48-00111A

EarthRes
ENGINEERING AND SCIENCE

PENNSYLVANIA
P.O. Box 468
Pipersville, PA 18947
215.766.1211

WEST VIRGINIA
P.O. Box 794
Morgantown, WV 26505
304.212.6866

800.264.4553

March 20, 2018

AIR QUALITY
MAY 18 2018
FACILITY:
PERMIT #:
COUNTY:
FILE CODE:

AIR QUALITY
MAR 22 2018
FACILITY:
PERMIT #:
COUNTY:
FILE CODE:

Mr. Mark Wejkszner, P.E.
Air Quality Program Manager
Pennsylvania Department of Environmental Protection
Northeast Regional Office
2 Public Square
Wilkes-Barre, PA 18701-1915

SUBJECT: Slate Belt Heat Recovery Center, LLC
Air Quality Plan Approval Application
Plainfield Township, Northampton County
EarthRes Project No. 151014.004

Dear Mr. Wejkszner:

EarthRes Group, Inc. (EarthRes) is pleased to provide the enclosed Plan Approval Application (in triplicate) for the installation of the Slate Belt Heat Recovery Center, LLC (SBHRC) facility. SBHRC proposes to permit and construct a biosolids processing facility which will be sited on a parcel of land owned by Grand Central Sanitary Landfill (GCSL) in Plainfield Township, Northampton County, Pennsylvania (see Figure 1 – Site Location Map). A pre-application meeting with PADEP for this project was held on November 28, 2017.

The proposed project involves the installation of heat recovery equipment, a supplemental thermal oil heater and thermal drying equipment to facilitate processing of imported dewatered biosolids into a Class A dried biosolids product. The Class A biosolids will be marketed as a fertilizer, soil conditioner, and/or renewable fuel product. The heat recovery equipment will be located and attached to the existing Green Knight Economic Development Corporation (GKEDC) facility, which is also located on GCSL land. The existing GKEDC turbine exhaust stacks will be will be modified to recover waste heat to a thermal oil loop for use in the belt dryers.

The proposed project will include the installation of two (2) sources: a supplemental thermal oil heater and an odor control system. The odor control system primarily services the dryer process which will not operate without the odor control system, therefore the facility odor control system stack (control device) is expected to be the only emission point. The thermal drying process will consist of two (2) fully enclosed indirectly heated belt dryers in parallel, each with a biosolids input capacity of approximately 200 wet tons per day, for a facility total throughput of 400 wet tons (containing an average of approximately 21% solids) per day. During normal expected operations there may be a need for supplemental heat that will be provided by a stand-alone

thermal oil heater. The supplemental thermal oil heater may utilize natural gas or excess / available landfill gas as a fuel.

This application package includes the following materials: a General Information Form (GIF), application narrative, emission calculations, manufacturer's literature, proof of municipal and county notification, best available technology (BAT) analysis, Compliance Review Form, and an application fee in the amount of $1,000.00 made payable to "Commonwealth of Pennsylvania – Clean Air Fund."

If you have any questions or concerns, please contact us at (215) 766-1211.

Sincerely,
EarthRes Group, Inc.

Nicole C. Wilson, P.E.
Technical Manager – Air Quality Services

Enclosures: As stated

cc: John Goodwin, SBHRC (w/ enclosure)
Glenn Kempa, GCSL (w/ enclosure)
Tom Petrucci, Plainfield Township (w/ enclosure)
Carlton Snyder, GKEDC (w/ enclosure)

VIA OVERNIGHT MAIL

Synagro Technologies, Inc.
To: COMMONWEALTH OF PA/ DEPT· CLE400

Check Number: 28091973
Date: 03/08/2018

Our Vouch Number	Invoice Number	Inv Date	Amount	Amount Paid	Discount	Net
1607037	:KRQ/030518/RTR1	03/05/2018	$1,000.00	$1,000.00	$0.00	$1,000.00

TOTALS:	$1,000.00	$1,000.00	$0.00	$1,000.00

FOLD FOLD

THE FACE OF THIS DOCUMENT HAS A MULTICOLORED BACKGROUND ON WHITE PAPER

Synagro Technologies, Inc.
435 Williams Court, Ste 100
Baltimore, MD 21220

PNC Bank, N.A 001
Jeannette PA
60-162/433

28091973

DATE	AMOUNT
Mar 8, 2018	$1,000.00

Pay One Thousand Dollars And 00 Cents

to the Order of:

COMMONWEALTH OF PA/ DEPT-CLEAN AIR FUND

400 MARKET STREET
HARRISBURG, PA 17105-8774

Security features included. Details on back.

⑈28091973⑈ ⑆043301627⑆ 10289503 28⑈

See Other Side For Opening Instructions

COMMONWEALTH OF PA/ DEPT-CLEAN AIR FUND
400 MARKET STREET
HARRISBURG, PA 17105-8774

Synagro Technologies, Inc.
435 Williams Court, Ste 100
Baltimore, MD 21220

PLAN APPROVAL APPLICATION

TABLE OF CONTENTS

GENERAL INFORMATION FORM (GIF)

1300-PM-BIT0001 5/2012
Form

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

AIR QUALITY
MAY 18 2018

FACILITY:
PERMIT #:
COUNTY:
FILE CODE:

GENERAL INFORMATION FORM – AUTHORIZATION APPLICATION

Before completing this General Information Form (GIF), read the step-by-step instructions provided in this application package. This version of the General Information Form (GIF) must be completed and returned with any program-specific application being submitted to the Department.

Related ID#s (If Known)			
Client ID#	TBD	**APS ID#**	
Site ID#	TBD	**Auth ID#**	
Facility ID#	TBD		

DEP USE ONLY
Date Received & General Notes
MAR 22 2018

AIR QUALITY
FACILITY:
PERMIT #:
COUNTY:
FILE CODE:

CLIENT INFORMATION

DEP Client ID#	Client Type / Code
TBD	LLC

Organization Name or Registered Fictitious Name	Employer ID# (EIN)	Dun & Bradstreet ID#
Slate Belt Heat Recovery Center, LLC	45-4824177	

Individual Last Name	First Name	MI	Suffix	SSN

Additional Individual Last Name	First Name	MI	Suffix	SSN

Mailing Address Line 1	Mailing Address Line 2
435 Williams Court	Suite 100

Address Last Line – City	State	ZIP+4	Country
Baltimore	MD	21220-2888	USA

Client Contact Last Name	First Name	MI	Suffix
Goodwin	John		

Client Contact Title	Phone	Ext
Vice President - Engineering	(443) 489-9069	

Email Address	FAX
jgoodwin@SYNAGRO.com	N/A

SITE INFORMATION

DEP Site ID#	Site Name
TBD	Slate Belt Heat Recovery Center, LLC

EPA ID# **Estimated Number of Employees to be Present at Site** 16

Description of Site
Biosolids Processing Facility

County Name	Municipality	City	Boro	Twp	State
Northampton	Plainfield	☐	☐	☒	PA
County Name	**Municipality**	**City**	**Boro**	**Twp**	**State**
		☐	☐	☐	

Site Location Line 1	Site Location Line 2
2100 block of Pen Argyl Road	

Site Location Last Line – City	State	ZIP+4
Pen Argyl	PA	18072

Detailed Written Directions to Site
Take Route 33 to the Route 512 Wind Gap/Pen Argyl exit. Off the exit, turn onto Route 512 North (a right turn from Route 33 Northbound). Follow Route 512 through Wind Gap, turning right at the Turkey Hill in Wind Gap (3rd traffic light) to stay on Route 512. After 1.4 miles, turn right into Waste Management's Grand Central Sanitary Landfill. The entrance to the Slate Belt Heat Recovery Center will be on the right adjacent to the Green Knight Energy Center at 2147 Pen Argyl Road, Pen Argyl, PA.

Site Contact Last Name	First Name	MI	Suffix
John	Goodwin		

Site Contact Title	Site Contact Firm
Vice President - Engineering	Slate Belt Heat Recovery Center, LLC

Mailing Address Line 1 435 Williams Court	**Mailing Address Line 2** Suite 100
Mailing Address Last Line – City Baltimore	**State** **ZIP+4** MD 21220-2888
Phone **Ext** **FAX** (443) 489-9069 N/A	**Email Address** jgoodwin@SYNAGRO.com
NAICS Codes (Two- & Three-Digit Codes – List All That Apply) 562	**6-Digit Code** (Optional) 562219
Client to Site Relationship OWNOP Owner/Operator	

FACILITY INFORMATION

Modification of Existing Facility(1)

		Yes	No
1.	**Will this project modify an existing facility, system, or activity?**	☒	☐
2.	**Will this project involve an addition to an existing facility, system, or activity?**	☒	☐

If "Yes", check all relevant facility types and provide DEP facility identification numbers below.

	Facility Type	DEP Fac ID#		Facility Type	DEP Fac ID#
☒	Air Emission Plant	GKEDC #574507	☐	Industrial Minerals Mining Operation	
☐	Beneficial Use (water)		☐	Laboratory Location	
☐	Blasting Operation		☐	Land Recycling Cleanup Location	
☐	Captive Hazardous Waste Operation		☐	MineDrainageTrmt/LandRecyProjLocation	
☐	Coal Ash Beneficial Use Operation		☒	Municipal Waste Operation	GCSL #100265
☐	Coal Mining Operation		☐	Oil & Gas Encroachment Location	
☐	Coal Pillar Location		☐	Oil & Gas Location	
☐	Commercial Hazardous Waste Operation		☐	Oil & Gas Water Poll Control Facility	
☐	Dam Location		☐	Public Water Supply System	
☐	Deep Mine Safety Operation -Anthracite		☐	Radiation Facility	
☐	Deep Mine Safety Operation -Bituminous		☐	Residual Waste Operation	
☐	Deep Mine Safety Operation -Ind Minerals		☐	Storage Tank Location	
☐	Encroachment Location (water, wetland)		☐	Water Pollution Control Facility	
☐	Erosion & Sediment Control Facility		☐	Water Resource	
☐	Explosive Storage Location		☐	Other:	

Latitude/Longitude Point of Origin	**Latitude**			**Longitude**		
	Degrees	**Minutes**	**Seconds**	**Degrees**	**Minutes**	**Seconds**
Center of Area	40°	51'	34"	-75°	15'	41"

Horizontal Accuracy Measure Feet --or-- Meters

Horizontal Reference Datum Code
- ☐ North American Datum of 1927
- ☒ North American Datum of 1983
- ☐ World Geodetic System of 1984

Horizontal Collection Method Code EMAP

Reference Point Code CNTAR

Altitude Feet 700 --or-- Meters

Altitude Datum Name
- ☐ The National Geodetic Vertical Datum of 1929
- ☒ The North American Vertical Datum of 1988 (NAVD88)

Altitude (Vertical) Location Datum Collection Method Code TOPO

Geometric Type Code POINT

Data Collection Date January 2018

Source Map Scale Number 1 Inch(es) = 24,000 Feet

--or-- Centimeter(s) = Meters

PROJECT INFORMATION

Project Name
Slate Belt Heat Recovery Center

Project Description
The proposed project involves the installation of heat recovery equipment, a supplemental thermal oil heater and thermal drying equipment to facilitate processing of imported dewatered biosolids into a Class A dried biosolids product. Dewatered municipal biosolids will be transported to the proposed facility where they will be thermally dried to produce Class A biosolids that will be marketed as a fertilizer, soil conditioner, and/or renewable fuel product.

Note:
(1) The Slate Belt Heat Recovery Center is a new facility; however, GKEDC and GCSL Facility IDs have been provided for project completeness.

Project Consultant Last Name	First Name	MI	Suffix
Pullar	Thomas	G.	P.E.

Project Consultant Title	Consulting Firm
Senior Project Manager	EarthRes Group, Inc.
Mailing Address Line 1	**Mailing Address Line 2**
P.O. Box 468	6912 Old Easton Road
Address Last Line – City	**State** / **ZIP+4**
Pipersville	PA 18947

Phone	Ext	FAX	Email Address
(215) 766-1211		(215) 766-1234	tpullar@earthres.com

Time Schedules	Project Milestone (Optional)
November 28, 2017	Pre-Application Meeting
March 15, 2018	PA DEP Applications
Oct 2018 - Dec 2018	PA DEP Permit Issuance
February 2019	Building Permits
Fall 2019	Construction
December 2019	Certification
December 2019	Start-Up

1. **Have you informed the surrounding community and addressed any concerns prior to submitting the application to the Department?** ☒ Yes ☐ No

2. **Is your project funded by state or federal grants?** ☐ Yes ☒ No
   Note: If "Yes", specify what aspect of the project is related to the grant and provide the grant source, contact person and grant expiration date.
   Aspect of Project Related to Grant
   Grant Source: _____
   Grant Contact Person: _____
   Grant Expiration Date: _____

3. **Is this application for an authorization on Appendix A of the Land Use Policy? (For referenced list, see Appendix A of the Land Use Policy attached to GIF instructions)** ☒ Yes ☐ No
   Note: If "No" to Question 3, the application is not subject to the Land Use Policy.
   If "Yes" to Question 3, the application is subject to this policy and the Applicant should answer the additional questions in the **Land Use Information** section.

LAND USE INFORMATION

Note: Applicants are encouraged to submit copies of local land use approvals or other evidence of compliance with local comprehensive plans and zoning ordinances.

1. **Is there an adopted county or multi-county comprehensive plan?** ☒ Yes ☐ No
2. **Is there an adopted municipal or multi-municipal comprehensive plan?** ☒ Yes ☐ No
3. **Is there an adopted county-wide zoning ordinance, municipal zoning ordinance or joint municipal zoning ordinance?** ☒ Yes ☐ No
   Note: If the Applicant answers "No" to either Questions 1, 2 or 3, the provisions of the PA MPC are not applicable and the Applicant does not need to respond to questions 4 and 5 below.
   If the Applicant answers "Yes" to questions 1, 2 and 3, the Applicant should respond to questions 4 and 5 below.
4. **Does the proposed project meet the provisions of the zoning ordinance or does the proposed project have zoning approval?** If zoning approval has been received, attach documentation. ☒ Yes ☐ No
5. **Have you attached Municipal and County Land Use Letters for the project?** ☒ Yes ☐ No

COORDINATION INFORMATION

Note: The PA Historical and Museum Commission must be notified of proposed projects in accordance with DEP Technical Guidance Document 012-0700-001 and the accompanying Cultural Resource Notice Form.

If the activity will be a mining project (i.e., mining of coal or industrial minerals, coal refuse disposal and/or the operation of a coal or industrial minerals preparation/processing facility), respond to questions 1.0 through 2.5 below.

If the activity will not be a mining project, skip questions 1.0 through 2.5 and begin with question 3.0.

1.0	**Is this a coal mining project?** If "Yes", respond to 1.1-1.6. If "No", skip to Question 2.0.	☐	Yes	☐	No
1.1	**Will this coal mining project involve coal preparation/ processing activities in which the total amount of coal prepared/processed will be equal to or greater than 200 tons/day?**	☐	Yes	☐	No
1.2	**Will this coal mining project involve coal preparation/ processing activities in which the total amount of coal prepared/processed will be greater than 50,000 tons/year?**	☐	Yes	☐	No
1.3	**Will this coal mining project involve coal preparation/ processing activities in which thermal coal dryers or pneumatic coal cleaners will be used?**	☐	Yes	☐	No
1.4	**For this coal mining project, will sewage treatment facilities be constructed and treated waste water discharged to surface waters?**	☐	Yes	☐	No
1.5	**Will this coal mining project involve the construction of a permanent impoundment meeting one or more of the following criteria: (1) a contributory drainage area exceeding 100 acres; (2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 feet; (3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet?**	☐	Yes	☐	No
1.6	**Will this coal mining project involve underground coal mining to be conducted within 500 feet of an oil or gas well?**	☐	Yes	☐	No
2.0	**Is this a non-coal (industrial minerals) mining project?** If "Yes", respond to 2.1-2.6. If "No", skip to Question 3.0.	☐	Yes	☐	No
2.1	**Will this non-coal (industrial minerals) mining project involve the crushing and screening of non-coal minerals other than sand and gravel?**	☐	Yes	☐	No
2.2	**Will this non-coal (industrial minerals) mining project involve the crushing and/or screening of sand and gravel with the exception of wet sand and gravel operations (screening only) and dry sand and gravel operations with a capacity of less than 150 tons/hour of unconsolidated materials?**	☐	Yes	☐	No
2.3	**Will this non-coal (industrial minerals) mining project involve the construction, operation and/or modification of a portable non-metallic (i.e., non-coal) minerals processing plant under the authority of the General Permit for Portable Non-metallic Mineral Processing Plants (i.e., BAQ-PGPA/GP-3)?**	☐	Yes	☐	No
2.4	**For this non-coal (industrial minerals) mining project, will sewage treatment facilities be constructed and treated waste water discharged to surface waters?**	☐	Yes	☐	No
2.5	**Will this non-coal (industrial minerals) mining project involve the construction of a permanent impoundment meeting one or more of the following criteria: (1) a contributory drainage area exceeding 100 acres; (2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 feet; (3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet?**	☐	Yes	☐	No

3.0	**Will your project, activity, or authorization have anything to do with a well related to oil or gas production, have construction within 200 feet of, affect an oil or gas well, involve the waste from such a well, or string power lines above an oil or gas well?** If "Yes", respond to 3.1-3.3. If "No", skip to Question 4.0.	☐	Yes	☒	No
3.1	**Does the oil- or gas-related project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a watercourse, floodway or body of water (including wetlands)?**	☐	Yes	☐	No
3.2	**Will the oil- or gas-related project involve discharge of industrial wastewater or stormwater to a dry swale, surface water, ground water or an existing sanitary sewer system or storm water system?** If "Yes", discuss in *Project Description*.	☐	Yes	☐	No
3.3	**Will the oil- or gas-related project involve the construction and operation of industrial waste treatment facilities?**	☐	Yes	☐	No
4.0	**Will the project involve a construction activity that results in earth disturbance?** If "Yes", specify the total disturbed acreage. **4.0.1 Total Disturbed Acreage** 6.3 acres	☒	Yes	☐	No
5.0	**Does the project involve any of the following?** If "Yes", respond to 5.1-5.3. If "No", skip to Question 6.0.	☐	Yes	☒	No
5.1	**Water Obstruction and Encroachment Projects – Does the project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a watercourse, floodway or body of water?**	☒	Yes	☐	No
5.2	**Wetland Impacts – Does the project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a wetland?**	☐	Yes	☒	No
5.3	**Floodplain Projects by the commonwealth, a Political Subdivision of the commonwealth or a Public Utility – Does the project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a floodplain?**	☐	Yes	☒	No
6.0	**Will the project involve discharge of stormwater or wastewater from an industrial activity to a dry swale, surface water, ground water or an existing sanitary sewer system or separate storm water system?**	☒	Yes	☐	No
7.0	**Will the project involve the construction and operation of industrial waste treatment facilities?**	☐	Yes	☒	No
8.0	**Will the project involve construction of sewage treatment facilities, sanitary sewers, or sewage pumping stations?** If "Yes", indicate estimated proposed flow (gal/day). Also, discuss the sanitary sewer pipe sizes and the number of pumping stations/treatment facilities/name of downstream sewage facilities in the *Project Description*, where applicable. **8.0.1 Estimated Proposed Flow (gal/day)** 1,120 conveyed to PAMA	☒	Yes	☐	No
9.0	**Will the project involve the subdivision of land, or the generation of 800 gpd or more of sewage on an existing parcel of land or the generation of an additional 400 gpd of sewage on an already-developed parcel, or the generation of 800 gpd or more of industrial wastewater that would be discharged to an existing sanitary sewer system?**	☒	Yes	☐	No
	9.0.1 Was Act 537 sewage facilities planning submitted and approved by DEP? If "Yes" attach the approval letter. Approval required prior to 105/NPDES approval.	☐	Yes	☒	No
10.0	**Is this project for the beneficial use of biosolids for land application within Pennsylvania?** If "Yes" indicate how much (i.e. gallons or dry tons per year).	☒	Yes	☐	No
	10.0.1 Gallons Per Year (residential septage) Covered under separate approval				
	10.0.2 Dry Tons Per Year (biosolids) Covered under separate approval				

11.0 **Does the project involve construction, modification or removal of a dam?** ☐ Yes ☒ No
If "Yes", identify the dam.
11.0.1 **Dam Name**

12.0 **Will the project interfere with the flow from, or otherwise impact, a dam?** ☐ Yes ☒ No
If "Yes", identify the dam.
12.0.1 **Dam Name**

13.0 **Will the project involve operations (excluding during the construction period) that produce air emissions (i.e., NOX, VOC, etc.)?** If "Yes", identify each type of emission followed by the amount of that emission. ☒ Yes ☐ No
13.0.1 **Enter all types & amounts of emissions; separate each set with semicolons.** See attached emission calculations.

