

**Indian River County, Florida
Solid Waste Disposal District
Board Memorandum**

Date: May 10, 2020

To: Jason E. Brown, County Administrator

From: Vincent Burke, PE, Director of Utility Services

Prepared By: Himanshu H. Mehta, PE, Managing Director, Solid Waste Disposal District

Subject: Leachate Pilot Study Results and Final Payment to the Indian River Eco-District and Geosyntec

Descriptions and Conditions:

On February 19, 2019, the Indian River County (IRC) Solid Waste Disposal District (SWDD) Board approved CCNA-2018-Work Order No. 4 to Geosyntec Consultants, Inc. (Geosyntec) to provide Class I Landfill professional services for the Feasibility of Landfill Liquids Management Options, not to exceed the amount of \$30,989.

On July 16, 2019, the SWDD Board approved staff recommendation to further evaluate Thermal Evaporation Technology as a potential solution for leachate treatment via a pilot study. This decision was based on the results of a Focused Feasibility Evaluation of Landfill Leachate prepared by Geosyntec, which recommended that SWDD pursue a pilot study using the Heartland Concentrator™ provided by Heartland Water Technology, Inc (Heartland) technology.

On November 19, 2019, the SWDD Board approved staff recommendations to waive the requirements for bids and to approve the proposal by the Indian River Eco-District, LLC (IREDD) for the Leachate Pilot Study using a 1,000 gallon per day pilot unit provided by Heartland. The approval to IREDD was for a total cost estimate, including 3rd party expenses, of \$46,375. This includes the IREDD/Heartland Price Component (five-day pilot effort) of \$20,900 and additional 3rd party expenses estimated at approximately \$25,475.

Also, on November 19, 2019, the SWDD Board approved Amendment No. 1 to Work Order No. 4 to Geosyntec in the amount of \$19,975 to provide engineering services related to performing an independent evaluation of the pilot study. This increased the total approval for Work Order No. 4 to \$50,964.

The 5-day Leachate Pilot Study was performed by IREDD/Heartland during the week of January 27, 2020 through January 31, 2020. Staff received an invoice from IREDD/Heartland for \$30,916.67 for 2/3 of the work performed, and this invoice has been paid. Staff also received a final report from IREDD/Heartland including a final invoice for \$18,669.96, which includes \$3,211.63 in additional third party expenses. The total project cost from IREDD/Heartland is \$49,586.63.

Geosyntec provided a site visit during the pilot test and has provided a final summary report and technical memorandum of their independent evaluation of the leachate pilot study. Geosyntec has also submitted a final project letter and invoice of \$1,824.18.

Overall, the leachate pilot test was successful in demonstrating the thermal evaporation of leachate with key summary below in the analysis section. Staff is requesting SWDD Board direction on the next steps for this project.

Analysis:

As provided by IRED/Heartland in their final report and verified by Geosyntec in their independent evaluation, the leachate pilot study can be summarized as follows as compared to the Key Performance Indicators:

1. **Target Volume Reduction (>93%)** - The pilot study results demonstrated that a volume reduction of >98% was achieved using site-specific leachate. According to IRED/Heartland, the commercial design basis should consider a 92-98% reduction with an actual expectation of 96-98% volume reduction. A total of 5,000 gallons of landfill leachate was processed during the pilot study and approximately 87 gallons of concentrated residuals were generated during the pilot study.
2. **Require Minimal Maintenance / Downtime** - The pilot system was operational for a total of approximately 95 hours over the five-day trial period. According to IRED/Heartland, not accounting for the generator downtime, the system was operating 99% of the time.
3. **System Operating Expenses – Chemical Consumption Efficiency** – The pilot system used both antiscalent and antifoam / defoamer in the process. Minimal foam was observed during the pilot and no indication of scale accumulation was present.
4. **Binding of Residual/Passing of Paint Filter Test & TCLP Analysis** – Staff from the Indian River County Department of Utility Services (IRCDUS) performed all the pre- and post-sampling field activities, with chemical analyses performed by PACE Analytical Laboratories. Laboratory analytical results indicated that the mulch-stabilized residuals passed both the Paint Filter Liquids Test as well as the Toxicity Characteristics Leachate Procedure (TCLP) criteria to be classified as non-hazardous and could potentially be landfilled in a Class I solid waste landfill in Florida.

Overall, IRED/Heartland provided a successful demonstration of the Heartland Concentrator™. In terms of providing any projections of capital and operating costs for a full scale unit to treat SWDD's leachate, IRED/Heartland requested better understanding of the next procurement steps prior to providing such items in writing.

Geosyntec in their technical memorandum did identify various permits that would be required for a full-scale project and reiterated their previous total capital projections of \$2.06 million and an annual operation and maintenance cost of \$175,200, which equates to about \$0.06 per gallon over a 10-year period for the processing of 20,000 gallons per day of leachate. The two challenges identified by Geosyntec include the available heat source and the characterization of the concentrated residuals.

