Pennsylvania Department of Environmental Protection

Southeast Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0052761**
Facility Type	**Non-Municipal**	APS ID	**1111903**
Major / Minor	**Minor**	Authorization ID	**1481238**

Applicant and Facility Information

Applicant Name	**Buckingham SNF, LLC**	Facility Name	**Buckingham Valley Nursing Center STP**
Applicant Address	820 Durham Road	Facility Address	820 Durham Road
	Newtown, PA 18912		Newtown, PA 18940
Applicant Contact	Simcha Werner	Facility Contact	Mike Wieland
Applicant Phone	(215) 598-7181	Facility Phone	(215) 598-7181
Client ID	271125	Site ID	242632
Ch 94 Load Status	Not Overloaded	Municipality	Buckingham Township
Connection Status		County	Bucks
Date Application Received	April 4, 2024	EPA Waived?	Yes
Date Application Accepted		If No, Reason	

Purpose of Application: Permit Renewal.

Summary of Review

Applicant requests renewal of NPDES permit to discharge 0.014 mgd of treated sewage effluent to an unnamed tributary to Mill Creek, which is tributary to Neshaminy Creek. Facility is located at 820 Durham Road, Newtown, PA 18940. The treatment plant consists of an equalization tank, primary and secondary anoxic/aerobic tanks, two clarifiers, a chlorine. contact tank, a post aeration tank, a de-chlorination tank, and a sludge holding tank. Chlorine is used for disinfection and Sodium Sulfite is used for Dechlorination. Alum is used for phosphorus removal.

For phosphorus, during a previous permit renewal, phosphorus was reduced from 2.0 mg/l to 0.8 mg/l from April 1st through October 31st. This was consistent with the Total Maximum Daily Load (TMDL) approved by EPA in 2003, which was subsequently withdrawn. The winter limit of 1.6 mg/l was also applied, consistent with Department policy. For CBOD5, NH3-N, and DO, the previous modeling results are attached. For TRC, the previous spreadsheet is attached. Dischargers in the Neshaminy basin are required to maintain total nitrogen <= 11 mg/l for protection of nearest downstream water supply, where TN=NH3-N + (NO2+NO3)-N. Since NH3-N = 3.0 mg/l, (NO2+NO3)-N = 8.0 mg/l from July through October.

From previous water quality protection report, the following input variables were used for WQM 7.0:

Qw = 0.014 mgd
DA = 0.1 mi.2
Q7-10 = 0.0 cfs at point of discharge (topo map and files indicate dry/intermittent conditions at the point of discharge that extend for approximately 1000 feet).
Q7-0 yield assumed 0.1 cfsm at the point where the stream becomes perennial. The default yield is used because there are no nearby stream gages within the range of drainage area for this discharge (e.g., gage for 01465000, Neshaminy at Rushland, which was used for earlier modeling, has a 164 mi.2 drainage area and may not be reflective

Approve	Deny	Signatures	Date
X		Ketan Thaker Ketan Thaker / Project Manager	10/18/2024
X		Pravin Patel Pravin C. Patel, P.E. / Environmental Engineer Manager	10/18/2024

Summary of Review

of flows in a small headwater stream).
Temp (discharge) = 20ºF summer and 15ºF winter (default values, NH3-N guidance)
Temp (stream) = 25ºF summer and 5ºF winter (default, NH3-N guidance)
pH (discharge) = 7.7 (operation reports from 2003-2004 indicate July-September pH ranges from 7.3-8.2, and the median is estimated to be 7.7). Earlier reports were used because permittee had not submitted them in the past few years.
pH (stream) = 7 (default for freestone stream, NH3-N guidance)
Q7-10 (winter) = 2x Q7-10 summer, or 0.2 cfsm (guidance)

Existing discharge limits were input for CBOD5, NH3-N, and DO. Aquatic life protection was applied in Reach II only, where the stream is considered perennial (as was done in previous modeling). Modeling was also performed for the winter period. Results of WQM 7.0 (attached) indicate that existing limits for summer and winter periods are protective of DO and NH3-N toxicity.