14.0 **Does the project include the construction or modification of a drinking water supply to serve 15 or more connections or 25 or more people, at least 60 days out of the year?** If "Yes", check all proposed sub-facilities. ☐ Yes ☒ No
14.0.1 **Number of Persons Served**
14.0.2 **Number of Employee/Guests**
14.0.3 **Number of Connections**
14.0.4 **Sub-Fac: Distribution System** ☐ Yes ☐ No
14.0.5 **Sub-Fac: Water Treatment Plant** ☐ Yes ☐ No
14.0.6 **Sub-Fac: Source** ☐ Yes ☐ No
14.0.7 **Sub-Fac: Pump Station** ☐ Yes ☐ No
14.0.8 **Sub Fac: Transmission Main** ☐ Yes ☐ No
14.0.9 **Sub-Fac: Storage Facility** ☐ Yes ☐ No

15.0 **Will your project include infiltration of storm water or waste water to ground water within one-half mile of a public water supply well, spring or infiltration gallery?** ☐ Yes ☒ No

16.0 **Is your project to be served by an existing public water supply?** If "Yes", indicate name of supplier and attach letter from supplier stating that it will serve the project. ☒ Yes ☐ No
16.0.1 **Supplier's Name** Pennsylvania American Water
16.0.2 **Letter of Approval from Supplier is Attached** ☐ Yes ☒ No

17.0 **Will this project involve a new or increased drinking water withdrawal from a stream or other water body?** If "Yes", should reference both Water Supply and Watershed Management. ☐ Yes ☒ No
17.0.1 **Stream Name**

18.0 **Will the construction or operation of this project involve treatment, storage, reuse, or disposal of waste?** If "Yes", indicate what type (i.e., hazardous, municipal (including infectious & chemotherapeutic), residual) and the amount to be treated, stored, re-used or disposed. ☒ Yes ☐ No
18.0.1 **Type & Amount** Class A Biosolid: 84 dry ton/day (30,660 dry ton/year) (400 wet ton/day)

19.0 **Will your project involve the removal of coal, minerals, etc. as part of any earth disturbance activities?** ☐ Yes ☒ No

20.0 **Does your project involve installation of a field constructed underground storage tank?** If "Yes", list each Substance & its Capacity. **Note:** Applicant may need a Storage Tank Site Specific Installation Permit. ☐ Yes ☒ No
20.0.1 **Enter all substances & capacity of each; separate each set with semicolons.**

21.0 **Does your project involve installation of an aboveground storage tank greater than 21,000 gallons capacity at an existing facility?** If "Yes", list each Substance & its Capacity. **Note:** Applicant may need a Storage Tank Site Specific Installation Permit. ☐ Yes ☒ No
21.0.1 **Enter all substances & capacity of each; separate each set with semicolons.** Facility is proposed. See Question No. 23.

22.0 **Does your project involve installation of a tank greater than 1,100 gallons which will contain a highly hazardous substance as defined in DEP's Regulated Substances List, 2570-BK-DEP2724?** If "Yes", list each Substance & its Capacity. **Note:** Applicant may need a Storage Tank Site Specific Installation Permit. ☐ Yes ☒ No

22.0.1 **Enter all substances & capacity of each; separate each set with semicolons.**

Per DEP's Regulated Substances List, 2570-BK-DEP2724:

Tank	Classification
300,000 gal Process Wastewater Tank	N/A
5,000 gal Sulfuric Acid (H_2SO_4)) (Acid) Tank	Haz
3,000 gal Sodium Hydroxide (NaOH)) (Caustic) Tank	Haz
5,000 gal Sodium Hypochlorite (NaOCl)) (Bleach) Tank	Haz

As shown above, none of the proposed tanks will contain any highly hazardous ("HiHaz") substances, per DEP's Regulated Substances List, 2570-BK-DEP2724.

23.0 **Does your project involve installation of a storage tank at a new facility with a total AST capacity greater than 21,000 gallons?** If "Yes", list each Substance & its Capacity. **Note:** Applicant may need a Storage Tank Site Specific Installation Permit. ☒ Yes ☐ No

23.0.1 **Enter all substances & capacity of each; separate each set with semicolons.**

300,000 gal Process Wastewater Tank
5,000 gal Sulfuric Acid (H_2SO_4)) (Acid) Tank
3,000 gal Sodium Hydroxide (NaOH)) (Caustic) Tank
5,000 gal Sodium Hypochlorite (NaOCl)) (Bleach) Tank

24.0 **Will the intended activity involve the use of a radiation source?** ☐ Yes ☒ No

CERTIFICATION

I certify that I have the authority to submit this application on behalf of the applicant named herein and that the information provided in this application is true and correct to the best of my knowledge and information.

Type or Print Name John Goodwin

Signature	Title	Date
	Vice President - Engineering	3/13/2018

PLAN APPROVAL PROCESSES APPLICATION FORM

2700-PM-AQ0007 Rev. 7/2004

AIR QUALITY

MAY 18 2018

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF AIR QUALITY

Submit in Triplicate

FACILITY: _____
PERMIT #: _____
COUNTY: _____
FILE CODE: _____

PROCESSES

Application for Plan Approval to Construct, Modify or Reactivate an Air Contamination Source and/or Install an Air Cleaning Device

This application must be submitted with the General Information Form (GIF).

Before completing this form, read the instructions provided for the form.

Section A - Facility Name, Checklist And Certification

Organization Name or Registered Fictitious Name/Facility Name: Slate Belt Heat Recovery Center, LLC (SBHRC)

DEP Client ID# (if known): N/A

Type of Review required and Fees:

- ☒ Source which is not subject to NSPS, NESHAPs, MACT, NSR and PSD: $1,000.00
- ☐ Source requiring approval under NSPS or NESHAPS or both: ..... $_____
- ☐ Source requiring approval under NSR regulations: ..... $_____
- ☐ Source requiring the establishment of a MACT limitation: ..... $_____
- ☐ Source requiring approval under PSD: ..... $_____

Applicant's Checklist

Check the following list to make sure that all the required documents are included.

- ☒ **General Information Form (GIF)**
- ☒ **Processes Plan Approval Application**
- ☒ **Compliance Review Form** or provide reference of most recently submitted compliance review form for facilities submitting on a periodic basis: _____
- ☒ **Copy and Proof of County and Municipal Notifications**
- ☒ **Permit Fees**
- ☐ **Addendum A:** Source Applicable Requirements (only applicable to existing Title V facility)

Certification of Truth, Accuracy and Completeness by a Responsible Official

I, John Goodwin, certify under penalty of law in 18 Pa. C. S. A. §4904, and 35 P.S. §4009(b) (2) that based on information and belief formed after reasonable inquiry, the statements and information in this application are true, accurate and complete.

(Signature): _____ Date: 3/13/2018

Name (Print): John Goodwin Title: Vice President - Engineering

OFFICIAL USE ONLY

Application No. _____ Unit ID _____ Site ID _____
DEP Client ID #: _____ APS. ID _____ AUTH. ID _____
Date Received _____ Date Assigned _____ Reviewed By _____
Date of 1st Technical Deficiency _____ Date of 2nd Technical Deficiency _____
Comments: _____

Section B - Processes Information

1. Source Information

Source Description (give type, use, raw materials, product, etc). Attach additional sheets as necessary.

The proposed project involves the installation of two (2) sources: a supplemental thermal oil heater and an odor control system. The odor control system primarily services the dryer process which will not operate without the odor control system, therefore the facility odor control system stack (control device) is expected to be the only emission point. The dryer process will process approximately 400 wet tons per day (200 wet tons per day per treatment train) containing average 21% solids. The dryer system will be required to increase the solids content to greater than 90%. Note that the odor control system includes a fan which serves to keep the dryer process at negative pressure. Dryer facility details are presented in the narrative for completeness, however since the dryer process will not operate without the odor control system, the dryer process is not a separate source of air emissions. Odor control system details are presented in Section C, per the PADEP Instructions for this form. Refer to the attached Figure 2 – Process Flow Diagram and Attachment A – Application Narrative and Regulatory Review for a detailed process description.

1a. Source Information – Supplemental Thermal Oil Heater (see Section B3 for burner information)

Manufacturer Sigma Thermal (or equivalent)	Model No. Sigma Thermal HC2-35.0-H-SF(or equivalent)	Number of Sources One (1)
Source Designation Supplemental Thermal Oil Heater	Maximum Capacity Heater design heat input = 36.7 MMBTU/hr (Demand decreases to 6.1 MMBTU/hr when heat recovery system is online)	Rated Capacity Heater design heat input = 36.7 MMBTU/hr (Demand decreases to 6.1 MMBTU/hr when heat recovery system is online)

Type of Material Processed
Natural Gas / Landfill Gas

Maximum Operating Schedule

Hours/Day	Days/Week	Days/Year	Hours/Year
24	7	365	8,760

Operational restrictions existing or requested, if any (e.g., bottlenecks or voluntary restrictions to limit PTE)
None

Capacity (specify units)

Per Hour	Per Day	Per Week	Per Year
36.7 MMBTU/hr	Varies	Varies	Varies

Operating Schedule

Hours/Day	Days/Week	Days/Year	Hours/Year
24	7	365	8,760

Seasonal variations (Months) From to

If variations exist, describe them

Operating hours will be 8,760 hours per year. The thermal oil heater may operate less than 8,760 hours per year when the supplemental heat is not required or both dryer lines are simultaneously offline.

1b. Source Information – Odor Control System (see Section C for additional information)

Manufacturer CMI Environment America Inc. (AMCEC) (or equivalent)	Model No. TBD	Number of Sources One (1)
Source Designation Odor Control System	Maximum Capacity 8,820 SCFM (expected)	Rated Capacity 8,820 SCFM (expected)

Type of Material Processed Process air			
Maximum Operating Schedule			
Hours/Day 24	Days/Week 7	Days/Year 365	Hours/Year 8,760
Operational restrictions existing or requested, if any (e.g., bottlenecks or voluntary restrictions to limit PTE) None			
Capacity (specify units)			
Per Hour Varies	Per Day Varies	Per Week Varies	Per Year Varies
Operating Schedule			
Hours/Day 24	Days/Week 7	Days/Year 365	Hours/Year 8,760
Seasonal variations (Months) From		to	
If variations exist, describe them Operating hours will be 8,760 hours per year. Dryer process may operate 7,500 hours (approx. 85%) of the year, with 15% reserved in the event both dryer lines are simultaneously offline.			

2. Fuel

Type	Quantity Hourly	Annually	Sulfur	% Ash (Weight)	BTU Content
Natural Gas (Supplemental Heater Only)	36,700 SCFH	321.49 X 10^6 SCF	0.42 grain/100 SCF	Neg.	1,000 Btu/SCF
Gas (other) Landfill Gas (LFG) (Supplemental Heater Only)	73,400 SCFH	642.98 X 10^6 SCF	grain/100 SCF	Neg.	500 Btu/SCF

*Note: Describe and furnish information separately for other fuels in Addendum B.

Section B - Processes Information (Continued)

3. Burner

Manufacturer	Type and Model No.	Number of Burners
Hauck (or equivalent)	Low NOx Burner; Model B118 (or equivalent)	Two (2) (one (1) burner per fuel type)

Description:

Dual fuel (natural gas / landfill gas (LFG)) thermal heat transfer oil heater (referred to as the supplemental heater).

Rated Capacity	Maximum Capacity
Heater design heat input = 36.7 MMBTU/hr (Demand decreases to 6.1 MMBTU/hr when heat recovery system is online) Burner design firing rate may increase to 50.3 MMBTU/hr to allow for variability in fuel types and heating values.	Heater design heat input = 36.7 MMBTU/hr (Demand decreases to 6.1 MMBTU/hr when heat recovery system is online) Burner design firing rate may increase to 50.3 MMBTU/hr to allow for variability in fuel types and heating values.

4. Process Storage Vessels

A. For Liquids:

Name of material stored
1. Heat Transfer (HT) Oil Expansion Tank

Tank I.D. No.	Manufacturer	Date Installed
TBD	Sigma Thermal (or equivalent)	Upon PADEP approval

Maximum Pressure	Capacity (gallons/Meter^3)
150 psi	1,300 gallons

Type of relief device (pressure set vent/conservation vent/emergency vent/open vent)
Atmospheric vent from relief valve.

Relief valve/vent set pressure (psig)	Vapor press. of liquid at storage temp. (psia/kPa)
N/A	Hot oil stored at: ~300 °F; 2,581.7 w.c. (93.18 psia / 642.43 kPA)

Type of Roof: Describe:
N/A

Total Throughput Per Year	Number of fills per day (fill/day): 1 (before startup) Filling Rate (gal./min.): 900 Duration of fill hr./fill): 0.24
1 turnover per year (estimated)	

Name of material stored
2. Sulfuric Acid (H_2SO_4) Scrubber Solution (Ammonia (NH_3)) (Acid)

Tank I.D. No.	Manufacturer	Date Installed
TBD	CMI Environment America Inc. (AMCEC) (or equivalent)	Upon PADEP approval

Maximum Pressure	Capacity (gallons/Meter^3)
Atmospheric	5,000 gallons

Type of relief device (pressure set vent/conservation vent/emergency vent/open vent)
N/A

Relief valve/vent set pressure (psig)	Vapor press. of liquid at storage temp. (psia/kPa)
N/A; Atmospheric	N/A

Type of Roof: Describe:
Molded PE, integral to tank.

Total Throughput Per Year 15,000 gallons/yr		Number of fills per day (fill/day): 28 days/fill Filling Rate (gal./min.): 60 gpm Duration of fill hr./fill): ~60 minutes
Name of material stored **3. Sodium Hydroxide (NaOH) Scrubber Solution (Hydrogen Sulfide (H_2S)) (Caustic)**		
Tank I.D. No. TBD	Manufacturer CMI Environment America Inc. (AMCEC) (or equivalent)	Date Installed Upon PADEP approval
Maximum Pressure Atmospheric		Capacity (gallons/Meter^3) 3,000 gallons
Type of relief device (pressure set vent/conservation vent/emergency vent/open vent) N/A		
Relief valve/vent set pressure (psig) N/A; Atmospheric		Vapor press. of liquid at storage temp. (psia/kPa) N/A
Type of Roof: Describe: Molded PE, integral to tank.		
Total Throughput Per Year 7,000 gallons/yr		Number of fills per day (fill/day): 28 days/fill Filling Rate (gal./min.): 60 gpm Duration of fill hr./fill): ~60 minutes
Name of material stored **4. Sodium Hypochlorite (NaOCl) Scrubber Solution (Hydrogen Sulfide (H_2S)) (Bleach)**		
Tank I.D. No. TBD	Manufacturer CMI Environment America Inc. (AMCEC) (or equivalent)	Date Installed Upon PADEP approval
Maximum Pressure Atmospheric		Capacity (gallons/Meter^3) 5,000 gallons
Type of relief device (pressure set vent/conservation vent/emergency vent/open vent) N/A		
Relief valve/vent set pressure (psig) N/A; Atmospheric		Vapor press. of liquid at storage temp. (psia/kPa) N/A
Type of Roof: Describe: Molded PE, integral to tank.		
Total Throughput Per Year 27,000 gallons/yr		Number of fills per day (fill/day): 28 days/fill Filling Rate (gal./min.): 60 gpm Duration of fill hr./fill): ~60 minutes
B. For Solids		
1. Type: ☒ Silo ☐ Storage Bin ☐ Other, Describe		Name of Material Stored Dry Product (Class A Dried Biosolids)
Silo/Storage Bin I.D. No. TBD	Manufacturer Haarslev Industries (or equivalent)	Date Installed
State whether the material will be stored in loose or bags in silos Material stored loose in Silo		Capacity (Tons) 330 per silo (total of 660 tons)
Turn over per year in tons 30,660 dry tons/yr		Turn over per day in tons 84 dry tons/day

Describe fugitive dust control system for loading and handling operations See attached narrative.		
Describe material handling system See attached narrative.		
2. Type: ☐ Silo ☐ Storage Bin ☒Other, Describe Receiving Units	Name of Material Stored Biosolids	
Silo/Storage Bin I.D. No. TBD	Manufacturer Haarslev Industries (or equivalent)	Date Installed
State whether the material will be stored in loose or bags in silos Material stored loose in units	Capacity (Tons) 300 per unit	
Turn over per year in tons 146,000 dry tons/yr	Turn over per day in tons 84 dry tons/day	
Describe fugitive dust control system for loading and handling operations See attached narrative.		
Describe material handling system See attached narrative.		

5. Request for Confidentiality

Do you request any information on this application to be treated as "Confidential"? ☐ Yes ☒ No
If yes, include justification for confidentiality. Place such information on separate pages marked **"confidential"**.

Section B - Processes Information (Continued)

6. Miscellaneous Information

Attach flow diagram of process giving all (gaseous, liquid and solid) flow rates. Also, list all raw materials charged to process equipment, and the amounts charged (tons/hour, etc.) at rated capacity (give maximum, minimum and average charges describing fully expected variations in production rates). Indicate (on diagram) all points where contaminants are controlled (location of water sprays, collection hoods, or other pickup points, etc.). Describe collection hoods location, design, airflow and capture efficiency. Describe any restriction requested and how it will be monitored.

See attached Figure 2 – Process Flow Diagram.

Describe fully the facilities provided to monitor and to record process operating conditions, which may affect the emission of air contaminants. Show that they are reasonable and adequate.

A Programmable Logic Control (PLC) based control system will be provided by the supplement heater and odor control system vendors. Each system will include the necessary sensors to monitor and control their respective equipment. The data will be continuously transmitted to the Facility System Control and Data Acquisition System (SCADA) where the process conditions will be monitored and a historian will record the data.

See Attachment 3 – Manufacturer's Literature for more detail.

Describe each proposed modification to an existing source.

N/A – Project will be a new source.

Identify and describe all fugitive emission points, all relief and emergency valves and any by-pass stacks.

The dryers will vent to a non-contact condenser and then to the facility odor control system (odor control fan and scrubber) for odor control. All dryer facility equipment, conveyance, and storage operate under negative pressure and therefore, air infiltrates into the equipment, avoiding the potential of fugitive emissions. The only exhaust point to atmosphere will be from the facility odor control system stack (control device). Please note that all drying processes occur within the proposed dryer process building. There are three (3) pressure relief valves (one (1) for the natural gas supply line, one (1) for the landfill gas supply line and one (1) for the HT thermal oil heater inlet to the HT oil expansion tank).

