Dawn Bartel

From: Brian Helminger <brian.helminger@hvmsd.org>
Sent: Monday, June 22, 2020 9:06 AM
To: bruce siebers; Dave Casper; John Sundelius; kcoffey238@gmail.com; Pat Hennessey
Cc: Dawn Bartel
Subject: FW: Outagamie County Solid Waste- Memo to ECWRPC regarding SSA leachate pretreatment request for information
Attachments: 2020.6.18 Foth Analysis Response.pdf

The attached is the final version of the responses supplied to Outagamie county as part of their due diligence in siting and approval for the proposed NWLF cell. There were a number of changes to the comments and calculations in the reply memo.

Brian Helminger
District Director

Heart of the Valley
Metropolitan Sewerage District
801 Thilmany Road
Kaukauna, WI 54130
Phone: 920-766-5731
www.hvmsd.org

From: James Fenlon <James@littlechutewi.org>
Sent: Friday, June 19, 2020 1:39 PM
To: Anderson, Chris <Chris.Anderson@Foth.com>
Cc: Van Straten, Brian J. <Brian.VanStraten@outagamie.org>; 'Todd Verboomen' <TVerboomen@ecwrpc.org>; brian.helminger@hvmsd.org; paula.vandehey@appleton.org; Homan, Kara J. (Kara.Homan@outagamie.org) <Kara.Homan@outagamie.org>; Guidote, Joseph P. <Joseph.Guidote@outagamie.org>; Nelson, Thomas M. <Thomas.Nelson@outagamie.org>
Subject: RE: Outagamie County Solid Waste- Memo to ECWRPC regarding SSA leachate pretreatment request for information

Mr. Anderson,

Good afternoon. I am sending this email and attachment on behalf of the Village of Little Chute in regard to the proposed Northwest Landfill and the requested amendment to the SSA. This memo has been prepared in conjunction with Heart of the Valley Metropolitan Sewerage District and their input is included for you review.

If you have direct questions related to the information presented, we would happily participate in a conference call to discuss. We look forward to further communication on this topic with all involved stakeholders.

Have a great weekend.

Thanks,
James

James P. Fenlon, Village Administrator
Village of Little Chute | 108 W Main Street | Little Chute, Wisconsin 54140
☎ (920) 423-3850 | ✉ james@littlechutewi.org | Web | Facebook

From: Anderson, Chris <Chris.Anderson@Foth.com>
Sent: Wednesday, June 3, 2020 5:31 PM
To: brian.helminger@hvmsd.org; James Fenlon <James@littlechutewi.org>; paula.vandehey@appleton.org
Cc: Van Straten, Brian J. <Brian.VanStraten@outagamie.org>; 'Todd Verboomen' <TVerboomen@ecwrpc.org>
Subject: Outagamie County Solid Waste- Memo to ECWRPC regarding SSA leachate pretreatment request for information

Hello – I am sending this email on behalf of the Outagamie County Solid Waste & Recycling Department to provide you with the attached memo in regard to the proposed Northwest Landfill and the requested amendment to the SSA. This memo has been prepared in order to communicate some questions and requests for information for the village of Little Chute, the Heart of the Valley WWTP and the city of Appleton that are needed in order to complete the leachate pretreatment analysis as requested by the East Central WI Regional Planning Commission. In addition, the options being reviewed and the site data being utilized are presented for your information.

Outagamie County requests that you review the memo and provide the information requested as soon as possible. If a conference call is needed to discuss this request and/or the information, we would be happy to schedule a call. We respectively request that we receive a response within the next 2-weeks (Friday 6-19-2020) in order for us to complete the necessary analysis in preparation for a July ECWRPC meeting.

Thank you.

