TENNESSEE Wastewater
an Aqua utility

851 Aviation Parkway
Smyrna, TN 37167

Tennessee Wastewater Systems, Inc.
Docket 15-00025
October 2019 Report Overview

Systems subject to Notice of Violations and other Corrective Orders:

Summit View – Docket 14-00136 – TDEC has reinstated the construction plans for the site.

River Road* (NOV) – TWSI is awaiting a signed easement for the land occupied by the sewer system. This is the final requirement TDEC had for resolution of the NOV.

Hidden Springs Resort (Commissioner's Order) – Awaiting plans approval from TDEC. An Agreed Order is being negotiated with TDEC that will put a timeframe on the competition of the expansion project. A petition will be filed with the Commission seeking approval to spend funds from TWSI's escrow and reserve accounts for this project. CAD filed a letter in support of the petition and will not be intervening in the matter. A NOV was issued for this site related to the ongoing issues addressed in the Commissioner's Order. TWSI addressed the concerns raised in the NOV and reasserts that the plant must be expanded to ensure proper operation.

* River Road is not included in the KPI Report because there is no discharge from the facility and is not monitored.

Jeff Risden

From: HAWKMS Agent <agent@hawkms.com>
Sent: Tuesday, October 1, 2019 8:04 AM
To: Jeff Risden; Matthew Nicks
Cc: Bob Pickney
Subject: TPUC KPI Compliance Report for 10/1/2019 8:00:05 AM

TPUC Flow KPI Report for 9/30/2019

Jeramy Stewart	Permitted	Expected	Actual	% of Expected	AvgFlow	% o
Hidden Springs RSF	**30750**	19600	13911	**0.71**	6515.40	
Summit View RSF	**8000**	5600	1585	**0.28**	2470.45	

Brandon Dotson	Permitted	Expected	Actual	% of Expected	AvgFlow	% o
Smoky Village RSF	**5600**	4725	1031	**0.22**	1818.97	

Marshall Fall

From: George Garden <George.Garden@tn.gov>
Sent: Thursday, September 26, 2019 8:56 AM
To: Marshall Fall
Cc: Patrick Parker
Subject: 190926_Nitrogen loading for drip/spray disposal of treated domestic wastewater

I cannot hold you to the Total Nitrogen concentration standard 23 mg/L at Hidden Springs. I'm rewriting the conditional approval proposal now. I am considering monitoring nitrification during start-up and requiring demonstration of the maximum nitrification during operation to protect groundwater quality to the maximum extent possible.

From: George Garden
Sent: Thursday, September 26, 2019 6:44 AM
To: Marshall Fall
Subject: FW: 190925_Nitrogen loading for drip/spray disposal of treated domestic wastewater

Just trying to do my job reviewing plans better....

From: Buchanan, John R [mailto:jbuchan7@utk.edu]
Sent: Wednesday, September 25, 2019 12:55 PM
To: George Garden
Cc: Brad Harris
Subject: [EXTERNAL] RE: 190925_Nitrogen loading for drip/spray disposal of treated domestic wastewater

Okay – your question was not as complex as I first feared.

As stated in the George Guidelines for Land Treatment of Municipal Wastewater by Drip Irrigation, 1996, the assumption is that "all nitrogen not lost to denitrification, ammonia volatilization or plant uptake is assumed to leach into the groundwater as nitrate." Bob O'Dette used the Georgia information to derive the nitrogen balance, and likewise Georgia used the 1981 Process Design Manual: Land Treatment of Municipal Wastewater.

Thus, Cn is the total nitrogen applied by the wastewater. All nitrogen species must be converted to the "as-N" form and summed. As written, the definition of Cn on page 17-15 is not correct if the treatment system does not achieve complete nitrification.

I hope this helps,

John R. Buchanan, Ph.D, P. E. (jbuchan7@utk.edu)
Associate Professor Biosystems Engineering & Soil Science
2506 E. J. Chapman Drive
Knoxville, TN 37996-4531
(865) 974-7266

From: George Garden <George.Garden@tn.gov>
Sent: Wednesday, September 25, 2019 10:16 AM
To: Buchanan, John R <Jbuchan7@utk.edu>
Cc: Brad Harris <Brad.Harris@tn.gov>
Subject: 190925_Nitrogen loading for drip/spray disposal of treated domestic wastewater

John, I have a hot topic I'd like you to weigh in on if possible. In the excerpt attached from the Wastewater Design Criteria there is a calculation for areal loading based on nitrogen (Lwn) developed from the EPA Sept 2006 Process Design Manual: Land Treatment of Municipal Wastewater Effluents. Equation 16-1 is a nitrate mass balance around the soil. Cn is the critical term since that represents the effluent permit standard for the pre-land-application treatment plant. My question is whether Cn should be "nitrate [mg/L]" or "Total Nitrogen [mg/L]" ? it seems to me, as written in the State Design Criteria, the formula assumes that the only nitrogen form to be considered is the nitrate form; that the anaerobic/aerobic biological and chemical conversions of any other forms of nitrogen (organic or ammonia) to nitrate is ignored. It makes a really big difference in treatment capacity to limit the plant discharge to 23 mg/L of nitrate; if the plant does not nitrify, then it is easy to meet the requirement and that is NOT what we want.