Describe how emissions will be minimized especially during start up, shut down, process upsets and/or disruptions.

The dryers will vent to a non-contact condenser and an odor control system (odor control fan and scrubber) for odor control. The only exhaust point to atmosphere will be from the facility odor control system stack (control device); therefore, dust and emissions will be minimized. Due to the dryer process design, with the use of slow moving belts which do not agitate the material being dried and single exhaust point post control device, dust, odor and other emissions will not increase during start up/shutdown sequences or process upsets / disruptions.

A perforated stainless steel belt is used for the sludge transport in the dryer. The measured dust content inside the dryer atmosphere is below 10 mg/m^3 at all likely operating scenarios, startup, shutdown, malfunctions, restarts, etc. Due to low concentration of dust, a hazardous atmosphere in the dryer is not possible and inertization of the dryer system is not required. Also, the dryer exhaust will pass through a non-contact condenser and then to the facility odor control system which will minimize emissions.

Anticipated Milestones:

i. Expected commencement date of construction/reconstruction/installation: Upon PADEP Approval
ii. Expected completion date of construction/reconstruction/installation: Upon PADEP Approval
iii. Anticipated date of start-up: Upon PADEP Approval

Section C - Air Cleaning Device

1. Precontrol Emissions*

Not applicable – Source will not operate without sending exhaust gas through the two (2) stage scrubber prior to discharging to atmosphere; therefore, only controlled emissions are presented in Section F.

Pollutant	Maximum Emission Rate				Calculation/ Estimation Method
	Specify Units	Pounds/Hour	Hours/Year	Tons/Year	
PM					
PM-10					
SO_x					
CO					
NO_x					
VOC					
Others: (e.g., HAPs)	-----	-----	-----	-----	-----

* These emissions must be calculated based on the requested operating schedule and/or process rate, e.g., operating schedule for maximum limits or restricted hours of operation and/or restricted throughput. Describe how the emission values were determined. Attach calculations.

2. Gas Cooling Not applicable

Water quenching ☐ Yes ☐ No Water injection rate _____ GPM

Radiation and convection cooling ☐ Yes ☐ No

Air dilution ☐ Yes ☐ No
If yes, _____CFM

Forced Draft ☐ Yes ☐ No

Water cooled duct work ☐ Yes ☐ No

Other

Inlet Volume _____ACFM
@ _____°F _____% Moisture

Outlet Volume _____ACFM
@ _____°F _____% Moisture

Describe the system in detail.

Section C - Air Cleaning Device (Continued)

3. Settling Chambers Not applicable

Manufacturer	Volume of gas handled _____ACFM @ _____°F	Gas velocity (ft/sec.)

Length of chamber (ft.)	Width of chamber (ft.)	Height of chamber (ft.)	Number of trays

Water injection ☐ Yes ☐ No	Water injection rate (GPM)

Emissions Data

Inlet	Outlet	Removal Efficiency (%)

4. Inertial and Cyclone Collectors Not applicable

Manufacturer	Type	Model No.
Pressure drop (in. of water)	Inlet volume _____ACFM @ _____°F	Outlet volume _____ACFM @ _____°F

Number of individual cyclone(s)	Outlet straightening vanes used? ☐ Yes ☐ No

Length of Cyclone(s) Cylinder (ft.)	Diameter of Cyclone(s) Cylinder (ft.)	Length of Cyclone(s) cone (ft.)

Inlet Diameter (ft.) or duct area ($ft.^2$) of cyclone(s)	Outlet Diameter (ft.) or duct area ($ft.^2$) of cyclone(s)

If a multi-clone or multi-tube unit is installed, will any of the individual cyclones or cyclone tubes be blanked or blocked off?

Describe any exhaust gas recirculation loop to be employed.

Attach particle size efficiency curve

Emissions Data

Inlet	Outlet	Removal Efficiency (%)

Section C - Air Cleaning Device (Continued)

5. Fabric Collector Not applicable

Equipment Specifications

Manufacturer | Model No. | ☐ Pressurized Design ☐ Suction Design

Number of Compartments | Number of Filters Per Compartment | Is Baghouse Insulated? ☐ Yes ☐ No

Can each compartment be isolated for repairs and/or filter replacement? ☐ Yes ☐ No

Are temperature controls provided? (Describe in detail) ☐ Yes ☐ No

Dew point at maximum moisture _____ °F | Design inlet volume _____ SCFM

Type of Fabric

Material _____ ☐ Felted ☐ Membrane

Weight _____ oz/sq.yd ☐ Woven ☐ Others: List: _____

Thickness _____ in ☐ Felted-Woven

Fabric permeability (clean) @ ½" water-Δ P _____ CFM/sq.ft.

Filter dimensions Length _____ Diameter/Width _____

Effective area per filter _____ | Maximum operating temperature (°F) _____

Effective air to cloth ratio Minimum _____ Maximum _____

Drawing of Fabric Filter

A sketch of the fabric filter showing all access doors, catwalks, ladders and exhaust ductwork, location of each pressure and temperature indicator should be attached.

Operation and Cleaning

Volume of gases handled _____ ACFM @ _____ °F | Pressure drop across collector (in. of water). Describe the equipment to be used to monitor the pressure drop.

Type of filter cleaning

☐ Manual Cleaning ☐ Bag Collapse ☐ Reverse Air Jets

☐ Mechanical Shakers ☐ Sonic Cleaning ☐ Other: _____

☐ Pneumatic Shakers ☐ Reverse Air Flow

Describe the equipment provided if dry oil free air is required for collector operation

Cleaning Initiated By

☐ Timer Frequency if timer actuated _____

☐ Expected pressure drop range _____ in. of water ☐ Other Specify _____

Does air cleaning device employ hopper heaters, hopper vibrators or hopper level detectors? If yes, describe.

Describe the warning/alarm system that protects against operation when the unit is not meeting design requirements.

Emissions Data

Pollutant	Inlet	Outlet	Removal Efficiency (%)

Section C - Air Cleaning Device (Continued)

6. Wet Collection Equipment **Two (2) Stage Wet Scrubber System**

Equipment Specifications

Manufacturer	Type	Model No.
CMI Environment America Inc. (AMCEC) (or equivalent)	2-Stage Wet Scrubber	TBD

Design Inlet Volume (SCFM)	Relative Particulate/Gas Velocity (ejector scrubbers only)
8,820 SCFM (total) 4,031 SCFM from 2 Dryer Lines (expected) *(2,015 SCFM per Dryer Line (expected))* 4,038 SCFM from Cake Receiving (expected) 751 SCFM from Product Storage and Conveyance (expected)	N/A

Describe the internal features (e.g., variable throat, gas/liquid diffusion plates, spray nozzles, liquid redistributors, bed limiters, etc.).

See Attachment C – Manufacturer's Literature

Describe pH monitoring and pH adjustment systems, if applicable.

Ammonia Scrubber (Stage 1) is a packed column which may be sprinkled by a sulfuric acid solution used as wash fluid (acidic). The washing liquid will be operated at a pH value of 3-6. Hydrogen Sulfide Scrubber (Stage 2) is a packed column which may be sprinkled by a sodium hydroxide and sodium hypochlorite solution as wash fluid (alkaline). The washing liquid here will be operated at a pH value of 9-10. The use of, and rate of use of, chemical addition will be determined once the facility is online and actual inlet concentrations are determined and system efficiency / needs are confirmed so that the exhaust quality requirements are met.

Describe mist eliminator or separator (type, configuration, backflush capability, frequency). N/A

Attach particulate size efficiency curve. N/A

Operating Parameters

Inlet volume of gases handled 8,820 SCFM	Outlet volume of gases handled 8,820 SCFM

Liquid flow rates. Describe equipment provided to measure liquid flow rates to scrubber (e.g., quenching section, recirculating solution, makeup water, bleed flow, etc.) Chemical addition will be monitored via peristatic metering pump.

Describe scrubber liquid supply system (amount of make-up and recirculating liquid, capacity of recirculating liquid system, etc.) Makeup flow estimated to be 0.5 gpm monitored by a totalizing flow meter.

State pressure drop range (in water) across scrubber (e.g., venturi throat, packed bed, etc.) only. Describe the equipment provide to measure the pressure drop. Do not include duct or de-mister losses.

N/A

Describe the warning/alarm system that protects against operation when unit is not meeting design requirements.

A pH transmitter may be used in conjunction with a sensor signal to transmit data to the system control panel. Manufacturer recommended pH control set points will be used to adjust dosing pumps and alarm limits. The alarms and available operating data will be transmitted to the facility.

Emissions Data

Pollutant	Inlet	Outlet	Removal Efficiency (%)
Hydrogen Sulfide (H_2S)	12 ppm	0.12 ppm	99%
Ammonia (NH_3)	89 ppm	0.89 ppm	99%

Section C - Air Cleaning Device (Continued)

7. Electrostatic Precipitator Not applicable

Equipment Specifications

Manufacturer	Model No.	☐ Wet ☐ Dry ☐ Single-Stage ☐ Two-Stage

Gas distribution grids ☐ Yes ☐ No

Design Inlet Volume (SCFM) _____

Maximum operating temperature (°F) _____

Total collecting surface area _____ sq. ft. Collector plates size length _____ ft. x width _____ ft.

Number of fields _____ Number of collector plates/field _____

Spacing between collector plates _____ inches.

Maximum gas velocity _____ ft./sec. Minimum gas treatment time: _____ sec.

Total discharge electrode length _____ ft.

Number of discharge electrodes _____ Number of collecting electrode rappers _____

Rapper control ☐ Magnetic ☐ Pneumatic ☐ Other _____ Describe in detail

Operating Parameters

Inlet gas temperature (°F) _____

Outlet gas temperature (°F) _____

State pressure drop range (inches water gauge) across collector only _____

Describe the equipment

Volume of gas handled (ACFM) _____

Dust resistivity (ohm-cm). Will resistivity vary?

Power requirements

Number and size of Transformer Rectifier sets by electrical field

Field No.	No. of Sets	Each Transformer KVA	Each Rectifier KV Ave./Peak	Each Rectifier Ma DC

Current Density	Corona Power	Corona Power Density
_____ Micro amperes/ft^2.	_____ Watts/1000 ACFM	_____ Watts/ft^2.

Will a flue gas conditioning system be employed? If yes, describe it.

Does air cleaning device employ hopper heaters, hopper vibrators or hopper level detectors? If yes, describe.

Describe the warning/alarm system that protects against operation when unit is not meeting design requirements.

Emissions Data

Pollutant	Inlet	Outlet	Removal Efficiency (%)

Section C - Air Cleaning Device (Continued)

8. Adsorption Equipment Not applicable

Equipment Specifications

Manufacturer	Type	Model No.

Design Inlet Volume (SCFM)	Adsorbent charge per adsorber vessel and number of adsorber vessels

Length of Mass Transfer Zone (MTZ), supplied by the manufacturer based upon laboratory data.

Adsorber diameter (ft.) and area ft^2.)	Adsorption bed depth (ft.)

Adsorbent information

Adsorbent type and physical properties.

Working capacity of adsorbent (%)	Heel percent or unrecoverable solvent weight % in the adsorbent after regeneration.

Operating Parameters

Inlet volume of gases handled _____ (ACFM) @ _____ °F

Adsorption time per adsorption bed	Breakthrough capacity: Lbs. of solvent / 100 lbs. of adsorbent = _____

Vapor pressure of solvents at the inlet temperature	Available steam in pounds to regenerate carbon adsorber (if applicable)

Percent relative saturation of each solvent at the inlet temperature

Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.

Describe the warning/alarm system that protects against operation when unit is not meeting design requirements.

Emissions Data

Pollutant	Inlet	Outlet	Removal Efficiency (%)

Section C - Air Cleaning Device (Continued)

9. Absorption Equipment See page 11 for Wet Scrubber details

Equipment Specifications

Manufacturer	Type	Model No.

Design Inlet Volume (SCFM)	Tower height (ft.) and inside diameter (ft.)
Packing type and size (if applicable)	Height of packing (ft.) (if applicable)
Number of trays (if applicable)	Number of bubble caps (if applicable)

Configuration

☐ Counter-current ☐ Cross flow ☐ Cocurrent flow

Describe pH and/or other monitoring and controls.

Absorbent information

Absorbent type and concentration.	Retention time (sec.)

Attach equilibrium data for absorption (if applicable)

Attach any additional information regarding auxiliary equipment, absorption solution supply system (once through or recirculating, system capacity, etc.) to thoroughly evaluate the control equipment. Indicate the flow rates for makeup, bleed and recirculation.

Operating Parameters

Volume of gas handled (ACFM)	Inlet temperature (°F)	Pressure drop (in. of water) and liquid flow rate. Describe the monitoring equipment.

State operating range for pH and/or absorbent concentration in scrubber liquid.

Describe the warning/alarm system that protects against operation when unit is not meeting design requirements.

Emissions Data

Pollutant	Inlet	Outlet	Removal Efficiency (%)

Section C - Air Cleaning Device (Continued)

10. ☐ **Selective Catalytic Reduction (SCR)**
☐ **Selective Non-Catalytic Reduction (SNCR)** Not applicable
☐ **Non-Selective Catalytic Reduction (NSCR)**

Equipment Specifications

Manufacturer	Type	Model No.

Design Inlet Volume (SCFM)	Design operating temperature (°F)

Is the system equipped with process controls for proper mixing/control of the reducing agent in gas stream? If yes, give details.

Attach efficiency and other pertinent information (e.g., ammonia slip)

Operating Parameters

Volume of gases handled _____ (ACFM) @ _____ °F

Operating temperature range for the SCR/SNCR/NSCR system (°F) From _____°F To _____°F

Reducing agent used, if any	Oxidation catalyst used, if any

State expected range of usage rate and concentration.

Service life of catalyst	Ammonia slip (ppm)

Describe fully with a sketch giving locations of equipment, controls systems, important parameters and method of operation.

Describe the warning/alarm system that protects against operation when unit is not meeting design requirements.

Emissions Data

Pollutant	Inlet	Outlet	Removal Efficiency (%)

Section C - Air Cleaning Device (Continued)

11. Oxidizer/Afterburners Not applicable

Equipment Specifications

Manufacturer	Type ☐ Thermal ☐ Catalytic	Model No.
Design Inlet Volume (SCFM)	Combustion chamber dimensions (length, cross-sectional area, effective chamber volume, etc.)	

Describe design features, which will ensure mixing in combustion chamber.

Describe method of preheating incoming gases (if applicable).	Describe heat exchanger system used for heat recovery (if applicable).

Catalyst used	Life of catalyst	Expected temperature rise across catalyst (°F)	Dimensions of bed (in inches). Height: _____ Diameter or Width: _____ Depth: _____

Are temperature sensing devices being provided to measure the temperature rise across the catalyst? ☐ Yes ☐ No
If yes, describe.

Describe any temperature sensing and/or recording devices (including specific location of temperature probe in a drawing or sketch.

Burner Information

Burner Manufacturer	Model No.	Fuel Used
Number and capacity of burners	Rated capacity (each)	Maximum capacity (each)

Describe the operation of the burner	Attach dimensioned diagram of afterburner

Operating Parameters

Inlet flow rate (ACFM) _____ @ _____°F	Outlet flow rate (ACFM) _____ @ _____°F
State pressure drop range across catalytic bed (in. of water).	Describe the method adopted for regeneration or disposal of the used catalyst.

Describe the warning/alarm system that protects against operation when unit is not meeting design requirements.

Emissions Data

Pollutant	Inlet	Outlet	Removal Efficiency (%)

Section C - Air Cleaning Device (Continued)

12. Flares Not applicable

Equipment Specifications

Manufacturer	Type ☐ Elevated flare ☐ Ground flare ☐ Other _____ Describe	Model No.
Design Volume (SCFM)	Dimensions of stack (ft.) Diameter _____ Height _____	
Residence time (sec.) and outlet temperature (°F)	Turn down ratio	Burner details

Describe the flare design (air/steam-assisted or nonassisted), essential auxiliaries including pilot flame monitor of proposed flare with a sketch.

Describe the operation of the flare's ignition system.

Describe the provisions to introduce auxiliary fuel to the flare.

Operation Parameters

Detailed composition of the waste gas	Heat content	Exit velocity
Maximum and average gas flow burned (ACFM)	Operating temperature (°F)	

Describe the warning/alarm system that protects against operation when unit is not meeting design requirements.

Emissions Data

Pollutant	Inlet	Outlet	Removal Efficiency (%)

Section C - Air Cleaning Device (Continued)

13. Other Control Equipment – Dust Collector [1]

A. Equipment Specifications

Manufacturer	Type	Model No.
PR / Haarslev (or equivalent)	Dust Collector	TBD

Design Volume (SCFM)	Capacity
751 SCFM (expected)	N/A

Describe pH monitoring and pH adjustment, if any.
N/A

Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any.
See Attachment C - Manufacturer's Literature

Attach efficiency curve and/or other efficiency information.
See Attachment C - Manufacturer's Literature

Attach any additional date including auxiliary equipment and operation details to thoroughly evaluate the control equipment.
See Attachment C - Manufacturer's Literature

Operation Parameters

Volume of gas handled

751 SCFM (expected)

Describe fully giving important parameters and method of operation.

The dust collector will remove dust from the enclosed product storage and conveyance steps. Dry product emissions for these steps were calculated assuming Haarslev stated emission rates in order to provide a worst-case estimate of dust emissions. This control option is custom designed for this proposed dryer process and is expected to have a dust removal efficiency of at least 90%, per the manufacturer. However, no control efficiency has been applied in the emission calculations to provide a worst-case potential emissions estimate.

Describe the warning/alarm system that protects against operation when unit is not meeting design requirements.

To be provided by the manufacturer.

Emissions Data

Pollutant	Inlet	Outlet	Removal Efficiency (%)
Dust (Particulate Matter)	≤180 mg/m^3	≤20 mg/m^3	90% (minimum)

[1] The dryer process will also have a non-contact condenser unit(s) for moisture reduction.

Section C - Air Cleaning Device (Continued)

14. Costs

Indicate cost associated with air cleaning device and its operating cost (attach documentation if necessary)

See below

Device	Direct Cost	Indirect Cost	Total Cost	Annual Operating Cost
Chemical Scrubber System	N/A	N/A	Capital: $250,000 Freight to Site: $10,000	N/A – Chemical packing material has a lifespan of ~5-7 years. NH_3 Scrubber Packing: $2,000 (material only) H_2S Scrubber Packing: $2,000 (material only)
Dust Collector	N/A	N/A	$30,000	Electricity: $50,000

15. Miscellaneous

Describe in detail the removal, handling and disposal of dust, effluent, etc. from the air cleaning device including proposed methods of controlling fugitive emissions.

The dryers will vent to a non-contact condenser and an odor control system (odor control fan and scrubber) for odor control. The only exhaust point to atmosphere will be from the facility odor control system stack (control device); therefore, dust and emissions will be minimized. Please note that all drying processes occur within the proposed facility.

Attach manufacturer's performance guarantees and/or warranties for each of the major components of the control system (or complete system).

See Attachment C – Manufacturer's Literature.

Attach the maintenance schedule for the control equipment and any part of the process equipment that if in disrepair would increase air contaminant emissions.

See Attachment C – Manufacturer's Literature.

Section D - Additional Information

Will the construction, modification, etc. of the sources covered by this application increase emissions from other sources at the facility? If so, describe and quantify.

No. The proposed facility within this application is a new facility.