Sincerely,

Christopher A. Anderson, P.E.
Licensed in WI
Foth Infrastructure & Environment, LLC
Ph: (920) 496-6832 | Cell: (920) 619-5400 |

Little Chute
ESTABLISHED 1848

To: Chris Anderson, P.E., Senior Client Manager, Foth Infrastructure & Environment, LLC

Cc: Brian Van Straten, Director, Outagamie County Recycling & Solid Waste Department
Joe Guidote, Outagamie County Corporation Counsel
Kara Homan, Outagamie County Director of Development & Land Services
Paula Vandehey, Public Works Director, City of Appleton
Brian Helminger, Director, Heart of the Valley Metropolitan Sewerage District

From: James Fenlon JPF

Date: June 18, 2020

Re: Response to OCLF NWLF SSA Leachate Pretreatment Option Analysis

This memo is meant to provide responses related to your June 3rd memo regarding Outagamie County Northwest Landfill and the pretreatment option and analysis. It should be noted that the Village of Little Chute coordinated with Heart of the Valley Metropolitan Sewerage District (HOVMSD) and we have provided the HOVMSD correspondence as an attachment.

Prior to providing answers to your questions, we would like to point out that HOVMSD has provided responses to the pretreatment options and the Village of Little Chute is in concurrence with the viability and preference of the HOVMSD. In addition, it is worth highlighting that HOVMSD has consistently and repeatedly communicated that the HOVMSD cannot guarantee that the East and Northeast Landfill would never require pretreatment. As has been communicated to you and the OCLF staff previously, the HOVMSD is currently working with a consultant on this topic. Any analysis on the entire OCLF campus must take this into consideration when conducting any evaluation of the options and future scenarios.

Answers to your questions are noted below:

1. What is the cost of sanitary sewer infrastructure improvements to be included in the analysis under Option 4? Assuming all leachate is discharged to the Village of Little Chute sanitary Sewer (8-inch diameter pipe) at the intersection of CTH OO and Holland Road. The upsizing of this pipe and corresponding infrastructure will need to be included in the cost evaluation.

    a. Attachment #1 is a cost estimate from the Village Engineer with recent unit prices we have experienced in a bid environment. In addition, the Village Engineer has provided comments related to the assumptions you indicate.

2. What treatment standards (parameters, concentration/lbs., etc.) and cost of disposal (surcharge, rate, etc.) should be included in the analysis for all options?

    a. See Attachment #2 for HOVMSD where their response is as follows: "Recent sewer rate parameters attached for Foth. Rate structure is reviewed and adjusted annually by HOVMSD.

Major rate increases are generally due to debt service obligations related to major capital projects funded by the Clean Water Fund with 20 year pay back. Facilities plans are reviewed by DNR and also utilize flow and loadings estimates for a 20-year planning cycle/life. It would be reasonable to incorporate a 3% inflationary adjustment to sewer rates per annum for purposes of long-range cost forecasting. The District is currently studying Interceptor rehabilitation, Tertiary effluent filtration to meet TMDL requirements, and reviewing loads to-determine if/when plant upgrade/expansion will be necessary. With consistent load increases (attached) it appears likely that the District will need to begin facility planning before 2028."

b. Village of Little Chute sewer rates are as follows (Ordinance #1, Series 2017):

   i. Volume - $7.50/1,000 Gallons
   ii. $3.00 Month/Sewer Meter Charge
   iii. BOD Surcharge - $0.238/lb. (Volume/1,000,000) x 8.34 lb./gallon. Rate is .238/lb. FOR BOD IN EXCESS OF 180 mg/l
   iv. Suspended Solids Surcharge- $0.255/lb. Convert gallons to pounds (Volume in Gallons/1,000,000) x 8.34 lb. gallon at rate of .255/lb. for Suspended Solids IN EXCESS OF 250 mg/l
   v. Phosphorus Surcharge - $6.239/lb. (Volume/1,000,000) x 8.34 lb./gallon at rate of 6.239/lb. for phosphorus IN EXCESS OF 8 mg/l
   vi. Ammonia Surcharge - $1.324/lb. (Volume/1,000,000) x 8.34 lb./gallon at rate of 1.324/lb. FOR Ammonia IN EXCESS OF 35 mg/l
   vii. Overall Surcharge per Agreement – 25%

3. Also, what schedule should be assumed for these standards and costs to be in-place? This information is critical for estimating the size and performance of the pretreatment system as well as for evaluating the long-term cost of leachate disposal for this report.

   a. See Attachment #2 for HOVMSD where their response is as follows: "Accurate answer requires predicting the future as project timing and cost is not yet known."