The EPA manual section 8.2.2 (attached also) describing the "Nitrogen Balance" is also attached and it does not limit the "nitrogen" to "nitrate". I'm a little sensitive to the criticism that we have not been adequately reviewing plans that was expressed at the last listening session so I'm redoubling my efforts to emphasize the pre-land-app treatment. I have always thought that the only widely accepted calculation for soil activity with respect to treatment was this calculation at least for domestic wastewater. I want to make sure we get it right and I think we are wrong. What think you?

TN Department of Environment & Conservation

George C Garden | PE BCEE
Chief Engineer/Deputy Director Engineering Services
11th Floor Wm R Snodgrass TN Tower
312 Rosa L. Parks Avenue
Nashville TN 37243-1102
George.Garden@tn.gov
p. 615-253-9934 c. 615-416-0164

Marshall Fall

From: Marshall Fall
Sent: Wednesday, September 25, 2019 12:54 PM
To: George Garden
Subject: RE: Hidden Springs

My main goal is to get started on the construction,,,BUT I want to make sure there aren't going to be any unrealistic permit expectations. Based on the limits you wanted us to agree on to get the plans approved, it would have required me to double the size of the Bioclear units which would have significantly impacted the cost,,,,and constructability,,,,not to mention placing unnecessary limits on the permit. Remember, this is land app, not discharge to surface waters…:)

Thanks,

Marshall

From: George Garden <George.Garden@tn.gov>
Sent: Wednesday, September 25, 2019 10:04 AM
To: Marshall Fall <marshall.fall@adenus.com>
Subject: RE: Hidden Springs

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Marshall, the spreadsheet came from TN's interpretation of the 2006 EPA Process Design Manual for Land Treatment of Municipal Wastewater. John Buchanan and I are discussing whether it is correct. You are right; there is a big difference in nitrate and total nitrogen; if we stay with nitrate then we have to have an ammonia limit; without it you could do not nitrification and meet the limit. I suspect it will be TN at some limit or nitrate + ammonia at some limits.

From: Marshall Fall [mailto:marshall.fall@adenus.com]
Sent: Tuesday, September 24, 2019 7:58 PM
To: George Garden
Subject: [EXTERNAL] Re: Hidden Springs

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George,

the spreadsheet lists the Cn as 23 parts of Nitrate N, not total Nitrogen. Josh said this is obtainable.

Get Outlook for iOS

From: George Garden <George.Garden@tn.gov>
Sent: Friday, September 20, 2019 4:39:20 PM
To: Marshall Fall <marshall.fall@adenus.com>
Subject: RE: Hidden Springs

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From: Marshall Fall [mailto:marshall.fall@adenus.com]
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Cc: Jeff Risden; Matthew Nicks; Jeramy Stewart
Subject: [EXTERNAL] Fwd: Hidden Springs

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I am CC'ing this response to Jeff so he can forward it to Bill Penny, so he can forward it to the departments attourney and then he can forward it to everyone else in typical government timeframes and waste the remaining part of the construction season.

Have a good weekend.

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Cc: Jeff Risden <Jeff.Risden@Adenus.com>
Subject: RE: Hidden Springs

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Hi Marshall...

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Unfortunately, we don't have enough media volume and surface area in the currently proposed 30/32-TF model filters to nitrify the ammonia to < 5 mg/l. In a combined oxidation and nitrification (CON) trickling filter where both BOD removal and nitrification of ammonia are accomplished in the same single stage filter we would need a loading rate of about 0.25 Kg BOD/m3 media (0.55 lbs BOD/m3) in order to accomplish 90% NH3-N reduction (or about 50 mg/l NH3-N

in the influent reduced to 5 mg/l NH3-N in the effluent). See attached scanned reference pages from ***WEF MOP 35 – Biofilm Reactors, 2011.***

I think we had used 150 mg/l as an influent BOD load on the initial calcs report but frankly, 120 mg/l influent BOD is more realistic from STEP on residential applications (would you agree?).

If we assume 120 mg/l BOD and 15,000 gpd per Bioclere unit we would have roughly the following loading.

(0.015 MGD * 8.34 lbs/gal * 120 mg/l BOD) = 15 lbs BOD per Bioclere.

Therefore we would need on the order of 30 m3 of media in each Bioclere in order to accomplish the above loading rates for BOD removal where we could also expect 90% nitrification of ammonia.

The currently proposed 30/32-TF filters only have 18 m3 media each. The easiest way to get to 30 m3 while limiting cost would be to make the same 30 series filters (10' dia) about 5' 6" taller. This would take the total height of the filter from 11' 1-3/4" to 16' 7-3/4". The additional 12 m3 media plus the extra filter high would add about $8,400 per unit. However, it doesn't change the footprint, layout or site plans. Freight would also not change. Therefore this is probably our best solution.

Other options would be to put in more shallower 10' dia filters or to use 12' dia filters but both of these options change the footprint, shipping, etc. and come with quite a bit higher cost.