If this project is subject to any one of the following, attach a demonstration to show compliance with applicable standards.

a. Prevention of Significant Deterioration permit (PSD), 40 CFR 52?	☐ YES	☒ NO
b. New Source Review (NSR), 25 Pa. Code Chapter 127, Subchapter E?	☐ YES	☒ NO
c. New Source Performance Standards (NSPS), 40 CFR Part 60? (If Yes, which subpart) _____	☐ YES	☒ NO
d. National Emissions Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 61? (If Yes, which subpart) _____	☐ YES	☒ NO
e. Maximum Achievable Control Technology (MACT) 40 CFR Part 63? (If Yes, which part) _____	☐ YES	☒ NO

Attach a demonstration showing that the emissions from any new sources will be the minimum attainable through the use of best available technology (BAT).

See Attachments B (Emission Calculations) and F (Best Available Technology (BAT) Analysis).

Provide emission increases and decreases in allowable (or potential) and actual emissions within the last five (5) years for applicable PSD pollutant(s) if the facility is an existing major facility (PSD purposes).

Not applicable. This is a new facility.

Section D - Additional Information (Continued)

Indicate emission increases and decreases in tons per year (tpy), for volatile organic compounds (VOCs) and nitrogen oxides (NOx) for NSR applicability since January 1, 1991 or other applicable dates (see other applicable dates in instructions). The emissions increases include all emissions including stack, fugitive, material transfer, other emission generating activities, quantifiable emissions from exempted source(s), etc.

Permit number (if applicable)	Date issued	Indicate ***Yes*** or ***No*** if emission increases and decreases were used previously for netting	Source I. D. or Name	VOCs		NOx	
				Emission increases in potential to emit (tpy)	Creditable emission decreases in actual emissions (tpy)	Emission increases in potential to emit (tpy)	Creditable emission decreases in actual emissions (tpy)

Not applicable. Not a major source.

If the source is subject to 25 Pa. Code Chapter 127, Subchapter E, New Source Review requirements,

a. Identify Emission Reduction Credits (ERCs) for emission offsets or demonstrate ability to obtain suitable ERCs for emission offsets.

Not applicable

b. Provide a demonstration that the lowest achievable emission rate (LAER) control techniques will be employed (if applicable).

Not applicable

c. Provide an analysis of alternate sites, sizes, production processes and environmental control techniques demonstrating that the benefits of the proposed source outweigh the environmental and social costs (if applicable).

Not applicable

Attach calculations and any additional information necessary to thoroughly evaluate compliance with all the applicable requirements of Article III and applicable requirements of the Clean Air Act adopted thereunder The Department may request additional information to evaluate the application such as a standby plan, a plan for air pollution emergencies, air quality modeling, etc.

See attached emission calculations.

Section E - Compliance Demonstration

Note: Complete this section if source is not a Title V facility. Title V facilities must complete Addendum A.

Method of Compliance Type: Check all that apply and complete all appropriate sections below

☒ Monitoring ☐ Testing ☒ Reporting

☒ Recordkeeping ☒ Work Practice Standard

Monitoring:

a. Monitoring device type (Parameter, CEM, etc): PLC System

b. Monitoring device location: Various instrument or PLC readout stations

c. Describe all parameters being monitored along with the frequency and duration of monitoring each parameter:

A PLC system will be installed to measure the heat provided by the supplemental thermal oil heater and will monitor the heat volume or flowrate on an ongoing basis.

Testing: Not applicable

a. Reference Test Method: Citation

b. Reference Test Method: Description

Recordkeeping:

Describe what parameters will be recorded and the recording frequency:

A PLC system will be installed to measure the heat provided by the supplemental thermal oil heater and will record the heat volume / flowrate on an ongoing basis.

Reporting:

a. Describe what is to be reported and frequency of reporting:

Reporting and frequency of reporting will be conducted upon request by the PADEP.

b. Reporting start date: Upon request of PADEP.

Work Practice Standard:

Describe each:

Operation and maintenance practices in accordance with manufacturer specifications will be adhered to at all times.

Section F - Flue and Air Contaminant Emission

1. Estimated Atmospheric Emissions* (1)

Pollutant	Maximum emission rate (2)			Calculation/ Estimation Method
	specify units	lbs/hr (1)	tons/yr. (1)	
PM-10	--	15.20	15.47	Manufacturer's Data, Site Specific Data, EPA AP-42
PM-2.5	--	3.85	9.92	Manufacturer's Data, Site Specific Data, EPA AP-42
SO_x	--	5.24	22.95	EPA AP-42
CO	--	6.50	28.48	Manufacturer's Data, EPA AP-42
NO_x	--	3.67	16.07	EPA AP-42
VOC	--	0.41	1.78	Manufacturer's Data, Site Specific Data, EPA AP-42
HCOH	--	0.01	0.05	Site Specific Data, EPA AP-42
Total HAPs	--	0.57	2.52	Manufacturer's Data, Site Specific Data, EPA AP-42
Ammonia (NH_3)	--	0.04	0.17	Manufacturer's Data
Hydrogen Sulfide (H_2S)	--	0.01	0.05	Manufacturer's Data, Site Specific Data, EPA AP-42
Total CO_2eq	--	8,596	37,653	40 CFR Part 98

* These emissions must be calculated based on the requested operating schedule and/or process rate e.g., operating schedule for maximum limits or restricted hours of operation and /or restricted throughput. Describe how the emission values were determined. Attach calculations.

(1) Above facility-wide emissions includes dryer facility (non-combustion air) emissions, combustion emissions from the supplemental heater, enclosed product storage and conveyance steps, and hauling activities. See Attachment B – Emissions Calculations for detailed emission factors and calculations for each source.

(2) Values for dryer facility and combustion emissions have been multiplied by a safety factor of 2 to account for site fluctuations and provide a worst-case emissions estimate.

2. Stack and Exhauster

Stack Designation/Number To be assigned by PADEP.

List Source(s) or source ID exhausted to this stack:

The dryers will vent to a non-contact condenser and an odor control system (odor control fan and scrubber) for odor control. The only exhaust point to atmosphere will be from the facility odor control system stack (control device); therefore, dust and emissions will be minimized.

% of flow exhausted to stack: 100

Stack height above grade (ft.) 24.25 Grade elevation (ft.) 700	Stack diameter (ft) or Outlet duct area (sq. ft.) 4-6"	f. Weather Cap ☐ YES ☒ NO

Distance of discharge to nearest property line (ft.). Locate on topographic map.

See attached topographic map (Figure 1 - Site Location Map).

Does stack height meet Good Engineering Practice (GEP)?
Yes

If modeling (estimating) of ambient air quality impacts is needed, attach a site plan with buildings and their dimensions and other obstructions. Upon request by PADEP.

Location of stack** Latitude/Longitude Point of Origin	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
Center of Area	40°	51'	34"	-75°	15'	41"

Stack exhaust

See Figure 2.

Volume ____ ACFM Temperature ____ °F Moisture _____ %

Indicate on an attached sheet the location of sampling ports with respect to exhaust fan, breeching, etc. Give all necessary dimensions.
TBD

Exhauster (attach fan curves) Not applicable in. of water _____ HP @ _____ RPM.

** If the data and collection method codes differ from those provided on the General Information Form-Authorization Application, provide the additional detail required by that form on a separate form.

Section G - Attachments

Number and list all attachments submitted with this application below:

General Information Form (GIF)

Attachment A – Application Narrative and Regulatory Review

Attachment B – Emission Calculations

Attachment C – Manufacturer's Literature

Attachment D – Proof of Municipal/County Notifications

Attachment E – Compliance Review Form

Attachment F – Best Available Technology (BAT) Analysis

Figure 1 – Site Location Map

Figure 2 – Process Flow Diagram

ATTACHMENT A

APPLICATION NARRATIVE AND REGULATORY REVIEW

EarthRes
ENGINEERING AND SCIENCE

Attachment A
Application Narrative and Regulatory Review

Introduction

This application is being submitted to the Pennsylvania Department of Environmental Protection (PADEP) Northeast Regional Office (NERO) Air Quality Program for the installation of the Slate Belt Heat Recovery Center, LLC (SBHRC). The SBHRC proposes to permit and construct a biosolids processing facility which will be sited on a parcel of land owned by Grand Central Sanitary Landfill (GCSL), in Plainfield Township, Northampton County, Pennsylvania (see Figure 1 – Site Location Map). The proposed property is currently two (2) lots, Tax Parcel No. E8-12-1 and Tax Parcel No. E8-12-1A, which will be adjusted from the 4.35 acre lot currently operated as the GKEDC, Tax Parcel No. E8-12-1A and create a new lot area containing 12.05 acres for the SBHRC.

A pre-application meeting with PADEP for this project was held on November 28, 2017.

Process Description

The proposed project involves the installation of heat recovery equipment, a supplemental thermal oil heater and thermal drying equipment to facilitate processing of imported dewatered biosolids into a Class A dried biosolids product. The Class A biosolids will be marketed as a fertilizer, soil conditioner, and/or renewable fuel product. The thermal dryer process will consist of two (2) fully enclosed indirectly heated belt dryers in parallel, each with a biosolids input capacity of approximately 200 wet tons per day, for a facility total throughput of 400 wet tons (containing an average of approximately 21% solids) per day.

The project location was chosen based on a desire to harness the currently unused heat source provided by the existing GKEDC landfill gas to energy (LFGTE) plant. The LFGTE plant specifically anticipated the future use of waste heat. The existing turbine stacks located at the LFGTE plant will be modified to recover waste heat to a thermal oil loop for use in the belt dryers without adding or subtracting from the GKEDC potential to emit. A Request for Determination (RFD) is being submitted by GKEDC separately to address the modifications to the existing turbine stacks at the GKEDC facility. During normal expected operations there may be a need for supplemental heat that will be provided by a stand-alone thermal oil heater supplying approximately 6.1 MMBTU/hr. The supplemental thermal oil heater may utilize natural gas or excess / available landfill gas as a fuel. The total maximum heat demand of the supplemental thermal oil heater, assuming GKEDC turbine outage, is currently estimated to be 36.7 MMBTU/hr to support the dryer system capacity rating without the GKEDC waste heat. The burner design firing rate may increase to 50.3 MMBTU/hr to allow for variability in fuel types and heating values. The only combustion emission point for the project will be from the supplemental thermal oil heater.

Drying facility details are presented in the attached Figure 2 - Process Flow Diagram. Each belt dryer will have an inlet chamber and associated drying chambers arranged in series. The dryer belts and all associated processing equipment will be enclosed and the dryers will be held under slightly negative pressure to contain and capture all evaporated moisture, heat and odor. All process air will be directed to a non-contact condenser for moisture reduction. The normally enclosed receiving units, covered aboveground process wastewater storage tank, covered product conveyance system, and covered product storage will be ventilated with air flow maintained by the odor control system fan. A dust collector will remove dust from the enclosed product storage and conveyance steps. The dryer process air, along with the dust collector and other odor sources, are directed to the two-stage odor control system prior to release to the atmosphere. The only exhaust point from the thermal drying process and associated equipment will be at the facility odor control system stack (control device).

Facility-Wide Potential to Emit

Potential sources of air emissions are outlined below.

Dryer Facility Emissions

Dryer facility emission calculations were prepared using data provided by Synagro. Post-control emissions data provided by Haarslev, the dryer manufacturer, was used to estimate emissions of CO, H_2S, NH_3, and particulate matter (PM) (as dust) from the drying process. The emission factor for PM was used to estimate PM-10 and PM-2.5. Potential emissions from the drying process were multiplied by a safety factor of two (2) to be conservative. In addition, the scrubber control efficiencies provided for each pollutant were not applied.

Emissions data provided by Haarslev is assumed to include all emissions from the drying process which vent to the wet scrubber as a single emission point. No emissions are expected from the handling and processing of the wet feed as the areas are enclosed and vented to the odor control system.

Product Conveyance and Storage Emissions

The dust collector will remove dust from the enclosed product storage and conveyance steps. Dry product emissions for these steps were calculated assuming Haarslev stated emission rates in order to provide a worst-case estimate of dust emissions. This control option is custom designed for this proposed dryer process and is expected to have a dust removal efficiency of at least 90%, per the manufacturer. However, no control efficiency has been applied in the emission calculations to provide a worst-case potential emissions estimate. AP-42 emission factors were reviewed, but provided a much lower PTE for PM (dust) than the manufacturer's values.

The dryer process is enclosed, operating under slight negative pressure where air will leak into the process, and will vent to a non-contact condenser for moisture and PM (dust) removal. The non-contact condenser will serve to optimize scrubber performance.

PM associated with paved and unpaved roadway emissions were also included since roadway dust emissions are often a concern for landfill sites.

Combustion Emissions

To estimate potential emissions from the supplemental heater, the maximum heat input of 36.7 MMBTU/hr was used assuming the heat recovery system is not in use. Emission factors for NOx, SOx, VOC, and HAPs were obtained from U.S. EPA AP-42 Section 1.4 for the supplemental heater using waste heat and/or natural gas. Emissions factors for the supplemental heater firing LFG were obtained from AP-42 Section 2.4. Greenhouse gas (GHG) emission factors were obtained from 40 CFR Part 98 Subpart C for each fuel type. GHG emissions were converted to CO_2 equivalents (CO_2e) using 40 CFR 98 Subpart A. Potential emissions from the supplemental heater were multiplied by a safety factor of two (2) to be conservative.

Permit Requirements based on PTE

Based on the size of the supplemental thermal oil heater, an air quality plan approval will be required prior to construction and startup of operations for the proposed facility. See 25 Pa. Code 127.11. Based on the PTE as an estimate of projected actual emissions for the proposed facility, an operating permit will be required. The facility will be a natural minor source of emissions. Refer to the table below for a comparison of the facility's PTE to Title V and operating permit thresholds.

A summary of the facility's potential emissions compared to Title V (major source) thresholds is shown below to demonstrate the facility's status as a natural minor source.

Table 1
PTE Comparison to Title V Thresholds

Pollutant	**PTE (tons/yr)**	**Title V Threshold *(based on PTE)* (tons/yr)**	**Operating Permit Threshold *(based on actual emissions)* (tons/yr)**
PM-10	15.47	100	3
NOx	16.07	100	10
SOx	22.95	100	8
CO	28.48	100	20
VOC	1.78	50	8
HCOH	0.05	10	1
Total HAPs	2.52	25	2.5

Applicable Federal and State Requirements

The following PADEP and EPA programs and regulations have been evaluated for applicability with respect to the proposed facility. A summary is included in Table 1.

Title V (Major Source) Applicability

The facility will be a natural minor (non-major) source based on its PTE. No operational or emissions limits are necessary. Therefore, the facility will not trigger Title V (major source) applicability.

PADEP Chapter 123 Standards for Contaminants

The dryer process will be subject to the following emission limits under 25 Pa. Code Chapter 123 – Standards for Contaminants:

- Limitations for fugitive emissions including fugitive particulate matter (PM), per 25 Pa. Code 123.1 and 123.2.
- Concentration of particulate matter as PM in the effluent gas from each source may not exceed 0.04 gr/dscf, per 25 Pa. Code 123.13(c). This is based on an exhaust flow rate of 15,189 m^3/hr, as indicated by Haarslev, which is equivalent to 8,940 ACFM or 8,467 DSCFM. Total PM emissions from the dryer facility (including dryer facility, product conveyance and storage, and worst-case combustion emissions), are estimated to be 0.028 gr/dscf which is below the PADEP limit.
- Limitations for malodors under 25 Pa. Code 123.31.

The supplemental heater will be subject to the following emission limits under 25 Pa. Code Chapter 123 – Standards for Contaminants:

- Emissions of particulate matter (PM) to the atmosphere must be less than 0.4 lb/MMBTU, per 25 Pa. Code 123.11(a)(1). Worst-case PM emissions from the supplemental heater firing any fuel type are 0.09 lb/MMBTU; therefore, the supplemental heater will meet this requirement.
- Emissions of sulfur oxides expressed as SO_2 from a combustion unit must be less than 4 lb/MMBTU over a 1-hour period, per 25 Pa. Code 123.22(a)(1). Worst-case SO_2 emissions from the supplemental heater firing any fuel type are 0.77 lb/MMBTU; therefore, the supplemental heater will meet this requirement.
- Limitations for malodors under 25 Pa. Code 123.31.
- Limitations for visible emissions (opacity) under 25 Pa. Code 123.41.

PADEP Chapter 129 Standards for Sources

The project is not subject to requirements under 25 Pa. Code Chapter 129.

Best Available Technology (BAT)

There are not currently established BAT limits for this dryer process. It is expected that the supplemental thermal oil heater will be subject to the BAT requirements for combustion units

constructed after December 2, 1995 with rated capacity equal to or greater than 10 MMBTU/hr established under General Permit GPA/GP-1:

- 30 ppmdv NOx at 3% O_2 when firing gas; and
- 300 ppmdv CO at 3% O_2.

It is expected that the use of a low NOx burner on the supplemental thermal oil heater will be required to meet BAT. It will be technically feasible to equip the supplemental heater with a low NOx burner. Additional requirements for the burner may include good operating and maintenance practices such as periodic burner inspections, adjustments and tune-ups.

The use of the dust collector to control PM and dust emissions and the use of the scrubber to control odors and VOC/HAP emissions will also be considered BAT.

See Attachment F for a complete BAT Analysis.

Reasonably Available Control Technology (RACT)

Reasonably Available Control Technology (RACT) is defined under 25 Pa. Code 121.1 as "the lowest emission limit for VOCs or NOx that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility." Major sources of NOx and VOC emissions are subject to RACT requirements under 25 Pa. Code 129.91. The facility will not be a major source of NOx or VOC; therefore, RACT does not apply.

Prevention of Significant Deterioration (PSD)

Prevention of Significant Deterioration (PSD) applies to new major sources or major modifications for pollutants in areas designated as being in attainment or unclassifiable with National Ambient Air Quality Standards (NAAQS). PSD permitting requires installation of Best Available Control Technology (BACT), an air quality analysis (modeling), and an additional impacts analysis. Because the facility will not be a new major source, PSD is not triggered.

Nonattainment New Source Review (NNSR)

Nonattainment New Source Review (NNSR) applies to new major sources or major modifications for pollutants in areas designated as being in nonattainment with NAAQS. NNSR permitting requires installation of Lowest Achievable Emission Rate (LAER) technology as well as emissions offsets. Because the facility will not be a new major source, NNSR is not triggered.

New Source Performance Standards

NSPS Subpart LLLL – Standards of Performance for New Sewage Sludge Incineration Units

The project is not subject to this NSPS because the process does not involve the combustion of the sludge and therefore the process does not meet the definition of sewage sludge incineration (SSI) unit under 40 CFR 60.4930.

The proposed project is not subject to any other promulgated NSPS.

NESHAP/MACT

The proposed project is not subject to any National Emission Standards for Hazardous Air Pollutants (NESHAPs) or Maximum Available Control Technology (MACT) requirements established under 40 CFR Part 61 or Part 63.

NESHAP Subpart DDDDD – Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters

The project is not subject to this subpart because the facility is not a major source of Hazardous Air Pollutants (HAPs).

NESHAP Subpart JJJJJJ – Industrial, Commercial, and Institutional Boilers Area Sources

The supplemental heater would be considered a process heater, not a boiler; therefore, the proposed facility is not subject to this NESHAP. The supplemental heater will fire only natural gas and landfill gas, and therefore will not be subject to the Area Source Boiler MACT under NESHAP Subpart JJJJJJ.

