

**Florida Department of Health
Florida Onsite Sewage Nitrogen Reduction Strategies Study**

Contract CORCL

TASK B.8

**Operation, Maintenance and Repairs Report for
Passive Nitrogen Reduction System
B-HS5**

January, 2015

Task B of the Florida Onsite Sewage Nitrogen Reduction Strategies Study (FOSNRS) includes performing field experiments to critically evaluate the performance of nitrogen removal technologies that were identified in FOSNRS Task A.9 and pilot tested in Task A.26. To meet this objective, full-scale treatment systems were installed at various residential sites in Florida, operated on septic tank effluent (STE) under actual onsite conditions, and monitored over an extended timeframe.

This report summarizes the operation, maintenance, and repairs required for the passive nitrogen reduction system (PNRS) installed at a home site in Seminole County, Florida (B-HS5) in July, 2013. Design and construction details were presented previously in the Task B.6 Field System Installation Report for this system. The field system monitoring reports that document system performance, operation, and maintenance issues were presented previously in Task B.7 documents for each monitoring event. The B-HS5 system performance was monitored from July 2013 to December 2014.

The passive nitrogen reduction system (PNRS) consists of three process tanks that were added to the existing permitted onsite system which included a pre-existing 1,350 gallon concrete septic tank which continues to provide primary treatment prior to the PNRS system. In addition, the PNRS system includes a 1500 gallon plastic tank housing a Stage 1 unsaturated media filter; a 300 gallon concrete pump tank; and a 1,500 gallon two chamber concrete tank housing a Stage 2 saturated media biofilter. The denitrified treated effluent is discharged into the soil via the existing drainfield which is of standard bed geometry.

Overall this system required very little maintenance. A Hazen and Sawyer technician visited the site on a monthly basis; however, the only maintenance required was cleaning of the septic tank effluent screen. A description of the routine operation and maintenance items (O&M), the entity that performed the repair/maintenance, and the associated cost are included in Table 1. Table 2 is the summary log of repairs, maintenance actions, inspection results and system observations since start-up. This data, along with data from the other full-scale systems evaluated in Task B, will be used to estimate O&M effort and cost for full-scale passive nitrogen reduction systems (PNRS) in the Life Cycle Cost Analysis (Task B.13).

Table 1. Site B-HS5: Summary of start-up, routine operation and maintenance issues, repairs and refinement actions

Date	Start-up Issues	Routine Operations & Maintenance Issues	Repairs	System Refinement	Time Required (hr)	Estimated Cost ¹
7/8/13	ME performed pump start-up and float adjustments were made				2	\$150
7/9/13	Stage 1 and Stage 2 throttling gate valves were set for single pass mode of operation				1	\$75
7/17/13	Vericomm panel connected to homeowner's internet connection				1	\$75
4/25/14				H&S revised mode of operation to recirculation to Stage 1 biofilter sprayers	1	\$75
7/11/14			H&S fixed first and second sprayers which were not spinning		0.5	\$38
7/29/14		H&S cleaned primary tank effluent screen			0.5	\$38
8/18/14			H&S fixed second sprayer which was not spinning		0.5	\$38
9/19/14		H&S cleaned primary tank effluent screen			0.5	\$38
10/21/14		H&S cleaned primary tank effluent screen			0.5	\$38
12/15/14		H&S cleaned primary tank effluent screen			0.5	\$38
1/21/15				H&S revised mode of operation to single pass	0.5	\$38

ME = maintenance entity = Averett Septic Inc.

H&S = Hazen and Sawyer (field technician)

HO = homeowner

CHD = county health department

¹An hourly rate of \$75 was assumed for maintenance entity labor.

Table 2. Site B-HS5: System inspections, observations, maintenance actions, and repairs log

Date	Description
6/24/2013	Construction - Stage 1 and Stage 2 tanks installed
6/25/2013	Construction - Drainfield distribution box installed and all pipework
7/8/2013	Pump start-up and float adjustments were made
7/9/2013	System start-up
	Bull run valve switched from drainfield to Stage 1 biofilter
	Stage 1 and Stage 2 throttling gate valves were set for single pass mode of operation
7/17/2013	System check
	Met homeowner's internet provider to connect Vericomm panel to an internet connection
7/23/2013	Construction - sod installation
7/29/2013	Preliminary sample event No. 1
8/6/2013	Site visit. System ok.
	Need to add soil around low side of pump tank riser
8/15/2013	Preliminary sample event No. 2
9/27/2013	Sample Event No. 1
11/8/2013	Site visit. System ok.
11/27/2013	Site visit. System ok.
12/4/2013	Sample Event No. 2
12/23/2013	Site visit. System ok.
1/23/2014	Site visit. System ok.
1/31/2014	Site visit. System ok.
2/3/2014	Sample Event No. 3
2/4/2014	Sample Event No. 4
2/5/2014	Sample Event No. 5
2/6/2014	Sample Event No. 6
2/7/2014	Sample Event No. 7
2/12/2014	Site visit. System ok.
3/14/2014	Site visit. System ok.
4/11/2014	Sample Event No. 8
4/25/2014	Site visit. System ok.
	Revised mode of operation to recirculation to the Stage 1 biofilter sprayers.
	Set recirc ratio to 3:1.
	Installed Stage 1 biofilter piezometer for water level monitoring.
4/29/2014	Site visit. System ok.
5/28/2014	Sample Event No. 9 (formal No. 5)
5/29/2014	Collected samples for product composition testing.
7/11/2014	Site visit. System ok.
	First and second sprayers in Stage 1 biofilter not spinning on dose. Fixed.
7/29/2014	Site visit. System ok.
	Cleaned STE effluent screen.

Table 2 (cont.). Site B-HS5: System inspections, observations, maintenance actions, and repairs log

Date	Description
8/18/2014	Sample Event No. 10 (formal No. 6)
	Middle sprayer in Stage 1 biofilter not spinning on dose. Fixed.
9/19/2014	Site visit. System ok.
	Cleaned STE effluent screen.
10/21/2014	Sample Event No. 11 (formal No. 7)
	Cleaned STE effluent screen.
11/21/2014	Site visit. System ok.
12/15/2014	Sample Event No. 12 (formal No. 8)
	Cleaned STE effluent screen.
1/21/2015	Revised mode of operation to single pass.