



STANDARD OPERATING PROCEDURE

HIGH STRENGTH WASTE RECEIVING

Date Approved:
March 8, 2018

Approved By:
Glenbard Wastewater Authority
Executive Oversight Committee

PURPOSE: A guide to qualify proposed digester feedstock and to safely and effectively accept the feedstock and process it for the purposes of co-generation. It is important to note that this is a biological process, and that while defining strict operating procedures, the possibility of an upset condition cannot be eliminated – only reduced. Staff shall not be held liable for an upset condition as long as these procedures are followed.

SCOPE: This Standard Operating Procedure (SOP) covers all aspects of receiving High Strength Waste (HSW). and is broken down into sections as detailed below.

It is desirable to use a single source hauler for delivery of high strength waste to the Authority so that greater control of delivery amounts and accountability of delivered materials can be had. However, as market changes may necessitate using more than one hauler or changing the sole hauler, included in this SOP is the process of qualifying additional feedstock and suppliers.

Part I	Staff Responsible: Environmental Resources Coordinator																			
Qualification of Feedstock																				
<p>1. HSW hauler will provide a complete description of the waste characteristics, including the following:</p> <ul style="list-style-type: none"> a. Waste type and origin. Type description to include general industry (food, medical, etc.) b. A Laboratory analysis of the proposed feedstock waste must be submitted and reviewed. The hauler may provide the analysis from an independent laboratory or it may be analyzed by the Glenbard Wastewater Authority (GWA) laboratory staff at the hauler’s sole expense. c. The analysis must contain the following parameters and be within the ranges indicated. <table border="1" style="margin-left: 40px; border-collapse: collapse; width: 60%;"> <thead> <tr> <th style="width: 30%;">Parameter</th> <th style="width: 35%;">Minimum</th> <th style="width: 35%;">Maximum</th> </tr> </thead> <tbody> <tr> <td>COD</td> <td>30,000</td> <td>N/A</td> </tr> <tr> <td>pH</td> <td>3</td> <td>8</td> </tr> <tr> <td>%VSS</td> <td>60%</td> <td>100%</td> </tr> <tr> <td>Sulfates</td> <td>0</td> <td>350 mg/Kg</td> </tr> <tr> <td>Volatile Fatty Acids</td> <td colspan="2">Informational Purposes Only/No Limit</td> </tr> </tbody> </table>			Parameter	Minimum	Maximum	COD	30,000	N/A	pH	3	8	%VSS	60%	100%	Sulfates	0	350 mg/Kg	Volatile Fatty Acids	Informational Purposes Only/No Limit	
Parameter	Minimum	Maximum																		
COD	30,000	N/A																		
pH	3	8																		
%VSS	60%	100%																		
Sulfates	0	350 mg/Kg																		
Volatile Fatty Acids	Informational Purposes Only/No Limit																			
<p>2. The Environmental Resources Coordinator (ERC) is responsible for reviewing the data provided and accepting or declining the feedstock based on the established range of parameters.</p> <p>3. The ERC may decline feedstock that meets the analysis criteria when there are other concerns, such as consistency or other risk factors.</p> <p>4. The Executive Director has the final approval or disapproval in all instances. The Authority has the right to refuse any feedstock or hauler at any time</p>																				

Part 2	Staff Responsible: Environmental Resources Coordinator
Hauler Qualification	
<ol style="list-style-type: none"> 1. Prior to delivering feedstock, proposed haulers must complete a permit application/contract agreement with GWA. 2. Haulers must provide proof of insurance with the following minimum coverage: <ol style="list-style-type: none"> A. Comprehensive General Liability Insurance covering personal injury, bodily injury, property damage, and contractual liability in the amount of One Million Dollars (\$1,000,000) for each occurrence and Two Million Dollars (\$2,000,000) aggregate per policy period; B. Comprehensive Automobile Liability Insurance covering personal injury, bodily injury and Property damage with a minimum combined limit of One Million Dollars (\$1,000,000). C. Worker’s Compensation insurance in the minimum amounts required by statute. 3. A certificate or certificates of insurance naming THE AUTHORITY, the Village of Lombard and the Village of Glen Ellyn as additional insured parties. The certificate or certificates shall reflect the above coverages and shall be in effect at all times. Updated certificates of insurance shall be submitted annually to the Authority. 4. Haulers must provide a “renders license” or sign an affidavit certifying they only transport material agreed upon. 5. The ERC is responsible for reviewing the information submitted and recommending that the hauler be approved or disapproved. 6. The Executive Director has the final approval or disapproval in all instances. 	
Part 3	Staff Responsible: Operations Department
Feedstock Receiving	Back-Up Staff: ERC
<ol style="list-style-type: none"> 1. The ERC should make all efforts possible to schedule deliveries ahead of time, and convey this schedule to Operations on a daily basis or as mutually convenient. 2. Haulers must stop at gate and push button to announce arrival and open the gate. 3. A member of the Operations Department will meet the hauler at the receiving station to unlock it. 4. Prior to unlocking the station to commence discharge, the operator must check the daily log to ensure that there is capacity and the maximum volume of waste received will not be exceeded by the acceptance of the load. The criteria for the maximum volume of waste allowed to receive will be found in Schedule A of these SOP’s. 5. The hauler is to provide a completed manifest for the load. 6. The hauler must fill out the label on a GWA provided sample container and use the container to grab a sample of the load as it is discharging. 7. Sample jars are to be provided by the Authority with labels. 8. The sample is to be placed in the small refrigerator that is located near the desk in the garage of the press building (Building P). 9. A member of the Operations Department will observe the discharge to check for possible contaminants. 10. Should the load appear to be contaminated, the operator must stop the hauler from discharging anymore of the suspect load. 11. When the discharge is complete, the operator will re-lock the station. 12. Once the maximum amount of HSW is received for that day, the operator must communicate this to the ERC and the administrative secretary in order to divert any further loads. 13. If there is failure in equipment associated with the receiving, maintaining, or transfer of the High Strength Waste, additional hauling will be ceased immediately until such equipment is repaired. 14. Deliveries will only be received when full time staff is present, i.e. M-F 7am-4pm, excluding holidays. 	