EPA PSD and Title V GHG Tailoring Rule

The EPA issued a final rule on May 13, 2010 to establish a "common sense" approach to permitting greenhouse gas (GHG) emissions from stationary sources under the Clean Air Act (CAA) permitting programs. This final rule sets thresholds for GHG emissions that define when permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities. These thresholds are higher than those for other pollutants because of the much higher volumes at which GHG are emitted compared to criteria pollutants and HAPs. This PSD and Title V GHG Tailoring Rule delineated a three step permitting approach. Step 2 of the Rule went into effect July 1, 2011, and established that Title V applies to existing sources that are not "anyway sources" and that emit or have the potential to emit 100,000 tons per year (tpy) of CO_2 equivalents (CO_2eq). In addition, under Step 2 of the Rule, PSD permits must only be obtained for modifications increasing GHG emissions by at least 75,000 CO_2eq. Step 3, which went into effect July 1, 2013, maintains these Step 2 Title V/PSD thresholds of 100,000/75,000 CO_2eq. Most recently, on June 23, 2014, the United States Supreme Court issued a decision stating that the EPA may not treat GHG as an air pollutant for determining whether a source is a major source required to obtain a PSD or Title V permit.

GHG emissions from the proposed SBHRC plant and drying process are well below 75,000 CO_2eq. Therefore, the requirements of the PSD and Title V Tailoring Rule are not applicable to this project.

Table 2
Air Quality Regulatory Summary Table

Regulatory Standard	Is Facility / Project Subject?	Comment
Title V	No	Not a major source.
PADEP Chapter 123	Yes	Limits for odors, fugitive emissions, and visible emissions. Emission standards for PM and SO_2.
PADEP Chapter 129	No	No standards applicable to this dryer process.
BAT	Yes	Compliance with General Permit GPA/GP-1 emission limits for CO and NOx from the supplemental heater and use of control devices meets BAT. See Attachment F.
RACT	No	Not a major source.
PSD	No	Not a major source or major modification.
NNSR	No	Not a major source or major modification.
NSPS Subpart GG	No	GKEDC will continue to be subject to Subpart GG; however, the proposed SBHRC facility will not be subject to this subpart. The proposed facility is not subject to any other established NSPS.
NESHAP / MACT	No	There are no current NESHAP subparts that apply to this project.
EPA PSD and Title V GHG Tailoring Rule	No	Not a major source or major modification.

Single Source Determination

The SBHRC facility will be a stand-alone facility separate from GCSL and GKEDC. The proposed SBHRC facility will be sited on a parcel of land owned by GCSL, and situated near the GKEDC facility in Plainfield Township, Northampton County, Pennsylvania (see Figure 1 – Site Location Map). The proposed property is currently two (2) lots, Tax Parcel No. E8-12-1 and Tax Parcel No. E8-12-1A, which will be adjusted from the 4.35 acre lot currently operated as the GKEDC, Tax Parcel No. E8-12-1A and create a new lot area containing 12.05 acres for the SBHRC.

United States Environmental Protection Agency (USEPA) and Commonwealth of Pennsylvania Department of Environmental Protection (PADEP) guidance documentation and the discussion

at the pre-permit application meeting on November 28, 2017 indicate the emissions from the proposed SBHRC facility should not be aggregated with GCSL or GKEDC. A single source determination or aggregation of emissions is based on three (3) criteria which are listed below. Note that the three (3) criteria are defined by EPA under the definitions of "major source" under 40 CFR 70.2 and "stationary source" under 40 CFR 52.21(b)(5) and (6).

1. Whether the activities belong to the same industrial grouping (i.e., SIC or NAICS code);
2. Whether the facilities are contiguous or adjacent; and
3. Whether the activities are under common ownership and control'

There is no common ownership or control among SBHRC, GCSL, or GKEDC; therefore, this application is for a single source.

ATTACHMENT B

EMISSION CALCULATIONS

Slate Belt Heat Recovery Center, LLC (SBHRC) - Biosolids Processing Facility
Air Quality Plan Approval Application
Attachment B - Emission Calculations
Facility-wide PTE Total

Source	Pollutant (TPY)											
	PM	PM-10	PM-2.5	NOx	SOx	CO	VOC	HCOH	Total HAPs	H_2S	NH_3	Total CO_2eq
Dryer Facility (Non-Combustion Air) Emissions [1]	1.47	1.47	1.47	--	--	1.47	0.006	--	--	0.05	0.17	--
Supplemental Heater - Combustion Emissions (Worst-Case) [2]	2.64	2.64	2.64	16.07	22.95	27.01	1.77	0.05	2.52	--	--	37,653
Enclosed Product Storage and Conveyance Steps [3]	4.87	4.87	4.87	--	--	--	--	--	--	--	--	--
Roads [4]	26.64	6.49	0.94	--	--	--	--	--	--	--	--	--
Total [5],[6],[7]	**35.62**	**15.47**	**9.92**	**16.07**	**22.95**	**28.48**	**1.78**	**0.05**	**2.52**	**0.05**	**0.17**	**37,653**

Notes:

(1) PTE from belt drying lines include dryer facility emissions for dust and odors. Emission concentrations provided by Haarslev, the dryer manufacturer, were multiplied by a safety factor of two (2) to account for variations in site conditions. Emissions data provided by Haarslev is assumed to include all emissions from the drying process which vent to the wet scrubber as a single emission point. No emissions are expected from the handling and processing of the wet feed as the areas are enclosed and vented to the odor control system.

(2) Supplemental thermal oil heater will primarily run on waste heat from the GKEDC turbines, but can also fire natural gas and/or landfill gas (LFG). Emission rates from each fuel type were multiplied by a safety factor of 2 to account for site fluctuations. Since the heater can fire any of the fuel types, the highest of each pollutant from the firing of each fuel type is used in the above table to provide a worst-case emissions estimate. Supplemental heater's heat input rating will be 6.1 MMBTU/hr when firing waste heat from the GKEDC Plant. Maximum heat input rating when firing LFG or natural gas and the turbine plant is offline is 36.7 MMBTU/hr.

(3) A dust collector will remove dust from the enclosed product storage and conveyance steps. These emission estimates are presented separately to be conservative.

(4) Roadway emissions have been included to provide a worst-case estimate of particulate emissions, but are not expected to be a regulated air pollutant source category for the facility.

(5) The following sources are exempt from plan approval: Receiving Station (Exemption #14), Dry Product Storage Silo (Exemption #14), and Covered Aboveground Process Wastewater Storage Tank (Exemption #18).

(6) The following are not air emission sources and have not been included above: WHR thermal oil system, operation/control building, truck receiving pad, and wet sludge pipeline.

(7) Storage tanks for caustic and acid scrubber materials do not contain any VOCs or HAPs and are therefore not included above. Storage tank emissions considered to be insignificant.

Slate Belt Heat Recovery Center, LLC (SBHRC) - Biosolids Processing Facility
Air Quality Plan Approval Application
Attachment B - Emission Calculations
Supplemental Heater and Dryer Facility (Non-Combustion Air) Emissions

Specifications

2 Belt Drying Lines, each with a capacity of 200 wet tons per day (WTPD) for a total capacity of 400 WTPD.

Each belt drying line consists of one (1) inlet chamber, a belt dryer, and associated drying chambers arranged in series.

Dryer facility will have one (1) combustion heat source, a thermal oil heater referred to as the "supplemental heater" with a maximum heat demand of 36.7 MMBTU/hr, otherwise it will utilize a waste heat source at an approximate heat demand of 6.1 MMBtu/hr.

Heater will be equipped with a low NOx burner.

Dryer process air, along with the dust collector and other odor sources, are directed to the two-stage odor control system prior to release to the atmosphere.

Exhaust air flow rate to odor control provided by Haarslev Industries via email on 2/17/2016.

Scrubber control efficiency rates for NH_3, H_2S, dust, and odors have not been included in order to provide a worst-case emissions estimate. — All ready Accounted —

Supplemental Heater Power Rating [1]	616 HP	Heater Fuel 1		Waste Heat
	460 kW	Heater Fuel 2		Landfill Gas (LFG)
	MBTU/ton water	Heater Fuel 3		Natural Gas
Thermal Energy Requirement	19 evaporated	Heating Value [2]	1,000	BTU/SCF Natural Gas
Water Evaporation Total	7.66 tons/hr		500	BTU/SCF Landfill Gas
Supplemental Heater Heat Demand (max) [1]	36.7 MMBTU/hr			
Supplemental Heater Heat Demand (when using Waste Heat)	6.1 MMBTU/hr			
Throughput	400 WTPD			
Exhaust Air Rate to Odor Control [3]	8,940 ACFM	Maximum Operating Schedule		8,760 hrs/yr
	8,820 SCFM	Moisture Content	49	g/Nm^3
	8,467 DSCFM		4	%
	15,189 m^3/hr			

Dryer Facility (Non-Combustion Air) Emissions [4]

Pollutant	Notes	Emission Factor (mg/m^3)	Emission Factor (lb/hr)	Safety Factor [15]	Potential Emissions (lb/hr)	Potential Emissions (tons/yr)
PM	[5]	5	0.167	2	0.335	1.47
PM-10	[5]	5	0.167	2	0.335	1.47
PM-2.5	[5]	5	0.167	2	0.335	1.47
CO	[7]	5	0.167	2	0.335	1.47
Hydrogen Sulfide (H_2S)	[6]	0.12 ppm	0.005	2	0.010	0.05
Ammonia (NH_3)	[6]	0.89 ppm	0.019	2	0.039	0.17
VOC	[13]	0.0204	0.0007	2	0.0014	0.006

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Attachment B - Emission Calculations
Supplemental Heater and Dryer Facility (Non-Combustion Air) Emissions

Combustion Emissions - Waste Heat (Based on Supplemental Heater Heat Input of 6.1 MMBTU/hr)
(Emission Factors based on Natural Gas as a Fuel to Provide Worst-Case Emissions Estimate)

Pollutant	Notes	Emission Factor		Safety Factor [15]	Potential Emissions	
		(lb/MMSCF)	(kg/MMBTU)		(lb/hr)	(tons/yr)
PM	[8]	7.6	--	2	0.093	0.41
PM-10	[8]	7.6	--	2	0.093	0.41
PM-2.5	[8]	7.6	--	2	0.093	0.41
NOx	[8]	50	--	2	0.610	2.67
SOx	[8]	0.6	--	2	0.007	0.03
CO	[8]	84	--	2	1.025	4.49
VOC	[8]	5.5	--	2	0.067	0.29
Formaldehyde (HCOH)	[8]	0.075	--	2	0.001	0.00
Total HAPs	[8]	1.9	--	2	0.023	0.10
CO_2	[11]	--	53.06	2	1,427	6,252
CH_4	[11]	--	0.0010	2	0.0269	0.1178
N_2O	[11]	--	0.0001	2	0.0027	0.0118
Total CO_2eq	[12]	--	--	--	1,429	6,258

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Supplemental Heater and Dryer Facility (Non-Combustion Air) Emissions

Combustion Emissions - Firing Landfill Gas (LFG), AP-42 Concentrations (Based on Supplemental Heater Max Heat Input of 36.7 MMBTU/hr)

Pollutant	Notes	Emission Factor (lb/MMSCF)	Emission Factor (kg/MMBTU)	Safety Factor [15]	Potential Emissions (lb/hr)	Potential Emissions (tons/yr)
PM	[9]	4.1	--	2	0.602	2.64
PM-10	[9]	4.1	--	2	0.602	2.64
PM-2.5	[9]	4.1	--	2	0.602	2.64
NOx	[9]	16.5	--	2	2.422	10.61
SOx	[9]	8.66	--	2	1.272	5.57
CO	[9]	2.9	--	2	0.418	1.83
VOC	[9]	1.40	--	2	0.206	0.903
Formaldehyde (HCOH)	[9]	0.075	--	2	0.011	0.048
Total HAPs	[9]	3.92	--	2	0.575	2.52
CO_2	[11]	--	52.07	2	8,427	36,912
CH_4	[11]	--	0.0032	2	0.5179	2.2684
N_2O	[11]	--	0.00063	2	0.1020	0.4466
Total CO_2eq	[12]	--	--	--	8,471	37,102

Combustion Emissions - Firing Landfill Gas (LFG), Site-Specific Concentrations (Based on Supplemental Heater Max Heat Input of 36.7 MMBTU/hr)

Pollutant	Notes	Emission Factor (lb/MMSCF)	Emission Factor (kg/MMBTU)	Safety Factor [15]	Potential Emissions (lb/hr)	Potential Emissions (tons/yr)
SOx	[14]	35.70	--	2	5.241	22.95
VOC	[14]	1.85	--	2	0.271	1.186
Formaldehyde (HCOH)	[9]	0.075	--	2	0.011	0.048
Total HAPs	[10]	3.85	--	2	0.566	2.48

$0.146 \frac{MMSCF}{hr}$ Landfill Gas

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Supplemental Heater and Dryer Facility (Non-Combustion Air) Emissions

Combustion Emissions - Firing Natural Gas (Based on Supplemental Heater Max Heat Input of 36.7 MMBTU/hr)

Pollutant	Notes	Emission Factor		Safety Factor [15]	Potential Emissions	
		(lb/MMSCF)	(kg/MMBTU)		(lb/hr)	(tons/yr)
PM	[10]	7.6	--	2	0.558	2.44
PM-10	[10]	7.6	--	2	0.558	2.44
PM-2.5	[10]	7.6	--	2	0.558	2.44
NOx	[10]	50	--	2	3.670	16.07
SOx	[10]	0.6	--	2	0.044	0.193
CO	[10]	84	--	2	6.166	27.01
VOC	[10]	5.5	--	2	0.404	1.77
Formaldehyde (HCOH)	[10]	0.075	--	2	0.006	0.024
Total HAPs	[10]	1.9	--	2	0.139	0.61
CO_2	[11]	--	53.06	2	8,588	37,614
CH_4	[11]	--	0.0010	2	0.1618	0.7089
N_2O	[11]	--	0.0001	2	0.0162	0.0709
Total CO_2eq	[12]	--	--	--	8,596	37,653

Notes:
(1) Thermal oil heater (referred to as the supplemental heater) specifications provided by Haarslev Industries as part of Quotation No. 758694 Rev. 0 , November 13, 2014. Max heat input rating of 36.7 MMBTU/hr provided by SBHRC is the max rating for the supplemental heater when the heat recovery system on the GKEDC Plant is not functioning. Demand decreases to 6.1 MMBTU/hr when the heat recovery system is online. Note, the safety factor of 2 applied to the above calculations accounts for variation in burner heat input due to fuel type and fuel heating values (so up to 74 MMBTU/hr). Proposed max burner design firing rate is 50.3 MMBTU/hr.

(2) Fuel heating values have been assumed based on typical values for other sites.
(3) Exhaust flows and temperature obtained from Haarslev Belt Dryer Mass/Energy Balance (Printed 01/22/2018). Water (moisture) content of gas obtained from Haarslev's "Typical Dryer Exhaust Gas Composition Before/After Odour Control" and converted to % using a typical air density of 1.2041 kg/m^3 at ambient temperature. Assume wet cake bunker and dry product silo flows are at standard pressure. Exhaust flow in m^3/hr based on acfm flowrate to provide a worst-case emissions estimate.
(4) Dryer facility emissions refer to non-combustion air emissions. The dryer process air, along with the dust collector and other odor sources, are directed to the two-stage odor control system prior to release to the atmosphere. The only exhaust point from the thermal drying process and associated equipment will be at the facility odor control system stack (control device).
(5) Dryer facility emission factors for dust obtained from Haarslev's "Process Description Chemical Scrubber for Dryer Exhaust Air" and "Typical Dryer Exhaust Gas Composition Before/After Odour Control" data sheets. Value used is post odor control. A safety factor of 2 has been applied to the worst-case value presented to account for fluctuations in site conditions. Dust content value used to estimate PM, PM-10, and PM-2.5.

Notes (continued):

(6) Dryer facility emission factors for odors obtained from the "Odor Control Design Approach and Criteria" Synagro Memo, for the Slate Belt Heat Recovery Center, dated February 15, 2018, from FSBU Engineering, for hydrogen sulfide (H_2S) (12 ppm with a 99% removal efficiency (0.12 ppm), and ammonia (NH_3) (89 ppm with a 99% removal efficiency (0.89 ppm). A safety factor of 2 has been applied to the worst-case value presented to account for fluctuations in site conditions. Emission factors are for the odor control outlet.

(7) Process emission factor for CO obtained from Haarslev Industries Data Sheet "Typical Dryer Exhaust Gas Composition Before/After Odour Control" for Dryer Type Haarslev Belt Dryer with closed air loop and indirect non-contact condenser. A safety factor of 2 has been applied.

(8) No combustion emissions are expected from using waste heat; however, emissions have been estimated using U.S. EPA AP-42 Section 1.4 (Rev 7/98) emission factors to be conservative. While the waste heat recovery unit is in operation, combustion emissions are based on 6.1 MMBTU/hr supplemental heat input. Process emissions after odor control are presented.

(9) Heater can fire landfill gas (LFG) as an alternate fuel type. Maximum heater burner rating of 36.7 MMBTU/hr used. Emission factors obtained from U.S. EPA AP-42 Section 2.4 (Rev 11/98). NOx emission factor adjusted to 50% methane.

(10) Heater can fire natural gas as an alternate fuel type. Maximum heater burner rating of 36.7 MMBTU/hr used. Emission factors obtained from U.S. EPA AP-42 Section 1.4 (Rev 7/98). Low NOx burner emission factor used for NOx.

(11) Combustion greenhouse gas (GHG) emission factors obtained from 40 CFR 98 Tables C-1 and C-2, updated November 29, 2013. Note, the formation of CO_2 through incomplete combustion may result in small quantities of CO_2 not being formed. This amount is very small and does not have a significant impact on CO_2 emissions, per U.S. EPA AP-42 Section 2.4 (11/98).

(12) GHG emissions converted to carbon dioxide equivalents (CO_2eq) using the following Global Warming Potentials (GWP): $CO_2 = 1$, $CH_4 = 25$, and $N_2O = 298$ from 40 CFR 98 Subpart A, Table A-1, updated November 29, 2013.

(13) Inlet mercaptan concentration used to estimate process VOC emissions provided under Haarslev Industries' "Process Description Chemical Scrubber for Dryer Exhaust Air", brochure provided by Synagro on 2/17/2016.

(14) Pollutant concentrations for VOC (excluding formaldehyde, which is formed post-combustion), organic HAPs, SOx, and H_2S based on 2014-2017 annual LFG sample concentration maximums for GCSL as reported in Test America Lab Reports.

(15) Values have been multiplied by a safety factor of 2 to account for site fluctuations and provide a worst-case emissions estimate.

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Sulfur Compound, HAP and HCl Supplemental Heater Emission Factors

Pollutant concentrations obtained from U.S. EPA AP-42 Section 2.4 (Rev 11/98).
Emission factors calculated using US EPA AP-42 Section 2.4 Equations (3), (4), and (5) (Rev 11/98).