Effluent from the STP is generally in compliance with effluent limits of the permit. Effluent limits for all the parameters will remain the same in this permit renewal. Monitoring requirement for Total Nitrogen and E. Coli have been included in this permit renewal and are consistent with our SOP.

Following are effluent limits:

Parameter	Effluent Limits (AV. MO. in mg/l)	Basis
CBOD5 (5/1 to 10/31)	10	WQM Model
CBOD5 (11/1 to 4/30)	20	WQM Model
Dissolved Oxygen	5.0	WQM Model
Total Suspended Solods	30	92a.47
Total Residual Chlorine	0.1	TRC Spreadsheet
pH (S.U)	6.0 – 9.0 (S.U.)	92a.47, 95.2
Ammonia-Nitrogen (5/1 to 10/31)	3.0	WQM Model
Ammonia-Nitrogen (11/1 to 4/30)	9.0	WQM Model
Fecal Coliform (No./100 ml)	200 Geo Mean (No./100 ml)	92a.47
Total Phosphorus (4/1 to 10/31)	0.8	BPJ
Total Phosphorus (11/1 to 3/31)	1.6	BPJ
Nitrate-Nitrite as N (7/1 to 10/31)	8.0	BPJ
Total Nitrogen	Report	92a.61
E. Coli (No./100 ml)	Report	92a.47

Act-14 Notification to Buckingham Township and Bucks County Commissioners on March 7, 2024 by certified mail.

Sludge use and disposal description and location(s): The sludge is hauled and dispossessed off by Wind River Environmental Contractor.

Public Participation

DEP will publish notice of the receipt of the NPDES permit application and a tentative decision to issue the individual NPDES permit in the *Pennsylvania Bulletin* in accordance with 25 Pa. Code § 92a.82. Upon publication in the *Pennsylvania Bulletin*, DEP will accept written comments from interested persons for a 30-day period (which may be extended for one additional 15-day period at DEP's discretion), which will be considered in making a final decision on the application. Any person may request or petition for a public hearing with respect to the application. A public hearing may be held if DEP determines that there is significant public interest in holding a hearing. If a hearing is held, notice of the hearing will be published in the *Pennsylvania Bulletin* at least 30 days prior to the hearing and in at least one newspaper of general circulation within the geographical area of the discharge.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	.014
Latitude	40Âº 17' 39.33"	Longitude	-75Âº 0' 37.34"
Quad Name	Buckingham	Quad Code	1645
Wastewater Description:	Sewage Effluent		
Receiving Waters	Unnamed Tributary of Mill Creek (WWF, MF)	Stream Code	02613
NHD Com ID	25475784	RMI	0.57
Drainage Area	0.1 mi2	Yield (cfs/mi^2)	0.0*
Q_{7-10} Flow (cfs)	0.0 cfs	Q_{7-10} Basis	*
Elevation (ft)	220 ft	Slope (ft/ft)	0.00498
Watershed No.	2-F	Chapter 93 Class.	WWF, MF
Existing Use	Same as Chapter 93 classification	Existing Use Qualifier	na
Exceptions to Use	none	Exceptions to Criteria	Add Tur 1
Assessment Status	Mill Creek is attaining use. Neshaminy Creek is impaired.		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status	Final, 04/09/2003, later withdrawn**	Name	Neshaminy Creek

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake		Aqua PA SE Division, Neshaminy Creek	
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	

* dry/intermittent swale at point of discharge
** TMDL withdrawn (PA Bulletin Volume 37 No 33, August 18, 2007).