Part 4	Staff Responsible: Operations/Laboratory
Processing of HSW Samples	
<ol style="list-style-type: none"> 1. At the end of each day, a member of the Operations Department is to collect all load sample bottles from the refrigerator located in Building P, ensure they are labeled properly, and place them in the laboratory refrigerator in the designated area. 2. Laboratory staff is to ensure that if there are multiple haulers throughout a month that the random samples reflect each of the haulers. 3. If the Authority is to receive loads from multiple haulers, the results of these random samples will be entered into OPS works in the HSW worksheet. 4. All samples are to be saved for thirty (30) days, and at the end of the thirty (30) day period composited and analyzed for total solids and volatile solids. 5. The results of this composited sample are to be entered into OPS works on the Digester Volatile Acids worksheet and used to calculate the amount of volatile solids being sent to the digester. This will be used to determine if an appropriate amount of HSW is being sent to the digesters and will be evaluated monthly, or if/when a new waste stream is introduced. 6. Laboratory staff is to take a sample of the digester three times a week (Monday, Wednesday, and Friday) at consistent times and analyze it for the acids to alkalinity ratio. This data is to be recorded in the "Volatile Acids Binder," as well as the Digester Volatile Acids worksheet in the database management software (currently OPS Works). 7. The Laboratory Services Coordinator and/or Operations Superintendent is responsible for reporting any changes to the acids to alkalinity ratio outside above 0.15 to the Operations Superintendent and Executive Director immediately, and feeding of High Strength Waste to the digester will immediately be ceased. In this event, more frequent digester sampling will be taken as needed to more closely monitor the health of the digester and ensure upset conditions are not occurring. This range has been determined based on existing data from extended time periods when the Authority's digesters are operating without issue. 8. If the acids to alkalinity ratio range exceeds allowable limits, and/or the acids go above 200 mg/L, in a 24-hour period, feeding of High Strength Waste to the digester will immediately be ceased. In this event, more frequent digester sampling will be taken as needed to more closely monitor the health of the digester and ensure upset conditions are not occurring. 9. In the event of any upset conditions, the collected samples may be analyzed to determine if any potential containments were introduced via the high strength waste loads. Investigative work would be performed based on the type of upset condition that occurred, and if any unusual or suspect loads were received. 	
Part 5	Staff Responsible: Executive Director/ Operations Department
HSW Daily Loading	
<ol style="list-style-type: none"> 1. The Executive Director shall work with the Authority consultants to determine the maximum daily HSW volume that may be received, and that may be transferred to the digesters. 2. The determination of allowable volume to be transferred to the digesters will be made based on volatile solids loading bases, volume of storage available in the digesters, an acceptable feed rate to the digesters and resultant, empirical digester process testing. 3. The determination of allowable volume to be received will be made based on the volume of HSW allowed to be transferred to the digesters, the volume of storage available, and acceptable feed rates to the digesters in accordance with calculations defined in the attached "Schedule A." 4. These calculations will be reviewed periodically for potential adjustment based on: <ol style="list-style-type: none"> (a) Changes in the volatile solids loading base. 	

(b) Changes in equipment or process changes.

(c) Changes in the normal range of the volatile acids to alkalinity ratio.

5. The HSW Transfer pump to the digesters will be programmed to cease operating when the maximum allowable volume determined in Schedule A has been transferred to the digesters.
6. The HWS Transfer Pump (gallons per minute and duration) shall be programmed to pump at a consistent rate throughout the day according to calculations determined on Schedule A
7. The Authority, along with its consultants, have determined the maximum volumes of HSW allowed to be received and transferred to the digesters are defined in the attached Schedule A. These calculations are to be reviewed every 12 months and subject to change.
8. If changes are made to the high strength waste calculations/receiving/transfer amounts, a notification will be posted publicly on the Authority's website 45 days ahead of time, and notices will be sent via email to the Authority's subscribed email addresses, in order for there to be a public review/comment period.
9. Daily transfer rates to the digesters shall be in accordance with Schedule A in order to reduce the potential of a biological upset.