Heater Capacity [1]	36.70 MMBTU/hr
LFG Heating Value	500 BTU/SCF
LFG Throughput	2,078.5 m^3/hr
Q_{CH4} =	1,039.2 m^3/hr

CAS No.	VOC, HAP, or Sulfur Compound	MW	C_P (ppmv) [2]	AP-42 Control Efficiency (%)	Q_P (m^3/hr)	UM_P (kg/hr)	CM_P (kg/hr)	CM_P (lb/hr)	EF (lb/MMSCF)	HAP	VOC	Sulfur
71-55-6	1,1,1-Trichloroethane (Methyl Chloroform)	133.41	0.48	99.6	0.00	0.01	0.00	0.00	0.001	X		
79-34-5	1,1,2,2-Tetrachloroethane	167.85	1.11	99.6	0.00	0.02	0.00	0.00	0.002	X	X	
75-34-3	1,1-Dichloroethane	98.97	2.35	99.6	0.00	0.02	0.00	0.00	0.002	X	X	
75-35-4	1,1-Dichloroethene (Vinylidine Chloride)	96.94	0.20	99.6	0.00	0.00	0.00	0.00	0.000	X	X	
107-06-2	1,2-Dichloroethane (Ethylene Dichloride)	98.96	0.41	99.6	0.00	0.00	0.00	0.00	0.000	X	X	
78-87-5	1,2-Dichloropropane (Propylene Dichloride)	112.99	0.18	99.6	0.00	0.00	0.00	0.00	0.000	X	X	
107-13-1	Acrylonitrile	53.06	6.33	99.8	0.01	0.03	0.00	0.00	0.002	X	X	
71-43-2	Benzene	78	1.91	99.8	0.00	0.01	0.00	0.00	0.001	X	X	X
75-15-0	Carbon Disulfide	76.13	0.58	99.8	0.00	0.00	0.00	0.00	0.000	X	X	
56-23-5	Carbon Tetrachloride	153.84	0.004	99.6	0.00	0.00	0.00	0.00	0.000	X	X	X
463-58-1	Carbonyl Sulfide (Carbon Oxysulfide)	60.07	0.49	99.8	0.00	0.00	0.00	0.00	0.000	X	X	
108-90-7	Chlorobenzene	112.56	0.25	99.6	0.00	0.00	0.00	0.00	0.000	X	X	
75-00-3	Chloroethane (Ethyl Chloride)	64.52	1.25	99.6	0.00	0.01	0.00	0.00	0.001	X	X	
67-66-3	Chloroform	119.39	0.03	99.6	0.00	0.00	0.00	0.00	0.000	X	X	
106-46-7	Dichlorobenzene	147	0.21	99.6	0.00	0.00	0.00	0.00	0.000	X	X	
75-09-2	Dichloromethane (Methylene Chloride)	84.94	14.3	99.6	0.03	0.10	0.00	0.00	0.012	X		
75-18-3	Dimethyl Sulfide (Methyl Sulfide)	62.13	7.82	0.0	0.02	0.04	0.04	0.09	1.241		X	X
100-41-4	Ethylbenzene	106.16	4.61	99.8	0.01	0.04	0.00	0.00	0.002	X	X	
110-54-3	Hexane	86.18	6.57	99.8	0.01	0.05	0.00	0.00	0.003	X	X	
7783-06-4	Hydrogen Sulfide	34.08	35.5	0.0	0.07	0.10	0.10	0.23	3.089			X
7439-97-6	Mercury (total)	200.61	2.92E-04	0.0	0.00	0.00	0.00	0.00	0.000	X		
108-10-1	Methyl Isobutyl Ketone	100.16	7.09	99.8	0.01	0.06	0.00	0.00	0.004	X	X	
127-18-4	Perchloroethylene (Tetrachloroethylene)	165.83	3.73	99.6	0.01	0.05	0.00	0.00	0.006	X		
108-88-3	Toluene	92.13	39.3	99.8	0.08	0.31	0.00	0.00	0.018	X	X	
79-01-6	Trichloroethylene	131.4	2.82	99.6	0.01	0.03	0.00	0.00	0.004	X	X	
75-01-4	Vinyl Chloride	62.5	7.34	99.6	0.02	0.04	0.00	0.00	0.005	X	X	
1330-20-7	Xylenes	106.16	12.1	99.8	0.03	0.11	0.00	0.00	0.007	X	X	
67-63-0	2-Propanol	60.11	50.1	99.8	0.10	0.26	0.00	0.00	0.015		X	
75-27-4	Bromodichloromethane	163.83	3.13	99.8	0.01	0.04	0.00	0.00	0.003		X	
106-97-8	Butane	58.12	5.03	99.8	0.01	0.02	0.00	0.00	0.001		X	

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Attachment B - Emission Calculations
Sulfur Compound, HAP and HCl Supplemental Heater Emission Factors

CAS No.	VOC, HAP, or Sulfur Compound	MW	C_P (ppmv) [2]	AP-42 Control Efficiency (%)	Q_P (m^3/hr)	UM_P (kg/hr)	CM_P (kg/hr)	CM_P (lb/hr)	EF (lb/MMSCF)	HAP	VOC	Sulfur
74-87-3	Chloromethane	50.49	1.21	99.8	0.00	0.01	0.00	0.00	0.000	X	X	
75-34-4	Dichlorofluoromethane	102.92	2.62	99.8	0.01	0.02	0.00	0.00	0.001		X	
64-17-5	Ethanol	46.08	27.2	99.8	0.06	0.11	0.00	0.00	0.006		X	
75-08-1	Ethylmercaptan	62.13	2.28	99.8	0.00	0.01	0.00	0.00	0.001		X	X
106-93-4	Ethylene Dibromide	187.88	0.001	99.8	0.00	0.00	0.00	0.00	0.000	X	X	
78-93-3	Methyl Ethyl Ketone	72.11	7.09	99.8	0.01	0.04	0.00	0.00	0.003		X	
74-93-1	Methyl Mercaptan	48.11	2.49	99.8	0.01	0.01	0.00	0.00	0.001		X	X
109-66-0	Pentane	72.15	3.29	99.8	0.01	0.02	0.00	0.00	0.001		X	
74-98-6	Propane	44.09	11.1	99.8	0.02	0.04	0.00	0.00	0.002		X	
540-59-0	t-1,2-Dichloroethene	96.94	2.84	99.8	0.01	0.02	0.00	0.00	0.001		X	

Total VOC Emission Factor (excluding HCOH), lbs/MMSCF [3]	**1.33**
Total Sulfur Compounds Emission Factor, lbs/MMSCF [4]	**8.66**
Total HAP Emission Factor (excluding HCl), lbs/MMSCF [5],[6]	**0.07**

Notes:
(1) Calculation uses rated capacity of the supplemental heater.
(2) Concentrations published in AP-42 Section 2.4 Table 2.4-1 (Rev 11/98).
(3) VOC emission factor (excluding formaldehyde (HCOH), which is formed post-combustion) calculated using Equations (3), (4), and (5) from AP-42 Section 2.4 (Rev 11/98).
(4) Total sulfur compounds emissions factor calculated using Equations (7) and (8) from AP-42 Section 2.4 (Rev 11/98). Note that the total sulfur compounds emission factor includes a factor of 2.0 to account for the ratio of the molecular weight of SO_2 to the molecular weight of S, per AP-42.
(5) HAP emission factor calculated using Equations (3), (4), and (5) from AP-42 Section 2.4 (Rev 11/98).
(6) HCl emission factor calculated below.

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Sulfur Compound, HAP and HCl Supplemental Heater Emission Factors

HCl Emission Factor Calculation

Q_{CH4} = 1,039.2 m^3/hr (1)

Concentration of total Chloride Compounds (AP-42 Eqn (9)) (2)

Total concentration of chloride-containing HAPs, C_{Cl} (3) = 42.0 ppmv

Estimated Emission Rate of HCl (AP-42 Eqn (3) - Proposed 10/08)

Concentration of Methane, C_{CH4} = 0.50

$Q_{Cl} = 1/C_{CH4} \times Q_{CH4} \times C_{Cl} / 1x10^6$, in m^3/hr = 0.087 m^3/hr

Uncontrolled Mass Emissions of HCl (AP-42 Eqn (4))

$UM_{Cl} = Q_{Cl} \times [(MW_{Cl} \times 1\ atm)/(8.205\ x10^{-5}\ m3\text{-}atm/gmol\text{-}K)(1000\ g/kg)(273 + T\ K)]$

where Molecular weight of Cl, MW_{Cl} = 35.5 g/gmol

Temperature of LFG, T = 25 °C

UM_{Cl} = 0.127 kg/hr

Controlled Mass Emissions of HCl (AP-42 Eqn (10))

$CM_{HCl} = UM_{Cl} \times 1.03 \times (\eta cnt/100)$ =

1.03 = Ratio of molecular weight of HCl to molecular weight of Cl^-

ηcnt = control efficiency of NMOC by heater = 98 % destruction efficiency for NMOCs, per AP-42

CM_{HCl} = 0.128 kg/hr

0.282 lbs/hr

HCl emission factor:	3.84 lbs/MMSCF

Notes:

(1) Calculation uses rated capacity of the supplemental heater.

(2) HCl emission factor calculated using Equations (3), (4), (9) and (10) from AP-42 Section 2.4, Rev 11/98 and Rev 10/08 (Draft).

(3) Use a default value of 42.0 ppmv if site-specific data is unavailable, per AP-42 Section 2.4.

(4) Total HAPs emission factor includes Table 2.4-1 HAPs plus HCl.

Total HAP Emission Factor (including HCl), lbs/MMSCF (4)	3.92

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Sulfur Compound, HAP and HCl Supplemental Heater Emission Factors

CAS No.	Compound	Unit	2014 LFG Sample [1]	2015 LFG Samples [2]	2016 LFG Sample [3]	2017 LFG Sample [4]	Average (ppm)	Maximum (ppm)
7783-06-4	Hydrogen Sulfide	ppm v/v	210	250	140	390	248	**390**
624-92-0	Dimethyl Disulfide	ppm v/v	ND	ND	ND	0.46	0.46	**0.46**
75-18-3	Dimethyl Sulfide	ppm v/v	ND	ND	ND	6.6	6.60	**6.60**
74-93-1	Methyl Mercaptan	ppm v/v	ND	ND	ND	4.9	4.90	**4.90**
75-05-8	Acetonitrile	ppb v/v	160	ND	270	ND	0.22	**0.27**
71-43-2	Benzene	ppb v/v	960	1,400	1,500	1,500	1.34	**1.50**
107-06-2	1,2-Dichloroethane	ppb v/v	ND	190	230	ND	0.21	**0.23**
100-41-4	Ethylbenzene	ppb v/v	2,900	4,600	3,800	2,400	3.43	**4.60**
127-18-4	Tetrachloroethene	ppb v/v	ND	200	230	450	0.29	**0.45**
108-88-3	Toluene	ppb v/v	7,600	12,000	12,000	11,000	10.65	**12.00**
75-01-4	Vinyl chloride	ppb v/v	ND	180	160	ND	0.17	**0.18**

Notes:
(1) 2014 LFG Sample analysis conducted by TestAmerica. Sample collected on 10/23/2014.
(2) 2015 LFG Sample analyses conducted by TestAmerica. Samples collected on 10/29/2015 and 11/12/2015.
(3) 2016 LFG Sample analysis conducted by TestAmerica. Sample collected on 12/01/2016.
(4) 2017 LFG Sample analysis conducted by TestAmerica. Sample collected on 11/13/2017.
ND = Not Detected

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Sulfur Compound, HAP and HCl Supplemental Heater Emission Factors

Maximum pollutant concentrations obtained from analyses of annual 2014-2017 LFG samples taken at GCSL.
Emission factors calculated using US EPA AP-42 Section 2.4 Equations (3), (4), and (5) (Rev 11/98).

Heater Capacity [1]	36.70	MMBTU/hr
LFG Heating Value	500	BTU/SCF
LFG Throughput	2,078.5	m^3/hr
Q_{CH4} =	1,039.2	m^3/hr

CAS No.	VOC, HAP, or Sulfur Compound	MW	C_P (ppmv) [2]	AP-42 Control Efficiency (%)	Q_P (m^3/hr)	UM_P (kg/hr)	CM_P (kg/hr)	CM_P (lb/hr)	EF (lb/MMSCF)	HAP	VOC	Sulfur
7783-06-4	Hydrogen Sulfide	34.08	390	0.0	0.81	1.13	1.13	2.49	33.941			X
624-92-0	Dimethyl Disulfide	94.19	0.46	0.0	0.00	0.00	0.00	0.01	0.111		X	X
75-18-3	Dimethyl Sulfide	62.13	6.60	0.0	0.01	0.03	0.03	0.08	1.047		X	X
74-93-1	Methyl Mercaptan	48.11	4.90	0.0	0.01	0.02	0.02	0.04	0.602		X	X
75-05-8	Acetonitrile	41.05	0.27	99.8	0.00	0.00	0.00	0.00	0.000	X	X	
71-43-2	Benzene	78.11	1.50	99.8	0.00	0.01	0.00	0.00	0.001	X	X	
107-06-2	1,2-Dichloroethane	98.96	0.23	99.6	0.00	0.00	0.00	0.00	0.000	X	X	
100-41-4	Ethylbenzene	106.16	4.60	99.8	0.01	0.04	0.00	0.00	0.002	X	X	
127-18-4	Tetrachloroethene	165.83	0.45	99.6	0.00	0.01	0.00	0.00	0.001	X		
108-88-3	Toluene	92.13	12.00	99.8	0.02	0.09	0.00	0.00	0.006	X	X	
75-01-4	Vinyl chloride	62.50	0.18	99.6	0.00	0.00	0.00	0.00	0.000	X	X	

Total VOC Emission Factor (excluding HCOH), lbs/MMSCF [4]	**1.77**
Total Sulfur Compounds Emission Factor, lbs/MMSCF [5]	**35.70**
Total HAP Emission Factor (excluding HCl), lbs/MMSCF [6],[7]	**0.01**

Notes:
(1) Calculation uses rated capacity of the supplemental heater.
(2) Concentrations based on 2014-2017 annual LFG sample concentration maximums for GCSL as reported in Test America Lab Reports.
(3) Mercury concentration obtained from AP-42 Section 2.4 Table 2.4-1 (Rev 11/98), since annual LFG analysis does not include metals.
(4) VOC emission factor calculated using Equations (3), (4), and (5) from AP-42 Section 2.4 (Rev 11/98).
(5) Total sulfur compounds emissions factor calculated using Equations (7) and (8) from AP-42 Section 2.4 (Rev 11/98). Note that the total sulfur compounds emission factor includes a factor of 2.0 to account for the ratio of the molecular weight of SO_2 to the molecular weight of S, per AP-42.
(6) HAP emission factor calculated using Equations (3), (4), and (5) from AP-42 Section 2.4 (Rev 11/98).
(7) HCl emission factor calculated below.

Slate Belt Heat Recovery Center, LLC (SBHRC) - Biosolids Processing Facility
Air Quality Plan Approval Application
Attachment B - Emission Calculations
Sulfur Compound, HAP and HCl Supplemental Heater Emission Factors

HCl Emission Factor Calculation

Q_{CH4} = 1,039.2 m^3/hr (1)

Concentration of total Chloride Compounds (AP-42 Eqn (9)) (2)

Total concentration of chloride-containing HAPs, C_{Cl} (3) = 42.0 ppmv

Estimated Emission Rate of HCl (AP-42 Eqn (3) - Proposed 10/08)

Concentration of Methane, C_{CH4} = 0.50

$Q_{Cl} = 1/C_{CH4} \times Q_{CH4} \times C_{Cl}/ 1x10^6$, in m^3/hr = 0.087 m^3/hr

Uncontrolled Mass Emissions of HCl (AP-42 Eqn (4))

$UM_{Cl} = Q_{Cl} \times [(MW_{Cl} \times 1\ atm)/(8.205 \times 10^{-5}\ m3\text{-}atm/gmol\text{-}K)(1000\ g/kg)(273 + T\ K)]$

where lolecular weight of Cl, MW_{Cl} = 35.5 g/gmol

Temperature of LFG, T = 25 °C

UM_{Cl} = 0.127 kg/hr

Controlled Mass Emissions of HCl (AP-42 Eqn (10))

$CM_{HCl} = UM_{Cl} \times 1.03 \times (\eta cnt/100)$ =

1.03 = Ratio of molecular weight of HCl to molecular weight of Cl^-

ηcnt = control efficiency of NMOC by heater = 98 % destruction efficiency for NMOCs, per AP-42

CM_{HCl} = 0.128 kg/hr

0.282 lbs/hr

HCl emission factor:	3.84 lbs/MMSCF

Notes:

(1) Calculation uses rated capacity of the supplemental heater.

(2) HCl emission factor calculated using Equations (3), (4), (9) and (10) from AP-42 Section 2.4, Rev 11/98 and Rev 10/08 (Draft).

(3) Use a default value of 42.0 ppmv if site-specific data is unavailable, per AP-42 Section 2.4.

(4) Total HAPs emission factor includes site-specific HAPs plus mercury and HCl.

Total HAP Emission Factor (including HCl), lbs/MMSCF (4)	3.85

Slate Belt Heat Recovery Center, LLC (SBHRC) - Biosolids Processing Facility
Air Quality Plan Approval Application
Attachment B - Emission Calculations
Enclosed Product Storage and Conveyance Step Emissions [1]

Dryer Train Dust Loading Exhaust	4,031 SCFM
Cake Receiving Exhaust	4,038 SCFM
Product Storage and Conveyance Exhaust	751 SCFM
Maximum Operating Hours	8,760 hrs/yr

Process Step [1]	Exhaust Flow [2]		Loading	Potential Emissions [3]	
	(SCFM)	(m^3/hr)	(mg/m^3)	(lb/hr)	(tons/yr)
Dryer Train Dust Loading	4,031	6,848	20	0.302	1.32
Cake Receiving	4,038	6,861	20	0.302	1.32
Product Storage and Conveyance	751	1,276	180	0.506	2.22
Total	**8,820**	**14,985**	**220**	**1.111**	**4.87**

Notes:
(1) Dryer facility steps with potential for dust emissions as well as dust loading rates identified in the "Odor Control Design Approach and Criteria" Synagro Memo, for the Slate Belt Heat Recovery Center, dated February 15, 2018, from FSBU Engineering.
(2) Exhaust flows obtained from Haarslev Belt Dryer Mass/Energy Balance (Printed 01/22/2018). No moisture content has been included in the above calculations to provide a worst-case estimate of dust emissions.
(3) Dust loading, cake receiving, and product storage and conveyance will vent to a dust collector for dust control. The dust collector is expected to have a minimum control efficiency of 90%; however, no control efficiency has been applied in the above emission calculations to provide a worst-case potential emissions estimate.

Slate Belt Heat Recovery Center, LLC (SBHRC) - Biosolids Processing Facility
Air Quality Plan Approval Application
Attachment B - Emission Calculations
Vehicle, Site Input, and Road Travel Mileage Data

Table 1 - Vehicle and Site Input Data [1], [2]

Vehicle Type	Weight Unloaded (tons) W_{out}	Weight Loaded (tons) W_{in}	Mean Weight (tons) W_{avg}	Days/yr w/ 0.01" of prcpt/ (days) P	No. Paved Traffic Lanes n
Dump Trailer	20	40	30.00	130	2

Table 2 - Road Travel Mileage Input Data [3]

Vehicle Type	No. of Trucks/Day	No. of Days/Yr of Operation	Unpaved Inbound UPR (miles)	Unpaved Outbound UPR (miles)	Paved Inbound PR (miles)	Paved Outbound PR (miles)	Total Unpaved VMT [4] (miles/yr)	Total Paved VMT [5] (miles/yr)
Dump Trailer	50	365	0.25	0.25	0.5	0.5	9,125	18,250
						TOTAL	**9,125**	**18,250**

Notes:

(1) See U.S. EPA AP-42 Sections 13.2.1 Paved Roads (01/11) and 13.2.2 Unpaved Roads (11/06) for an explanation of each factor.
(2) Vehicle data (type, unloaded weight, and maximum loaded weight) estimated based on typical sludge haul truck carrying up to 20 tons of sludge per load. The following is an estimate of the vehicular traffic volume related to this application:

- Biosolid Vehicles: 20 inbound, 20 outbound, 40 total per day;
- Product Vehicles: 5 inbound, 5 outbound, 10 total per day;
- Employee and visitor: 10 inbound, 10 outbound, 20 total per day.