While not requested, we felt that following past billing information from June of 2017 through March of 2020 for the Northeast and East Landfill may be beneficial in the analysis you are attempting to execute:

	Total Leachate in Gallons	Pounds of Ammonia	Treatment Expense of Ammonia	Treatment Expense of BOD, Suspended Solids, Phosphorus, and Ammonia Combined
2017	5,722,831 (monthly average of 817,547)	37,156 (monthly average of 5,308)	$60,378.23 (monthly average of $8,625.46)	$74,703.52 (monthly average of $10,671.93)
2018	15,812,735 (monthly average of 1,317,728)	99,546 (monthly average of 8,296)	$149,462.42 (monthly average of $12,455.20)	$297,866.32 (monthly average of $24,822.19)

2019	11,935,605 (monthly average of 994,634)	90,153 (monthly average of 7,513)	$118,844.44 (monthly average of $9,907.04)	$197,384.54 (monthly average of $16,448.71)
2020	3,787,371 (monthly average of 1,262,457)	35,636 (monthly average of 11,879)	$47,181.88 (monthly average of $15,727.29)	$63,359.76 (monthly average of $21,119.92)
Total	37,258,542 (monthly average of 1,095,839)	262,491 (monthly average of 7,720)	$375,906.97 (monthly average of $11,056.09)	$633,314.15 (monthly average of $18,629.89)

Notes: **1. Analysis includes June of 2017 through March of 2020 for the East and Northeast Landfills.**
2. Gallons of leachate is for OCLF reported for East and Northeast cells (September of 2018 through December of 2019 was reported by OCLF using pump run time totals as reported by the OCLF's SCADA system and thus no metered data is used).
3. Pounds of Ammonia is based upon a single grab sample each month performed by OCLF. The resulting measure is then calculated based upon the volume as reported by the OCLF (September of 2018 through December of 2019 was reported by OCLF using pump run time totals as reported by the OCLF's SCADA system and thus no metered data is used).

Finally, there are other direct considerations that should be added to the discussion that both HOVMSD and Village of Little Chute share:

- A full economic analysis of the cost for dealing with leachate seems to currently focus only on the ammonia component, which is rightfully the largest concern from a treatment standpoint. The landfill should also consider the costs associated with the BOD component in the analysis. The BOD does vary from landfill cell-to-cell but it is far higher than what would be considered "domestic strength". The HOVMSD is nearing its rated capacities for both ammonia and BOD loading to the treatment plant and so it should be noted that there are concerns beyond just the ammonia content of the leachate.
- As a consortium, the landfill also has other locations (current and future) that produce leachate that needs to be treated. We are wondering if there has been consideration to sizing leachate treatment large enough to act as a centralized location for treating all the leachate that the consortium produces. There is a definite economy of scale that could be realized where the larger you go and more leachate is treated – the cheaper it can be done on a per gallon basis. If sized large enough to accommodate other locations, its use could provide treatment cost avoidance benefits for other consortium landfill leachate producing locations.
- From a planning perspective, and to avoid surcharges in the future, Little Chute has established 35 mg/L as being the cut off for domestic strength. Consideration for treatment to that threshold should be considered as why invest in infrastructure and pay to pretreat only to continue to pay surcharges like it had previously paid.
- The District is working with its consultant on local limits as the landfill has requested local limit value in the past. Local limits can be applied to many different pollution parameters and are used to ensure the treatment plant is not upset with loads or strengths that would create a pass thru situation (untreatable) or inhibit the biological process. Limits on metals have long been incorporated into permits as they would accumulate in the biosolids with the District being unable to land spread biosolids if metals accumulate and are found in excess of DNR/EPA standards. In

addition to ammonia, the District may seek to disincentivize high strength waste discharge containing ammonia and BOD and/or impose local limits.

- The District funded an ongoing study that focuses on the condition and interceptor corrosion that will likely require major capital outlay and comes as a result of biofilm in the sewers producing acids that attack the concrete piping. The origin of the biofilm has been traced back to ammonia in the sewer system. Little Chute, by closer proximity to a major ammonia source may well be experiencing the same decay.