Treatment Facility Summary				
Treatment Facility Name: Buckingham Valley Nursing Center STP				
Waste Type	**Degree of Treatment**	**Process Type**	**Disinfection**	**Avg Annual Flow (MGD)**
Sewage		Ext Aeration	Gas Chlorine	0.014
Hydraulic Capacity (MGD)	**Organic Capacity (lbs/day)**	**Load Status**	**Biosolids Treatment**	**Biosolids Use/Disposal**
0.014		Not Overloaded		

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
02F	2613	Trib 02613 of Mill Creek	**0.570**	220.00	0.10	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.100	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Buckingham VNC	PA0052761	0.0000	0.0000	0.0140	0.000	25.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	10.00	2.00	0.00	1.50
Dissolved Oxygen	5.00	8.24	0.00	0.00
NH3-N	3.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
02F	2613	Trib 02613 of Mill Creek	**0.380**	215.00	0.32	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.100	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	25.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
02F	2613	Trib 02613 of Mill Creek

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (°C)	Analysis pH
Q7-10 Flow												
0.570	0.01	0.00	0.01	.0217	0.00498	.32	1.96	6.12	0.05	0.230	23.42	7.00
Q1-10 Flow												
0.570	0.01	0.00	0.00	.0217	0.00498	NA	NA	NA	0.00	0.000	0.00	0.00
Q30-10 Flow												
0.570	0.01	0.00	0.00	.0217	0.00498	NA	NA	NA	0.00	0.000	0.00	0.00

WQM 7.0 Modeling Specifications

Parameters	D.O.	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	EMPR	Use Inputted W/D Ratio	☐
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	6		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
02F	2613	Trib 02613 of Mill Creek

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5		NH3-N		Dissolved Oxygen		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
0.57	Buckingham VNC	10	10	3	3	5	5	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
02F	2613	Trib 02613 of Mill Creek

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
0.570	0.014	23.421	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
1.960	0.320	6.120	0.050
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
7.47	1.347	2.05	0.911
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.024	26.127	Owens	6
Reach Travel Time (days)			
0.230			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.023	7.21	2.01	6.75
0.046	6.95	1.97	7.16
0.069	6.70	1.93	7.39
0.092	6.46	1.89	7.54
0.115	6.23	1.85	7.63
0.138	6.01	1.81	7.69
0.161	5.80	1.77	7.74
0.184	5.59	1.74	7.75
0.207	5.39	1.70	7.75
0.230	5.20	1.66	7.75

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
02F	2613	Trib 02613 of Mill Creek

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
0.570	Buckingham VNC	PA0052761	0.000	CBOD5	10		
				NH3-N	3	6	
				Dissolved Oxygen			5

A	B	C	D	E	F	G
TRC EVALUATION						
Input appropriate values in A3:A9 and D3:D9			PA0052761 - Buckingham Valley Nursing Center ST			
0.01	= Q stream (cfs)		0.5	= CV Daily		
0.014	= Q discharge (MGD)		0.5	= CV Hourly		
4	= no. samples		1	= AFC_Partial Mix Factor		
0.3	= Chlorine Demand of Stream		1	= CFC_Partial Mix Factor		
0	= Chlorine Demand of Discharge		15	= AFC_Criteria Compliance Time (min)		
0.5	= BAT/BPJ Value		720	= CFC_Criteria Compliance Time (min)		
	= % Factor of Safety (FOS)			=Decay Coefficient (K)		
Source	Reference	AFC Calculations		Reference	CFC Calculations	
TRC	1.3.2.iii	WLA afc = 0.166		1.3.2.iii	WLA cfc = 0.155	
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373		5.1c	LTAMULT cfc = 0.581	
PENTOXSD TRG	5.1b	LTA_afc= 0.062		5.1d	LTA_cfc = 0.090	
Source		Effluent Limit Calculations				
PENTOXSD TRG	5.1f	AML MULT = 1.720				
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.107		AFC		
		INST MAX LIMIT (mg/l) = 0.249				
WLA afc	(.019/e(-k*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))...					
	...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)					
LTAMULT afc	EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5)					
LTA_afc	wla_afc*LTAMULT_afc					
WLA_cfc	(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc))...					
	...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)					
LTAMULT_cfc	EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5)					
LTA_cfc	wla_cfc*LTAMULT_cfc					
AML MULT	EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1))					
AVG MON LIMIT	MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT)					
INST MAX LIMIT	1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)					

Compliance History

DMR Data for Outfall 001 (from September 1, 2023 to August 31, 2024)