50 trucks per day for 400 WTPD plant) based on wastewater backhaul to offsite disposal by the biosolids vehicles, consistent with the General Permit Application submitted under separate cover. Please note employee and visitor vehicle miles are not included in above estimates. See Unpaved Roads and Paved Roads spreadsheets for more detail.
(3) Road mileages estimated from "400 WTPD Preliminary Site Plan" provided by Synagro. Assume trucks will travel 0.5 miles each way from main entrance off of Route 512. If trucks have to weigh-in at scale house, paved road length would be 2.75 miles round trip. Unpaved road length estimated to account for truck travel to unloading and loading areas.
(4) Total unpaved vehicle miles calculated as No. trucks/day x 365 days/yr x total unpaved road length (miles/truck) for a Vehicle Miles Traveled (VMT) factor in (miles/yr).
(5) Total paved vehicle miles calculated as No. trucks/day x 365 days/yr x total paved road length (miles/truck) for a Vehicle Miles Traveled (VMT) factor in (miles/yr).

Slate Belt Heat Recovery Center, LLC (SBHRC) - Biosolids Processing Facility

Air Quality Plan Approval Application

Attachment B - Emission Calculations

Unpaved Roadway Calculations

Unpaved Road Vehicles		Parameters [2]					Uncontrolled Emission Factor [6]	Controls			Extrapolated Emission Factor [10]	Potential Emissions [11],[12]	
Pollutant Type	(miles/yr)	Particle Size Multipliers [3]			(%)	(tons)	(lb/VMT)	(hrs/yr)	(hrs/yr)	(hrs/yr)	(lb/VMT)	(lb/hr)	(tons/yr)
	VMT [1]	k	a	b	s [4]	W [5]	E	P [7]	N [8]	DC [9]	E_{ext}		
PM	9,125	4.9	0.7	0.45	6.40	30.0	8.89	1,560	8,760	3,600	3.66	**36.55**	**16.68**
PM-10	9,125	1.5	0.9	0.45	6.40	30.0	2.40	1,560	8,760	3,600	0.99	**9.87**	**4.50**
PM-2.5	9,125	0.15	0.9	0.45	6.40	30.0	0.24	1,560	8,760	3,600	0.10	**0.99**	**0.45**

Notes:

(1) See "Vehicle, Site Input, and Road Travel Mileage Data" spreadsheet for estimate of average miles per year.

(2) Parameters are defined as follows:

k = particle size multiplier (lb/VMT)
a = particle size multiplier constant (dimensionless)
b = particle size multiplier constant (dimensionless)
s = surface material silt content (%)
W = mean vehicle weight (tons)

(3) The Particle Size Multiplier constants can be found in AP-42 Table 13.2.2-2 (Rev 11/06).

(4) The road surface silt loading value was taken as one-half of the mean value listed in AP-42 Section 13.2.1 Table 13.2-1.4. This is felt to be a conservative approach, based on the supporting data for silt loading values listed in the Background Document "Emission Factor Documentation for AP-42, Section 13.2.1, Attachment 3 - New Silt Loading Data Set Used to Develop Revised Default Silt Loading Values," (March 1993).

(5) Average of mean vehicle weights as shown in the spreadsheet "Vehicle, Site Input, and Road Travel Mileage Data."

(6) Emission factors are calculated as follows:

Emission Factor (lb/vehicle mile traveled): $E = k\,(s/12)^a \times (W/3)^b$

(7) P = 130 days per year with precipitation, as shown on the facility input table. Assume rainfall/precipitation occurs for roughly 12 hours on any day with measurable

(8) N = Maximum number of hours vehicular traffic occurs based on 8,760 hrs/yr.

(9) DC = Assume dust control (road wetting/wet suppression and/or sweeping) is performed for 50% of each operating day. Roads are not wetted during days with precipitation. The following formula was used for calculating DC: DC=(N-P)*0.50.

(10) Extrapolated emission factor accounts for actual hours of roadway travel, days of precipitation, and road wetting practices, as detailed below, where:

$E_{ext} = E^*(N-P-DC)/N$

(11) Hourly Emissions are calculated as follows: Emissions (lb/hr) = E (lb/vehicle mile traveled) x Vehicle Speed Limit (10 miles/hr for unpaved roads).

(12) Annual emissions are calculated as follows: Emissions (ton/yr) = E (lb/vehicle mile traveled) x VMT / 2,000 (lb/ton).

Slate Belt Heat Recovery Center, LLC (SBHRC) - Biosolids Processing Facility

Air Quality Plan Approval Application

Attachment B - Emission Calculations

Paved Roadway Calculations

Paved Road Vehicles		Parameters [2]			Emission Factor [6]	Uncontrolled Annual Emissions	Correction Terms			Uncontrolled Extrapolated Emission Factor [9]	Control Efficiency [10]	Controlled Extrapolated Emission Factor [11]	Potential Emissions [12],[13]	
Type	(mile/yr) VMT [1]	(lb/VMT) k [3]	(g/m^2) sL [4]	(tons) W [5]	(lb/VMT) E	(tons/yr)	(days/yr) P [7]	(days/yr) N [8]	(unitless) 1 - P/4N	(lb/VMT) $E_{ext\ (unc)}$	(%) CE	(lb/VMT) $E_{ext\ (ctr)}$	(lb/hr)	(tons/yr)
PM	18,250	0.011	8.2	30.0	2.40	21.87	130	365	0.91	2.18	50	1.09	**16.38**	**9.96**
PM-10	18,250	0.0022	8.2	30.0	0.48	4.37	130	365	0.91	0.44	50	0.22	**3.28**	**1.99**
PM-2.5	18,250	0.00054	8.2	30.0	0.12	1.07	130	365	0.91	0.11	50	0.05	**0.80**	**0.49**

Notes:

(1) See "Vehicle, Site Input, and Road Travel Mileage Data" spreadsheet for estimate of average miles per year.

(2) Parameters are defined as follows:

k = particle size multiplier (lb/VMT)

sL = silt loading (g/m^2)

W = mean vehicle weight (tons)

(3) The particle size multiplier can be found in AP-42 Table 13.2-1.1.

(4) The road surface silt loading value was taken as the mean value listed in AP-42 Table 13.2.13 for quarries, since a specific value is not listed for drying facilities.

(5) Average vehicle weight and mileage calculated based upon trucks that travel on paved roads.

(6) Emission factors are calculated as follows: Emission Factor (lb/vehicle mile traveled): $E = k \times (sL)^{0.91} \times (W)^{1.02}$

(7) P = 130 days per year with precipitation; this is the precipitation correction term as defined under AP-42 Equation (2).

(8) N = Maximum number of hours vehicular traffic occurs based on 8,760 hrs/yr.

(9) Uncontrolled extrapolated emissions factors calculated using Equation (2) from AP-42, Section 13.2.1, where $E_{ext\ (unc)} = E * (1-P/4N)$.

This equation expresses P and N on a "daily" basis.

(10) CE = control efficiency; assume a dust control efficiency of 50%.

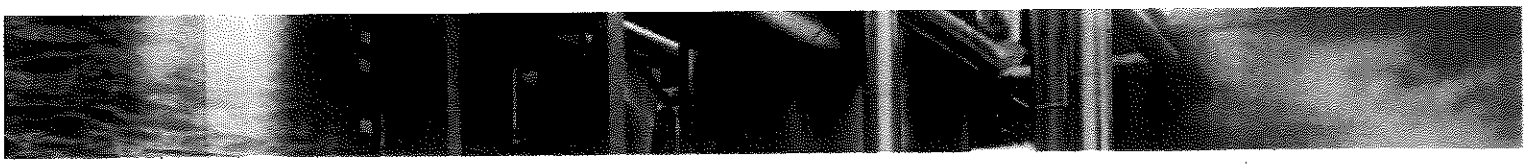
(11) Controlled extrapolated emission factors calculated as follows: $E_{ext\ (ctr)} = (100\% - CE\%/100\%) * E_{ext\ unc}$

(12) Hourly Emissions are calculated as follows: Emissions (lb/hr) = E (lb/vehicle mile traveled) x Vehicle Speed Limit (15 miles/hr for paved roads).

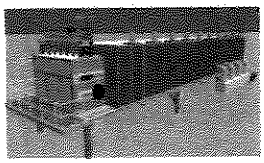
(13) Emissions are calculated as follows: Emissions (ton/yr) = E (lb/vehicle mile traveled) x VMT / 2,000 (lb/ton).

ATTACHMENT C

MANUFACTURER'S LITERATURE



DRYER SYSTEMS FOR
- SLUDGE
- DIGESTATE
- WOOD CHIPS
- BIOMASS



Belt Dryer
Disc Dryer
Rotary Drum Dryer
Hybrid Dryer System

HAARSLEV
INDUSTRIES

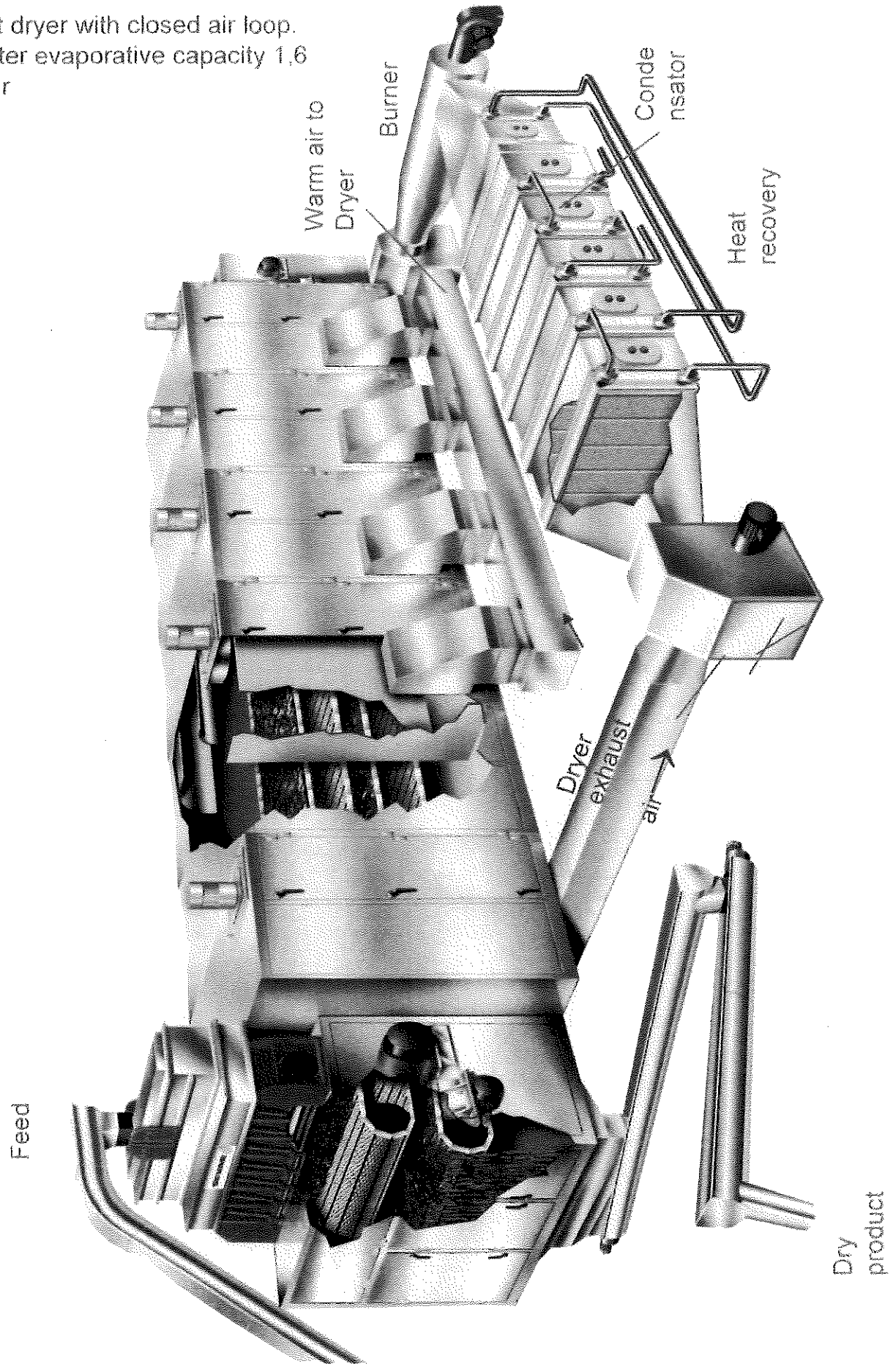
Web: www.haarslev.com

email: info@haarslev.com

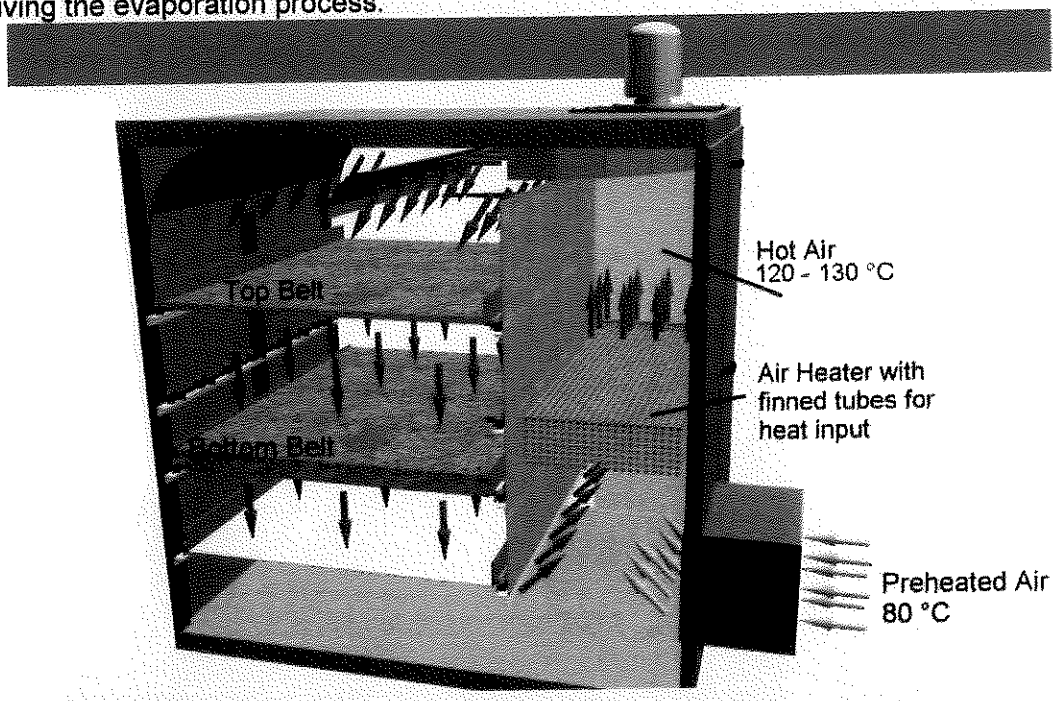
Belt Dryer BT3000

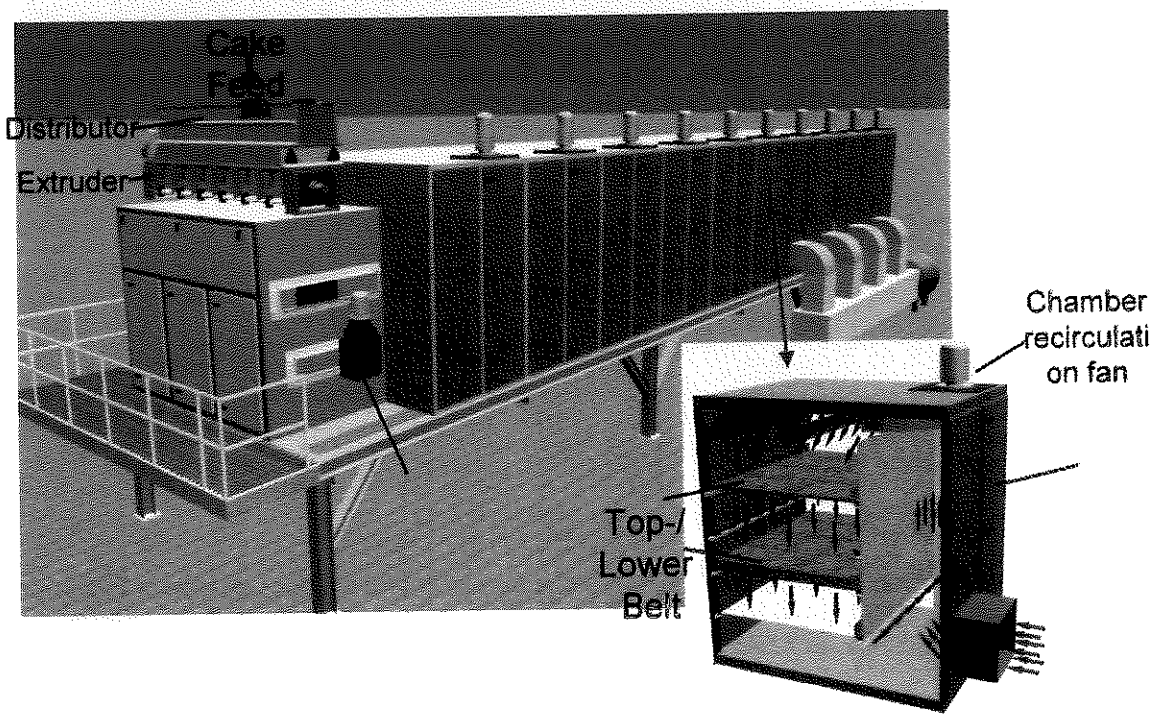
HAARSLEV INDUSTRIES

Belt dryer with closed air loop.
Water evaporative capacity 1,6 to/hr



A stainless steel plate belt with slot holes is used as the transport belt in the drier. Due to smooth transportation, dust production is prevented by avoiding any mechanical treatment of the material against itself or against parts of the drier.
As the material passes through succesive chambers, the gas temperature progressively increases (130°C), heating up the material to the desired temperature (appr. 80°C) and driving the evaporation process.