In conclusion, based upon the complexity of the issue and your request, it seems that having all four entities (City of Appleton, Outagamie County, Heart of the Valley Metropolitan Sewerage District, and Village of Little Chute) discuss and review the options provided collectively would provide for the greatest input and most viable option moving forward. We appreciate the opportunity to provide this information and given the volume and content of the leachate and the benefit of a regional solid waste facility, the outcome has significant opportunities and challenges for every entity for decades to come. We look forward to hearing from you.

Attachment #1

Little Chute
ESTABLISHED 1848

Outagamie County Landfill Sanitary Sewer Extension

Oversizing

Item No.	Units	Item Description	Actual Quantity	Unit Price	Amount
1	L.F.	15 inch Sanitary Sewer (Granular Backfill)	3,900	$ 118.85	$ 463,515.00
2	L.F.	15 inch Sanitary Sewer (Native Backfill)	0	$ 60.73	$ -
3	V.F.	48 inch Precast San. MH (w/13 castings)	395	$ 250.00	$ 98,750.00
4	L.F.	30 inch Pipe Casing Installed	200	$ 500.00	$ 100,000.00
5	EA.	Connect to Existing Sanitary Manhole	1	$ 8,000.00	$ 8,000.00
6	S.Y.	Furnish & Install - 4" Topsoil, Seed, & Fert.	15,500	$ 9.50	$ 147,250.00
7	S.Y.	Furnish & Install - Channel Erosion Mat	15,500	$ 2.50	$ 38,750.00
8	S.Y.	HMA Pavement 3 MT 58-28 S 2¼" Binder	167	$ 24.00	$ 4,008.00
9	S.Y.	HMA Pavement 4 MT 58-28 S 1¾" Surface	167	$ 18.70	$ 3,122.90
10	C.Y.	Crushed Agg. Base Course - 1¼" Dense	1,500	$ 27.40	$ 41,100.00
11	L.F.	Remove and Replace Culvert Pipe	200	$ 45.00	$ 9,000.00
				Total	$ 913,500.44
				10% Contingency	$1,005,000

Item No.	Units	Item Description	Actual Quantity	Unit Price	Amount
1	L.F.	8 inch Sanitary Sewer (Granular Backfill)	3,900	$ 95.00	$ 370,500.00
2	L.F.	15 inch Sanitary Sewer (Native Backfill)	0	$ 60.73	$ -
3	V.F.	48 inch Precast San. MH (w/13 castings)	156	$ 240.00	$ 37,440.00
4	L.F.	30 inch Pipe Casing Installed	200	$ 500.00	$ 100,000.00
5	Ea.	Connect to Existing Sanitary Manhole	1	$ 8,000.00	$ 8,000.00
6	S.Y.	Furnish & Install - 4" Topsoil, Seed, & Fert	15,500	$ 9.50	$ 147,250.00
7	S.Y.	Furnish & Install - Channel Erosion Mat	15,500	$ 2.50	$ 38,750.00
8	S.Y.	HMA Pavement 3 MT 58-28 S 2¼" Binder	167	$ 24.00	$ 4,008.00
9	S.Y.	HMA Pavement 4 MT 58-28 S 1¾" Surface	167	$ 18.70	$ 3,122.90
10	C.Y.	Crushed Agg. Base Course - 1¼" Dense	1,500	$ 27.40	$ 41,100.00
11	L.F.	Remove and Replace Culvert Pipe	200	$ 45.00	$ 9,000.00
				Total	$ 768,530.90
			10% Contingency	**County LF**	**$ 846,000**
				Village	**$ 159,000**

Attachment #1

1. The leachate discharge cannot be in the same location for both cost evaluations. It does not make sense to provide the discharge location in the SW corner of the project site if it is going to enter the Little Chute sanitary sewer system and treated by HOV.

2. A central pretreatment location could treat the current and future phases.

Attachment #2

HOVMSD response to 6/3/20 Foth memo

Option 1

Best describes the "current" leachate discharge arrangement. Loads to HOVMSD would continue and once the NELF is full and capped the flow would decline and the organic loads gradually begin to dissipate. The District cannot guarantee that this scenario would never require pretreatment and has communicated such to the landfill in past discussions. Provisions for flow equalization and continuous discharge would be desirable if this option is selected. Viable option that is not preferred by District.