The most optimal heat source would be to utilize landfill gas, which to process 20,000 gallons per day requires 315 standard cubic feet per minute (SCFM) of landfill gas at 50% methane concentration. SWDD has, through an approved landfill gas agreement with IRED, committed all of our landfill gas for the production of electricity or renewable natural gas (RNG) with an allowance to divert 225 SCFM for leachate treatment. However, there is language in the agreement that would allow us to request

additional gas for leachate treatment. Alternatively, SWDD would need to purchase natural gas from Florida City Gas.

The concern with the concentrated residuals identified by Geosyntec has to do with the analytical results showing that the concentrated leachate, prior to being solidified with mulch, triggered toxicity characteristic hazardous waste levels for arsenic and chromium. Further discussion with regulatory agencies may be warranted depending on the approach for a final full-scale system.

The following is a summary of the total cost for the Leachate Pilot Study:

Vendor	Costs
IRED/Heartland	\$49,586.63
Geosyntec (<i>not including feasibility study</i>)	\$19,975.00
Pace Laboratories	\$1,624.00
Total =	\$71,185.63

The primary reason that staff has pursued the evaluation and treatment of the Landfill Leachate is that three constituents of Arsenic, Total Dissolved Solids and Total Nitrogen in the leachate exceed the local Industrial Pre-Treatment Standards which could potentially impact the National Pollutant Discharge Elimination System (NPDES) permit of the West Regional Wastewater Treatment Plant.

Parameter	Regulatory Limit	March 2019 Results	January 2020 Results
Arsenic	70 µg/L	323 µg/L	505 µg/L
Total Dissolved Solids	1,200 mg/L	9,000 mg/L	10,100 mg/L
Total Nitrogen	40 mg/L	1,300 mg/L	1,260 mg/L

Next Steps:

Staff and Geosyntec recommend the following options:

Option 1:

- A. IRC and SWDD should negotiate with IRED to obtain a proposal for a short-term and long-term treatment of leachate either on the landfill property or on the IRED property.

The purpose is to get a clear answer of a narrow cost range for accepting and managing leachate from the IRC Landfill to facilitate comparison with range of costs presented in Geosyntec’s July 3, 2019, memorandum.

A short-term solution maybe more expensive; however, it would expedite the treatment of the leachate. Staff has budgeted \$50,000 per month in the proposed next Fiscal Year 20/21 Budget for such treatment.

A long-term solution maybe more cost-effective as this would provide a cost range to include an “all-in” per gallon price that considers management of 20,000 gallons per day (gpd) of leachate over 10 years, including the ultimate disposal of the stabilized residuals. (*As stated above,*

Geosyntec estimated total capital projections of \$2.06 million and an annual operation and maintenance cost of \$175,200, both costs expected to be borne by the Contractor, which equates to about \$0.06 per gallon over a 10-year period for the processing of 20,000 gpd of leachate.)

- B. Heartland and IRED should provide significant assurance in the form of an approved permit or conceptual approval letter from the Florida Department of Environmental Protection (FDEP) that the evaporation process is a “complete process that consists of processing from raw leachate to stabilized residual for disposal” and therefore can be disposed at a Class I landfill in Florida; or
- C. Heartland should provide examples, including reference contact information, of similar off-site facilities that leachate from Class I municipal solid waste (MSW) landfills have been processed, and the resulting stabilized residual sent back to the same MSW landfill for disposal.

Option 2:

IRC and SWDD should issue a Request for Proposals (RFP) to invite vendors to propose leachate treatment of 20,000 gpd using Evaporation Technology either on the SWDD property or an off-site property using landfill gas or an alternative heat source. If a vendor proposes to build a device off-site, then they should demonstrate the regulatory and permitting approvals for leachate treatment and residual disposal at a Class I landfill in Florida.

Funding:

Funding for this work is budgeted and available in the Other Professional Services account number 41121734-033190, which is funded from SWDD assessments and user fees.

Firm	Description	Account Number	Amount
Geosyntec	Other Professional Services	41121734-033190	\$ 1,824.18
Indian River EcoDistrict	Other Professional Services	41121734-033190	\$18,669.96

Please note, if a short-term solution is pursued with IRED, a budget amendment would be required this current 2019/20 Fiscal Year as the cost of leachate treatment is not budgeted.

Recommendation:

Solid Waste Disposal District (SWDD) staff recommends that its Board approve the following:

- a) Approve the final payment to Geosyntec in the amount of \$1,824.18;
- b) Approve the final payment to the Indian River Eco-District, LLC (IRED) in the amount of \$18,669.96, which includes the approval of additional third party expenses in the amount of \$3,211.63.

SWDD staff offers the following options for Board approval:

- a) Waive bid requirements and direct staff to further negotiate with IRED/Heartland on a short-term or long-term leachate treatment project for SWDD Board review at a future meeting, or;

- b) Direct staff to issue a Request for Proposals for a leachate treatment of 20,000 gallons per day using Evaporation Technology either on the SWDD property or an off-site property using landfill gas or an alternative heat source.

Attachments:

1. Geosyntec Summary Letter (Due to the voluminous nature, the Geosyntec Technical Memorandum which includes IRED/Heartland Report is available upon request in the BCC office or in the Utilities office in County Administration Building A.)
2. Final Invoice from Geosyntec
3. Final Invoice from Indian River Eco-District, LLC