Schedule A Sludge Production

Design Loading (Per 2007 Anaerobic Improvements Project)			Current Loading (March 2016 - September 2018)		
	Quantity	Units		Quantity	Units
Total Sludge Production	32,400	Pounds Total Solids (TS) per day	Total Sludge Production	11,894	Pounds Total Solids (TS) per day
Volatile Solids (VS) Production	24,300	Pounds VS Per Day	Volatile Solids (VS) Production	9,612	Pounds VS Per Day
Solids Concentration	4.3	%	Solids Concentration	3.6%	%
Flowrate	90,000	Gallons Per Day	Flowrate to digester	42,069	Gallons Per Day
			Percent VS	76.00%	%

Anaerobic Digesters (Digesters 1 & 2 are primary digesters. Digester 3 is a unmixed and unheated digester. Digesters 1 and 2 receive both primary sludge and waste activated

Digester Volumes		
	Quantity	Unit
Digester 1: Primary Digester	933,000	Gallon
Digester 2: Primary Digester	525,000	Gallon
Digester 3: Secondary Digester	375,000	Gallon
Total Volume of Digesters	1,833,000	Gallon
	245,053	Cubic Feet
Digester Loading Rates (Existing Performance)		
	Quantity	Unit
Volume of Primary Digesters	194,920	Cubic Feet
	1,458,000	Gallons
Current Primary Digester Municipal Loading Rate	9,612	Pounds VS Per Day
Organic Loading Rate	49.31	Pounds of VS Per Thousand Cubic Feet Per Day
Additional Allowable Digester Loading Rates (FOG)		
<i>Per the Manual of Practice No. 11, Operations of Municipal Wastewater Treatment plants, a completely mixed anaerobic digester organic loading rate range is 100-400 Pounds of Volatile Solids Per 1,000 Cubic Feet Per Day (lb VS/kcf/d)</i>		
	Quantity	Unit
Allowable Organic Loading Rate	100	Pounds of VS Per Thousand Cubic Feet Per Day
VS Loading Capacity	19,491.98	Pounds VS Per Day
Additional Capacity for Digestion of HSW	9,880	Pounds VS Per Day
Allowable Additional Volume of HSW at		
% TS (E-mail Report)	29,593	Gallons Per Day
% VS (Email Report)		
4.72%		
84.81%		
Digester Statistics		
	Quantity	Unit
Total Volume to Primary Digesters Including HSW	71,662	Gallons Per Day
Digester Detention Time	20.35	Days
Combined Municipal and HSW VS% IN	79.64%	Percent
VS% OUT (From OpsWorks: Monthly Metals: Cake)	63.40%	Percent
VS Reduction	55.70%	Percent
High Strength Waste/Fats, Oils, & Grease Receiving Summary		
Digesters 1 & 2 VS Loading Capacity		
	Quantity	Unit
Allowable Organic Loading Rate	100	Pounds of VS Per Thousand Cubic Feet Per Day
Total Volume (Digesters 1 & 2)	194,920	Cubic Feet
Allowable Additional Volume of HSW at 4.72% TS 84.81% VS	29,593	Gallons Per Day
HSW/FOG Storage Tank Capacities		
	Quantity	Unit
Tank Number 1 (West Tank)	5,062	Cubic Feet
	37,864	Gallons
Tank Number 2 (East Tank)	1,101	Cubic Feet
	8,239	Gallons
Volume of Tanks Total	46,103	Gallons

With a FoS of 2
CAPPED ALLOWABLE FOG GPD
20,000

(MOP 11 states no less than 10-15 Days)

(MOP 11 states normal range is 40%-60%)

Typical Daily Schedule							
	Monday	Tuesday	Wednesday	Thurs	Friday	Saturday	Sunday
HSW Volume Available to Start	40,238	35,838	31,438	27,038	22,638	18,238	33,838
HSW Volume Received into Holding Tanks*	20,000	20,000	20,000	20,000	20,000	0	0
HSW Volume Transferred to Digesters	15,600	15,600	15,600	15,600	15,600	15,600	15,600
Tank Volume Remaining in Holding Tanks**	35,838	31,438	27,038	22,638	18,238	33,838	40,238
* - Due to a typical HSW tanker being 5,000 gallons, volume added to holding tanks must be in 5,000 gallon increments							
** - If schedule is followed exactly, the holding tank would be emptied completely Sunday, resulting in the Total Volume Remaining to be the Total Available Volume							
<i>If excess volumes occur, deliveries will be halted or reduced for an appropriate amount of time in order to make storage available again.</i>							

HSW Transfer To Digesters Pump Operation

Pump Speed (Variable Drive Percent Loading)	Gallons Per Minute	
5%	3-9	Due to HSW (especially FOG) being prone to creating blockages in the pipe, in order to allow for higher scouring velocities, the pump will be cycled on/off on an hourly basis HSW Transfer Pump Shall Operate at 100% (~130 gpm) for 5 minutes every hour of the day (Total Volume Transfer = 15,600 gallons per day)
10%	18-20	
15%	25-35	
25%	42-47	
50%	88	
75%	88	
85%	90-110	
100%	130-145	