Option 2

Scenario includes pretreatment for leachate to HOVMSD. Some organic capacity gain would be realized especially to the benefit of Biostyr biological process. If enough capacity is regained it could extend the longevity of existing treatment plant infrastructure. Preferred and viable option to the District.

Option 3

District would shed loadings and Little Chute would lose a large revenue customer. District would realize an immediate increase in valuable organic capacity and useful life of the existing HOVMSD treatment plant infrastructure. Preferred and viable option to the District.

Option 4

Depending on the level of pretreatment, this scenario could see the District processing full liquid flow with pretreatment. Estimated mass load reduction coming to the District is positive. Treatment facility is not hydraulically challenged at this time so flow increase is acceptable. Viable option.

Option 5

Option would result in increased loadings to the District. Estimated ammonia load of 420 lbs/day from a single connected user would account for 26.2% of plant rated ammonia capacity. This option is undesirable and is not an acceptable option for HOVMSD.

HOV/Little Chute questions

1. N/A to HOVMSD.

2. Recent sewer rate parameters attached for Foth. Rate structure is reviewed and adjusted annually by HOVMSD. Major rate increases are generally due to debt service obligations related to major capital projects funded by the Clean Water Fund with 20 year pay back. Facilities plans are reviewed by DNR and also utilize flow and loadings estimates for a 20-year planning cycle/life. It would be reasonable to incorporate a 3% inflationary adjustment to sewer rates per annum for purposes of long-range cost forecasting. The District is currently studying Interceptor rehabilitation, Tertiary effluent filtration to meet TMDL requirements, and reviewing loads to-determine if/when plant upgrade/expansion will be necessary. With consistent load increases (attached) it appears likely that the District will need to begin facility planning before 2028.
3. Accurate answer requires predicting the future as project timing and cost is not yet known.

Concerns:

- The District is not in favor of any option that would increase the loads discharged to HOVMSD. There is no available capacity at the plant.
- Estimated loads appear to be annual averages. Daily loads and peak ammonia loads would differ significantly on a wet/dry weather basis.
- Foth estimates leachate production for NWLF and NELF to be the same. Maps appear to show that NWLF will be in the range of 1.5x larger. Will the open (uncapped) area receiving rainfall be limited to the same as NELF? How did the Foth arrive at them both being equal in leachate production given the size disparity?
- PFAS – currently unregulated and a potential issue in the future regardless of where the leachate is discharged.

RATES

2015 RATES

FLOW = $ 0.725 per 1000 Gallons
B.O.D. = $ 0.239 per Pound
S.SOLIDS = $ 0.197 per Pound
PHOSPHORUS = $ 5.247 per Pound
AMMONIA-N = $ 1.635 per Pound
CHLORIDE = $ 0.005 per Pound

2016 RATES

FLOW = $ 0.790 per 1000 Gallons
B.O.D. = $ 0.254 per Pound
S.SOLIDS = $ 0.219 per Pound
PHOSPHORUS = $ 5.722 per Pound
AMMONIA-N = $ 1.696 per Pound
CHLORIDE = $ 0.005 per Pound

2017 Sewer Rates

FLOW = $ 0.837 per 1000 Gallons
B.O.D. = $ 0.265 per Pound
S.SOLIDS = $ 0.261 per Pound
PHOSPHORUS = $ 6.136 per Pound
AMMONIA-N = $ 1.625 per Pound
CHLORIDE = $ 0.005 per Pound

2018 Sewer Rates

FLOW = $ 0.796 per 1000 Gallons
B.O.D. = $ 0.262 per Pound
S.SOLIDS = $ 0.266 per Pound
PHOSPHORUS = $ 6.290 per Pound
AMMONIA-N = $ 1.499 per Pound
CHLORIDE = $ 0.005 per Pound

2019 Sewer Rates

Flow = $0.735 per 1000 Gallons
B.O.D. = $0.238 per Pound
Total Suspended Solids = $0.255 per Pound
Total Phosphorus = $6.239 per Pound
Ammonia Nitrogen = $1.324 per Pound
Total Chlorides = $0.004 per Pound