Parameter	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	OCT-23	SEP-23
Flow (MGD) Average Monthly	0.006625	0.004771	0.005469	0.005584	0.006995	0.00775	0.007364	0.008677	0.007487	0.006752	0.006379	0.006968
Flow (MGD) Daily Maximum	0.01633	0.007217	0.013608	0.010773	0.02357	0.01502	0.011879	0.019931	0.015517	0.016192	0.013347	0.015755
pH (S.U.) Instantaneous Minimum	7.16	8.04	6.97	7.8	7.36	7.52	7.05	7.16	7.21	7.52	7.82	7.74
pH (S.U.) Instantaneous Maximum	8.85	8.66	8.71	8.38	8.68	8.44	8.34	8.02	8.19	8.33	8.52	8.33
DO (mg/L) Instantaneous Minimum	5.06	6.83	7.45	8.04	8.3	8.64	8.11	9.07	7.66	9.38	8.49	8.29
TRC (mg/L) Average Monthly	< 0.04	< 0.01	< 0.03	0.04	< 0.1	< 0.1	0.1	< 0.1	< 0.1	0.1	0.05	0.04
TRC (mg/L) Instantaneous Maximum	0.05	0.17	0.10	0.11	0.19	0.21	0.13	0.20	0.20	0.19	0.13	0.10
CBOD5 (mg/L) Average Monthly	< 2.0	< 5.0	< 2.0	< 2.0	< 2.0	< 2.1	< 2.0	< 2.0	< 2.8	< 2.3	< 2.0	< 2.0
TSS (mg/L) Average Monthly	7.0	4.5	1.0	< 1.5	3.0	1.3	1.0	1.5	< 2.0	< 1.5	< 1.0	2.5
Fecal Coliform (No./100 ml) Geometric Mean	55	35	< 17	< 2	< 4	< 4	< 6	< 2	< 2	< 2	< 2	< 2
Fecal Coliform (No./100 ml) Instantaneous Maximum	300	48	1230	3	10	16	21	3	3	< 2	< 2	< 2
Nitrate-Nitrite (mg/L) Average Monthly	3.1	7.2									4.6	7.6
Ammonia (mg/L) Average Monthly	0.2	0.8	0.7	2.0	< 0.1	0.5	0.4	< 0.02	0.3	0.04	< 0.02	< 0.02
Total Phosphorus (lbs/day) Average Monthly	0.005	0.009	0.01	0.01	0.02	0.01	0.007	0.008	0.006	0.1	0.005	0.008

Total Phosphorus (mg/L) Average Monthly	0.1	0.3	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.2	0.1	0.2

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality and BPJ. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (386-0400-001), SOPs and/or BPJ.

Outfall 001, Effective Period: Permit Effective Date through Permit Expiration Date.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Metered
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	5.0 Inst Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.1	XXX	0.25	1/day	Grab
CBOD5 Nov 1 - Apr 30	XXX	XXX	XXX	20.0	XXX	40	2/month	24-Hr Composite
CBOD5 May 1 - Oct 31	XXX	XXX	XXX	10.0	XXX	20	2/month	24-Hr Composite
TSS	XXX	XXX	XXX	30.0	XXX	60	2/month	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	2/month	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	2/month	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/month	Grab
Nitrate-Nitrite Jul 1 - Oct 31	XXX	XXX	XXX	8.0	XXX	16	2/month	24-Hr Composite
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Ammonia Nov 1 - Apr 30	XXX	XXX	XXX	9.0	XXX	18	2/month	24-Hr Composite

Outfall 001, Continued (from Permit Effective Date through Permit Expiration Date)

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum		
Ammonia May 1 - Oct 31	XXX	XXX	XXX	3.0	XXX	6	2/month	24-Hr Composite
Total Phosphorus Nov 1 - Mar 31	0.2	XXX	XXX	1.6	XXX	3.2	2/month	24-Hr Composite
Total Phosphorus Apr 1 - Oct 31	0.1	XXX	XXX	0.8	XXX	1.6	2/month	24-Hr Composite

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Approve	Deny	Signatures	Date
X		Ketan Thaker Ketan Thaker / Project Manager	10/18/2024
X		Pravin Patel Pravin C. Patel, P.E. / Environmental Engineer Manager	10/18/2024