If this solution makes sense, we can update the bid and drawings and get you any other materials you need. I should also point out that with the filters being 5' 6" taller the TDH on any feed pumps would be greater and they might need to be made slightly larger or higher HP as a result.

Let us know how you want to proceed...

Josh Lindell
AquaPoint.3, LLC
39 Tarkiln Place
New Bedford, MA 02745
O: 508-985-9050 ext 110
C: 508-951-2408
F: 508-985-9072
www.aquapoint.com

From: Marshall Fall [mailto:marshall.fall@adenus.com]
Sent: Thursday, September 19, 2019 5:46 PM
To: Josh Lindell; William Fenner
Cc: Jeff Risden
Subject: RE: Hidden Springs

Thanks Josh! Let me know what you come up with.

Marshall

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To: Marshall Fall <marshall.fall@adenus.com>; William Fenner <WFenner@aquapoint.com>
Subject: RE: Hidden Springs

Hi Marshall,

The proposed models are what we call 30/32-TFs which is the same filter as a 30/32 Bioclere and the TF just signifies that it is a trickling filter tower only (no sump).

For future reference, the Bioclere and TF model system is based on the filter diameter in meters and depth in meters. So, the 30/32 is 3.0 meters in diameter (about 10 ft) and 3.2 meters deep.

I have to run to a dinner but will check on loading rates first thing in the AM and get back to you on performance. The attached report suggests we did not design for ammonia removal but the loading rate is sufficiently low to accomplish about 40% ammonia removal with the currently proposed media and we do have the ability to use higher surface area media that can increase the surface area by about 65% to enhance ammonia removal (media is the same price so not cost implications). If we can get the ammonia, the TN is easy because we will denitrify most of the nitrate with what is a fairly high recycle rate.

Ill run the numbers in the AM and be back to you early in the day...

Thanks,

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From: Marshall Fall [mailto:marshall.fall@adenus.com]
Sent: Thursday, September 19, 2019 5:19 PM
To: William Fenner; Josh Lindell
Subject: FW: Hidden Springs
Importance: High

Bill and Josh,

Take a look at the below email regarding the limits that will be written into the next Hidden Springs Permit. Is the Amonia and TN limits feasible with this type of system we are proposing? Also, can you clarify or confirm for me the unit model number per item number 5 from the list below.

Thanks,

Marshall

From: Jeff Risden <Jeff.Risden@Adenus.com>
Sent: Thursday, September 19, 2019 10:07 AM
To: Marshall Fall <marshall.fall@adenus.com>

Cc: Matthew Nicks <Matthew.Nicks@adenus.com>
Subject: FW: Hidden Springs

Marshall –

Please see the email below from Patrick Parker. I believe these are the points George went over with you last week at the TDEC meeting. Please review and let me know if these conditions are acceptable or if there's anything that requires further conversation. Note the request to confirm the Aquapoint equipment number.

Thanks,

Jeff

From: Penny, Bill <bpenny@burr.com>
Sent: Thursday, September 19, 2019 10:00 AM
To: Jeff Risden <Jeff.Risden@Adenus.com>
Subject: FW: Hidden Springs

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Jeff,
Please see below.
Bill..

BURR FORMAN LLP

AL • DE • FL • GA
MS • NC • SC • TN

William L. Penny • *Partner*
Burr & Forman LLP

222 Second Avenue South, Suite 2000, Nashville, Tennessee 37201
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bpenny@burr.com • www.burr.com • blog: Environmental law matters

360 Attorneys. 19 Offices. 1 Firm. Southeast Strong.

From: Patrick Parker <Patrick.Parker@tn.gov>
Sent: Thursday, September 19, 2019 9:07 AM
To: Penny, Bill <bpenny@burr.com>
Cc: George Garden <George.Garden@tn.gov>
Subject: Hidden Springs

[EXTERNAL EMAIL]

Bill,

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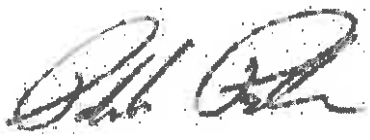
The modified permit will include monthly sampling events for NH3-N </= 5 mg/L and Total Nitrogen </= the Ca value of 23 mg/L for TN from the Lwn calculations in addition to the current permit sampling events.

Some of this may need to be in the Agreed Order settling the appeal so we need to figure out but let us know if you and your client are agreeable to this.



Patrick Parker | Senior Counsel
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312 Rosa L. Parks Ave., Nashville, TN 37243
p. 615-532-0129 c. 615-571-9304
patrick.parker@tn.gov
tn.gov/environment
tnstateparks.com

Marshall Fall

From: Marshall Fall
Sent: Friday, September 20, 2019 4:42 PM
To: George Garden
Subject: Re: Hidden Springs

I'll look on Monday. I'm all out of Drive and energy for this week. Have a great weekend and I appreciate ya getting back to me

Get Outlook for iOS

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William L. Penny • *Partner*
Burr & Forman LLP

AL • DE • FL • GA
MS • NC • SC • TN

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direct 615-724-3213 • fax 615-724-3290 • cell 615-351-0833
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