2020 Sewer Rates

Flow = $0.696 per 1000 Gallons
B.O.D. = $0.220 per Pound
Total Suspended Solids = $0.254 per Pound
Total Phosphorus = $6.321 per Pound
Ammonia Nitrogen = $1.32 per Pound
Total Chlorides = $0.003 per Pound

HOVMSD Influent Flow

Year	Plant flow	Daily Average Flow(mgd)	Annual Flow Total (% change)
2019	2,446,470,000	6.703	15.1%
2018	2,127,692,000	5.825	1.5%
2017	2,094,200,000	5.738	3.6%
2016	2,020,671,000	5.536	-3.9%
2015	2,101,955,000	5.759	1.1%
2014	2,079,440,000		Avg = 3.5%

Ammonia Loadings

Year	Total pounds - Influent	Annual Ammonia Load (% change)
2019	538684	5.7%
2018	509826	1.4%
2017	501901	-.6%
2016	505111	16.8%
2015	432534	3.2%
2014	419,000	Avg= 5.3%

BOD Loadings

Year	Total pounds - Influent	Annual BOD Load (% change)
2019	3857797	1.5%
2018	3802459	15.2%
2017	3301000	4.4%
2016	3159462	7.5%
2015	2943000	13.3%
2014	2598000	Avg = 8.4%

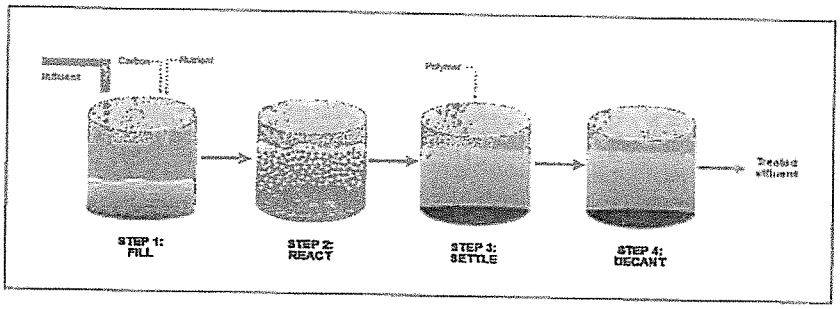
Onsite leachate treatment system delivers big savings to Monroe County, Ind.

Problem: Meeting regulations for leachate became a costly endeavor for an Indiana landfill.

Solution: A simple onsite leachate treatment system delivered savings for the long term.

As stormwater drains through collected materials on land such as waste at a landfill, it becomes leachate, which can accumulate many kinds of toxic compounds.

During the 1980s and 1990s, increasingly rigorous regulations were put on U.S. landfills to protect groundwater from leachate contamination. Landfills had to design, engineer, and build drainage and collection systems to capture leachate, and they had to determine how to treat it. Most chose to transport leachate using trucks or pipelines to the nearest publicly owned water resource recovery facility (WRRF), but Monroe County, Ind. – home to 140,000 residents – decided on a more cost-effective, onsite approach.



This diagram shows the steps of the Siemens batch PACT treatment steps. Siemens (Munich)

Continuing compliance needs

Monroe County had a problem experienced by many municipalities throughout the U.S. In 2004, it decided to start closing the landfill it had opened in 1971 and outsource solid waste management. Even though the landfill was closing, the county had to continue collecting and processing an average of 22,710 m^3/yr (6 million gal/yr) of landfill leachate for decades to come. Although hauling costs were less than half the national average and the county paid residential rates for wastewater services, continuing to haul its leachate to the local WRRF for treatment and disposal would be expensive.

The landfill, located about 16 km (10 mi) outside of Bloomington, Ind., consists of a 20-ha (50-ac) municipal solid waste section and a 2.8-ha (7-ac) construction and demolition section. In 2004, it stopped accepting public waste but still experienced issues with compliance, often because of leachate, said Tom McGlasson Jr., executive director at Monroe County Solid Waste Management District. To remedy the issues, the county updated the landfill's clay berms and installed new clay berms around the leachate collection system.

Leachate handling process become outdated

At first, the landfill pumped leachate from the collection system into a holding pond and transported it to the local WRRF using septic haulers.

