of July 24th. A preliminary schedule is included with the updated plan. The report detailing the well and gas probe installation and the initial sampling event of the groundwater wells will be submitted to FDEP within 3 months of completion of the drilling or by October 24th.

Do not hesitate to call me with any questions at 352-258-9520.

Thanks,

Troy D. Hays, PG
Senior Manager / Vice President
Jones Edmunds & Associates, Inc.
352.377.5821 ext. 1480 | Cell: 352.258.9520

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From: Madden, Melissa [mailto:Melissa.Madden@dep.state.fl.us]
Sent: Thursday, May 04, 2017 9:42 AM
To: henry.norris@citrusbocc.com
Cc: Ray Oates; Carol Sawyer; Morris, John R.; Morgan, Steve; Troy Hays; Tafuni, Steven

Subject: RE: Citrus County Central Landfill-Landfill Gas Assessment and Groundwater Delineation

Mr. Norris,

The Department has reviewed the Citrus County Central Landfill, *Landfill Gas Assessment and Groundwater Delineation Plan* ("Plan"), prepared by Troy Hays, PG, Jones Edmunds and Associates, and received by the Department on March 27, 2017 and is providing the following comments which need additional information:

1. Landfill Gas Monitoring Probes.
    a. **Map:** The Department requests a single figure which includes all the existing and proposed monitoring points, including gas vents, gas monitoring probes, piezometers and groundwater monitoring wells.

    b. **Routine Sampling:** Please revise the Plan to indicate that the County will also continue to include the monitor wells and piezometers in the quarterly landfill gas monitoring events.

2. Landfill Gas Monitoring Network. During the February 22, 2017 inspection, Department staff observed potential damage to GP-3 (hit by mower) and GP-18 (cap/valve damaged). Please verify that the integrity of GP-3 has been investigated and that it is functioning properly. It is the Department's expectation that the caps and valves on all probes will be replaced as part of the proposed retrofit.

3. East Property Boundary.

    b. **GP-21:** It appears the construction details for proposed GP-21 provided in Table 3 (length of solid pipe and screened pipe) are not consistent with the total well depth. Please revise as appropriate.

    c. **Sampling Procedures:** Please provide a description of the proposed sampling procedures for the new deep gas probes. It is the Department's expectation that tubing will be placed in the probe to collect a sample at depth, just above the water table.

    d. **MW-3:** Based on the high concentrations of landfill gas present in MW-3, additional gas delineation is required outbound of this location to verify that gas is not migrating beyond the property boundary. The Department requests a deep gas probe be paired with GP-15 constructed similar to proposed GP-20, or as appropriate based on land surface and groundwater elevations.

5. North Property Boundary.

    a. **MW-2:** Since this Plan was prepared, new information was provided to the Department which indicates the presence of landfill gas in MW-2. Since there are no additional gas probes in the vicinity, this location will be considered to be the compliance point and continued exceedances of the lower explosive limit (LEL) in this area may require remediation to prevent offsite migration of landfill gas. **This comment is for information purposes only, and does not necessarily require a response at this time.**

    b. **GP-4:** In order to delineate the areas west of MW-10/19 and north of PZ-1, which has recently reported presence of elevated gas, the Department also requests new clustered locations adjacent to GP-4 constructed similar to those proposed for GP-1 through GP-3.

6. Groundwater Delineation Wells. It was the Department's understanding during the on-site meeting that three new wells would be installed, but that a deep delineation well

adjacent to MW-21 was not necessary at this time. However, it was discussed that an even deeper delineation well would be paired with MW-19 (to be named MW-19D) so that the vertical extent could be established. Our notes from these discussion indicate that this well was proposed to be installed at a total depth of 160 ft BLS, with a discreet screened interval of ~5 ft, from 155-160ft. There are no objections to the proposed location and construction details of the vertical delineation well associated with MW-18 (MW-18D) or horizontal ZOD (compliance) well (MW-22).

Additionally, recent detections of Benzene, which appear to be increasing in trend, have been reported at MW-17. As landfill gas measurements at MW-17 have been reported at relatively low concentrations, an alternative source of potential impacts to groundwater quality may need to be investigated. **This comment is for information purposes only, and does not necessarily require a response at this time.**

Please provide a revised Plan which addresses the comments noted above and includes a schedule for installation of the new probes/wells and retrofit of the existing probes within 30 days of this letter. Once the new wells/probes have been installed and the extent of impacts fully delineated, a meeting should be scheduled to discuss the County's proposed methods and timeframes for remediation of migrating landfill gas.

Please feel free to contact me with any questions or concerns.

Thanks, Melissa

Melissa Madden
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From: Troy Hays [mailto:thayes@jonesedmunds.com]
Sent: Monday, March 27, 2017 4:00 PM
To: Morris, John R. <John.R.Morris@dep.state.fl.us>
Cc: Madden, Melissa <Melissa.Madden@dep.state.fl.us>; Henry C. Norris (Henry.Norris@citrusbocc.com) <Henry.Norris@citrusbocc.com>; Ray Oates (ray.oates@citrusbocc.com) <ray.oates@citrusbocc.com>; Carol Sawyer <CSawyer@jonesedmunds.com>
Subject: Citrus County Central Landfill-Landfill Gas Assessment and Groundwater Delineation

Good Afternoon John,

Attached is the Citrus County Central Landfill-Landfill Gas Assessment and Groundwater Delineation Plan that was discussed at our meeting in February. Please call me at 352-258-9520 with any questions or comments.

Thanks,
Troy D. Hays, PG

Senior Manager / Vice President

INTEGRITY | KNOWLEDGE | SERVICE

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