"But the holding ponds would occasionally overflow, resulting in compliance issues," McGlasson said. "In those years, they often needed to be running 24 hours a day, so their ability to keep up with the leachate flow during those times was a concern."

Hauling costs recently increased by 33%. Hauling leachate to the local WRRF costs about $50 for 3800 L (1000 gal), McGlasson said. If the county still hauled all of the landfill's leachate to the WRRF for treatment, he estimates it would cost $270,000 a year.

"We have a lot of seasonal rainfall variability in the spring and fall that adds to our leachate generation," McGlasson said. "Compounding that is the major construction that's been going on for about 2 years on the highway between our leachate pond and our wastewater treatment plant, which requires the trucks to take much, much longer to make their trips and keep up because of all the delays."

Finding a simple, effective, and reliable treatment solution

McGlasson began investigating different options for onsite treatment in 2008. He said the county lacked the space and money to install such traditional treatment technology as clarifiers and trickling filters. "We also looked at a constructed wetland, but that was cost-prohibitive too, costing between $1.5 million and $2 million," he added.

One solution stood out: Siemens (Munich) PACT® (Powdered Activated Carbon Treatment) system. It uses a combination of powdered activated carbon and aerobic bacteria to adsorb and metabolize leachate contaminants in a single stage. The system reduces settling time compared to conventional activated sludge systems. This produces a much clearer effluent in a fraction of the time. This speed helps process batches faster during seasonal rainfall events. The system releases clear water effluent into

Landfill leachate is shown after it has gone through treatment. Siemens (Munich)

a stormwater ditch that empties into a local creek.

The county favored the Siemens solution for its low cost, ability to accommodate a small footprint, and ease of operation. The system could handle the county's leachate, which can be highly variable in volume or occasionally contain shock loadings.

"Siemens reputation and financial strength helped, too," McGlasson said. "We knew we could count on the company being around decades from now."

The county installed the system at the landfill in spring 2009. Company engineers set up the system, trained employees how to operate it. The system "was easy to learn because of its simplicity," McGlasson said. "We were most pleased."

The landfill now treats between 64% and 79% of its leachate onsite, continuing to transport the remaining to the local WRRF.

The Siemens PACT system is housed in a 6- × 12-m (20- × 40-ft) shelter with a 7-m (24-ft) ceiling. The enclosure helps control temperature, which is critical in winter when wide temperature swings and extreme cold can diminish or extinguish the biomass. The system can treat as much as 144 m^3/d (38,000 gal/d) during peak flows. Its automated programmable logic controller-driven control system was adapted to provide remote operation and alerts, which contributed to its ease of operation, McGlasson said.

Compact system provides straightforward operation

The system is easy to use and maintain, said Lee Paulsen, the environmental compliance and landfill director, who oversees day-to-day management of the landfill's leachate.

"The PACT process is straightforward," Paulsen said. "A float in the PACT tank triggers a pump that fills the tank. The PACT tank first undergoes an aeration cycle. Then, the aeration automatically turns off and a polymer coagulating agent is added to expedite the settling of the sludge and suspended solids."

Since the system began operating, the landfill has exceeded its permits only once due to an algae bloom on the holding pond. This "had nothing to do with the PACT treatment system," Paulsen said.

Maintenance requirements for the system are minor. "Once every couple of years, we drain the tank, suck out all the sediment and clean aerators," Paulsen said. "And I clean out the polymer tub once a week."

The system provides operating flexibility in handling various loads of leachate and variability in its composition. "Our top concern is avoiding any leachate overflows," Paulsen said. "But the PACT system gives us plenty of flexibility to process different volumes and different leachate constituents."

Onsite treatment saves money

The system has produced significant savings for the county. Treating leachate onsite saved $93,000 in 2016 and $77,000 in 2017. And with the jump in hauling costs, savings were predicted to be even higher in 2018.

"Onsite leachate treatment is about half the cost of hauling it offsite," McGlasson said. "Even though we still have to haul, we're pocketing substantial savings." This will be important because the landfill has to monitor leachate for another 20 years. "That's a lot of savings we can redirect to citizen services and making Monroe County an even better place to live," he said. ■