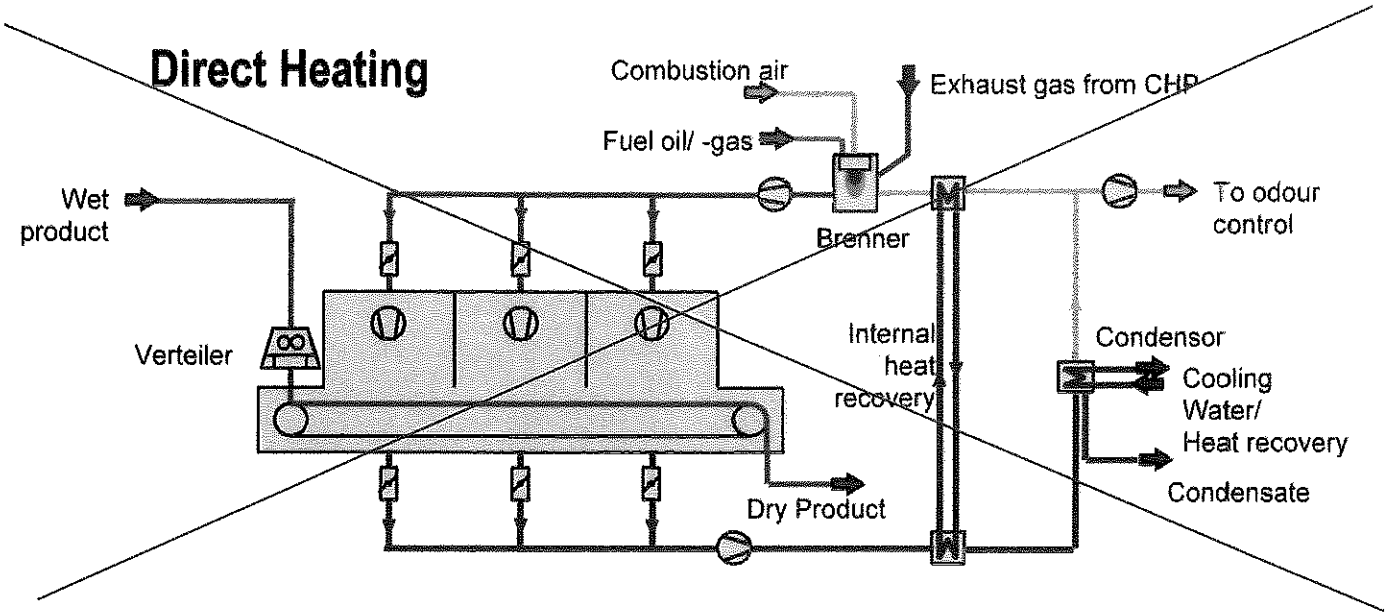


DRYER HEATING

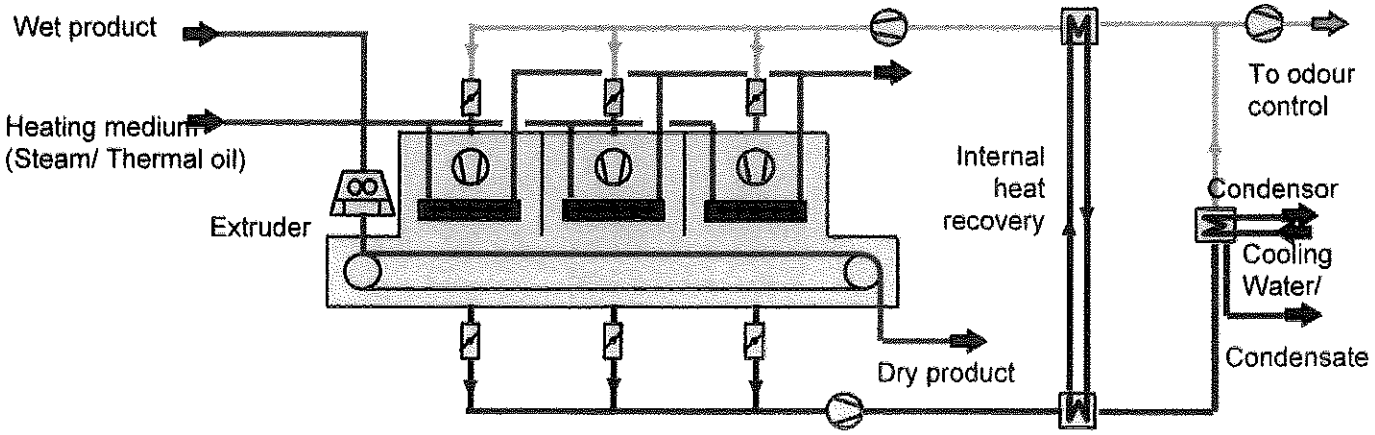
Standard design: Flow sheet with closed gas loop

The Haarslev Belt Dryer is a direct fired, single-pass or double-pass belt drier. The feed product is fed into the drier continuously to a distribution hopper providing even distribution across the belt.
Bulk products and fiberous materials can be placed direct from the distribution hopper onto the dryer belt.
Pasty products like sludge need to be press to a granular shape by a roller or swivel press and drop down onto the top belt of the drier in a uniform pile.

Direct Heating



Indirect Heating



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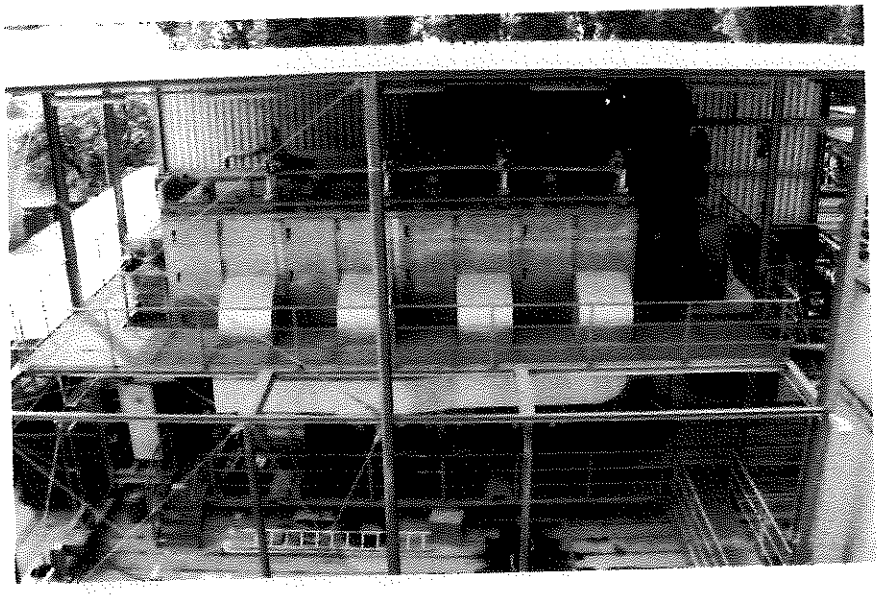
References

Drying Plant Lahnstein



Client:	**Chemische Fabriken Zschimmer und Schwarz**
Location:	**Lahnstein, Germany**
Dryer typ:	**BT 2500/4**
Heating:	**Indirect, steam heated (6 bar)**
Water evaporation	**900 kg/h**
Product:	**Industrial sludge (Belt filter press)**
Input:	**18 - 20 % DS-Content**
Output:	**90 % DS-Content**
Use of endproduct:	**Incineration**

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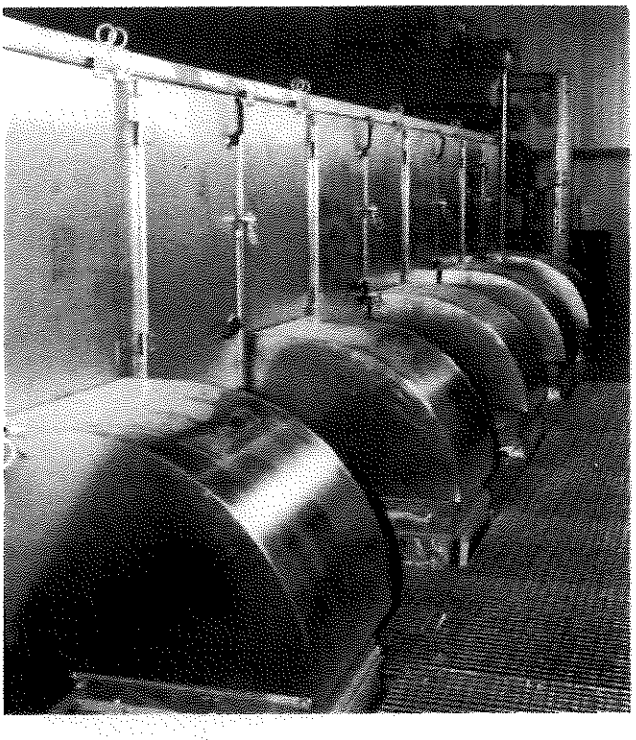
References

Sewage Treatment Works Mainz



Client:	WWTW Mainz
Location:	Mainz, Germany
Dryer Type:	BT 2500/9
Heating:	Direct, with Biogas/ Exhaust gas from CHP
Water evaporation:	2000 kg/h
Throughput:	3,5 to/hr
Product:	Sewage sludge (centrifuge)

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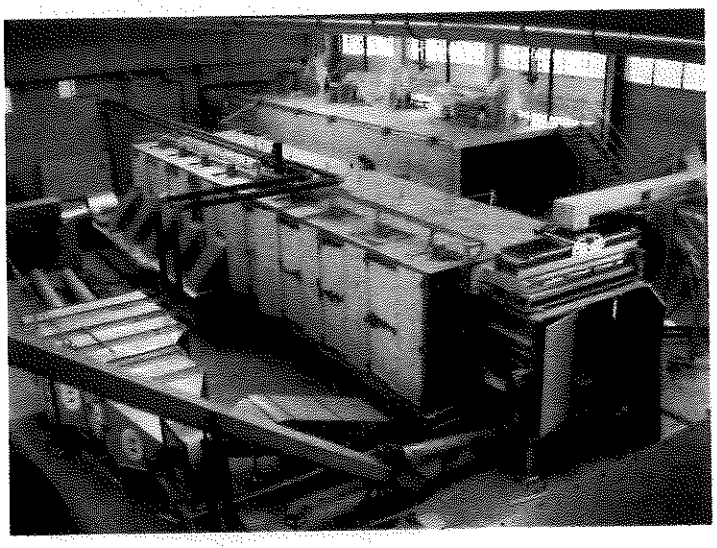
References

MBA- Deiderode

Belt dryer for Digestate



Client:	Abfallzweckverband Südniedersachsen
Location:	Göttingen/ Friedland
Dryer type:	BT 3000/9
Heating:	Exhaust gas from CHP, Energy backup by Biogas-Burners
Throughput:	4,5 to/hr
Water evaporation:	2,5 to//hr
Product:	Digestate from MBA, dewatered by centrifuge, 30 % DS

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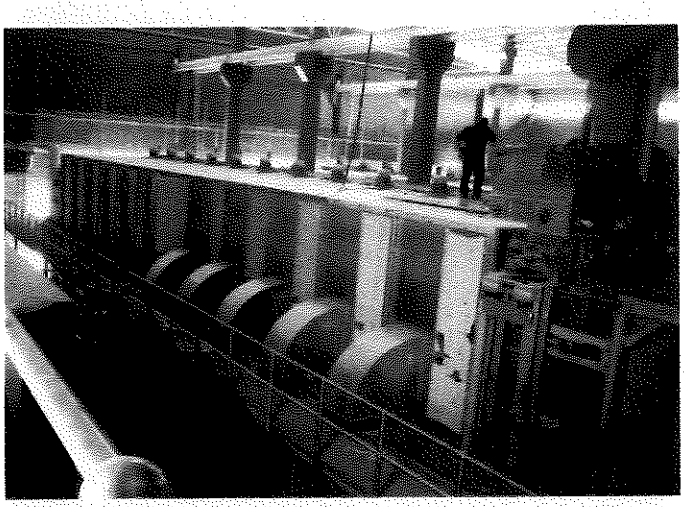
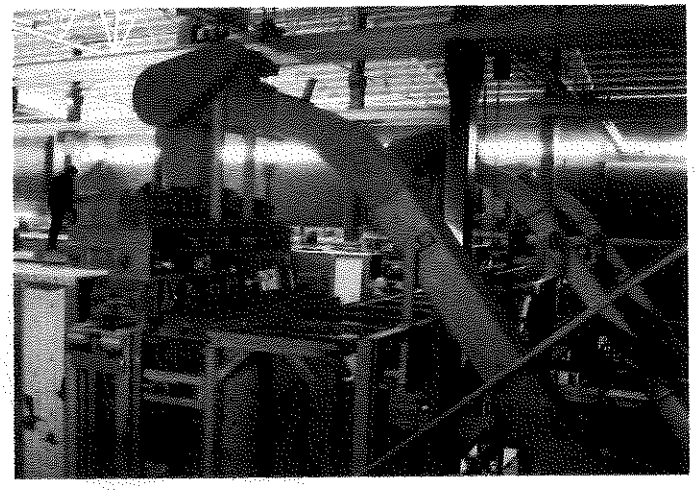
References

Drying Plant Dubai





Client:	Enpure Ltd, (UK)
Location:	Dubai (Jebel Ali)
Year of installation	2009
Dryer Type	BT 3000/12, 3 Lines
Heating	Direct (Biogas Burner)
Throughput	13000 kg/h
Water evaporation:	10500 kg/h
Feed:	Dewatered municipal sludge (ca. 22 % DS)

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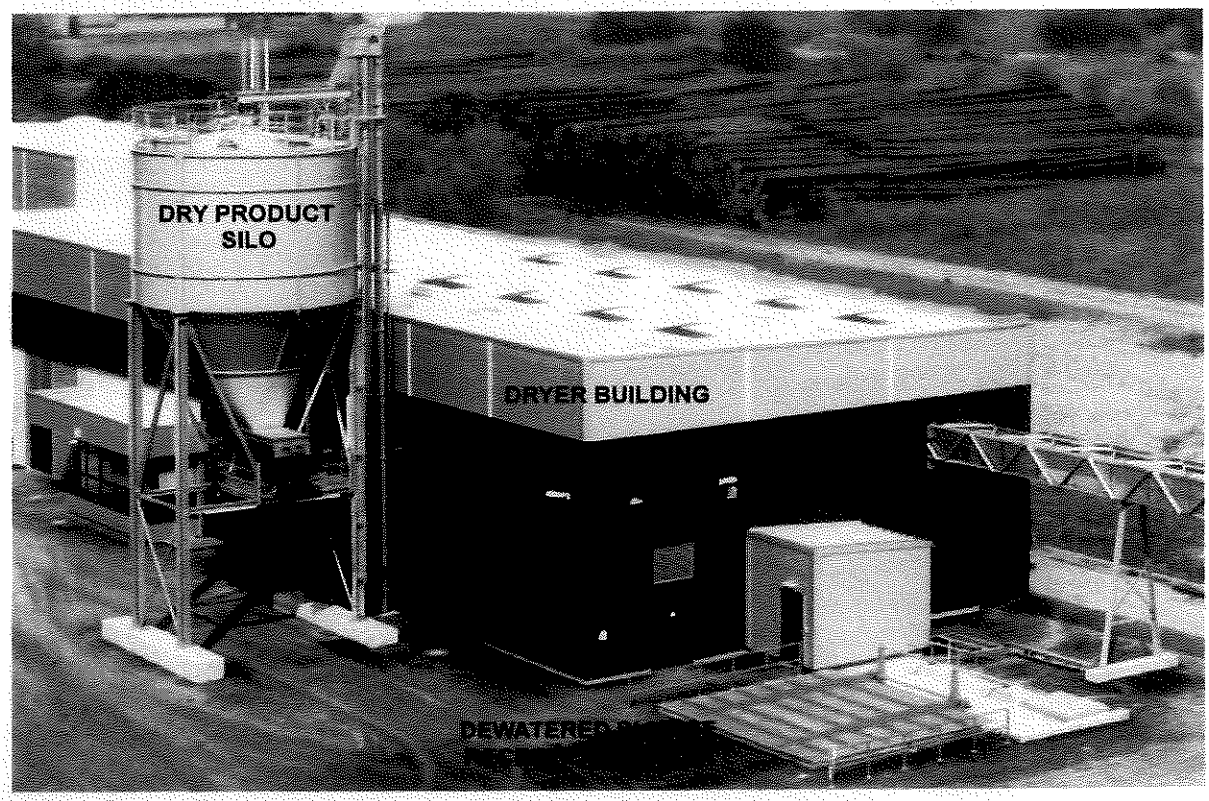
References

Albstadt, Germany, Belt Dryer heated with Waste Heat from ORC Turbine Process



Client:	KVA Albstadt GmbH
Location:	Albstadt, Ebingen
Year of constructon:	2011
Dryer Type:	BT 3000/6
Type of heating:	Indirect heating with hot water 85 °C from ORC turbine process
Input:	Dewatered sludge 1500 kg/h (ca. 30 % DS)
Water evaporation rate:	1000 kg/h

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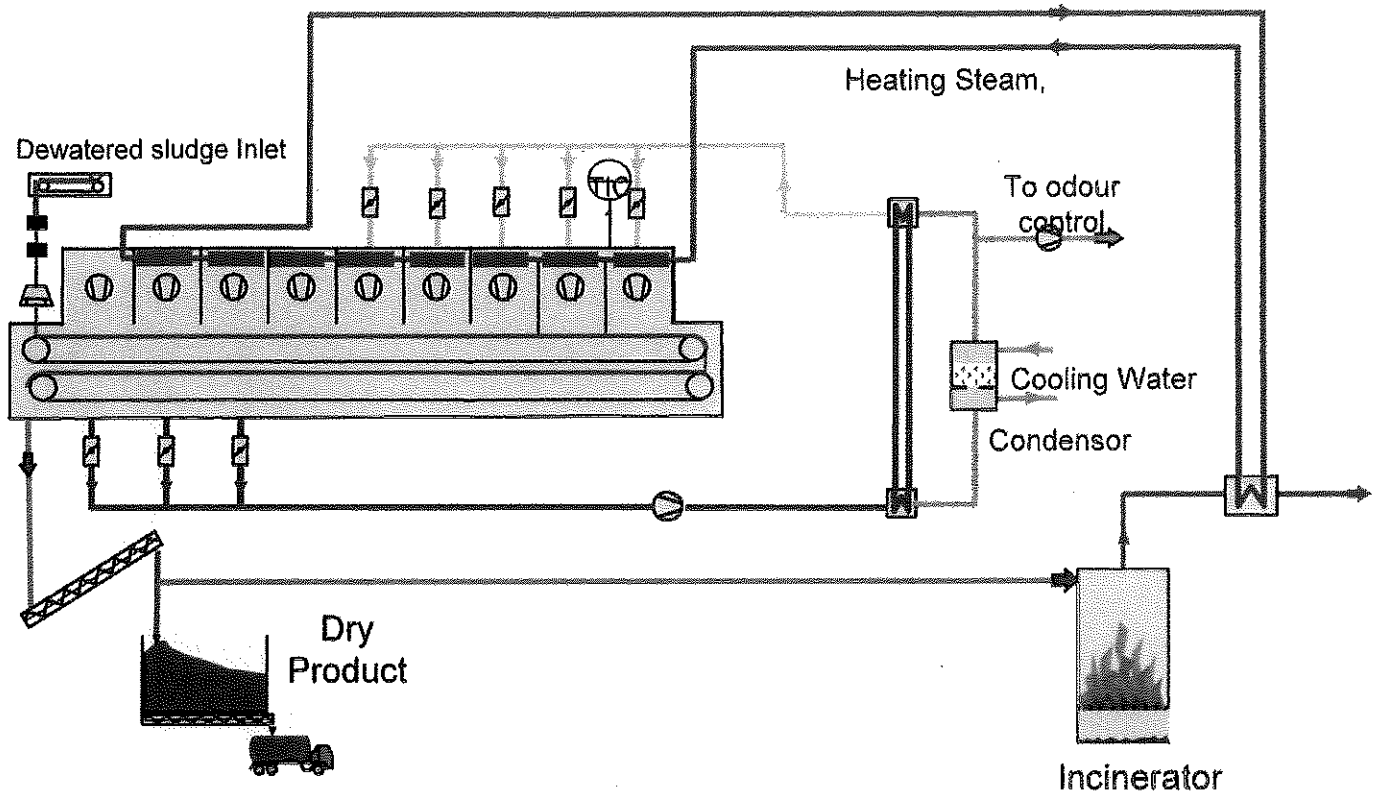
References

Belt Dryer with Incinterator , Antalya



Location:	Türkler Waste Water Treatment Plant, Antalya, Turkey
Year of constructon:	2012
Dryer Type:	BT 3000/10
Incinerator Type	Michaelis, Moved Bed
Type of heating:	Indirect Steam, 8 bar Burner for supplementary heat
Input:	Dewatered Sludge (ca.25 % DS)
Water evaporation rate:	2700 kg/h

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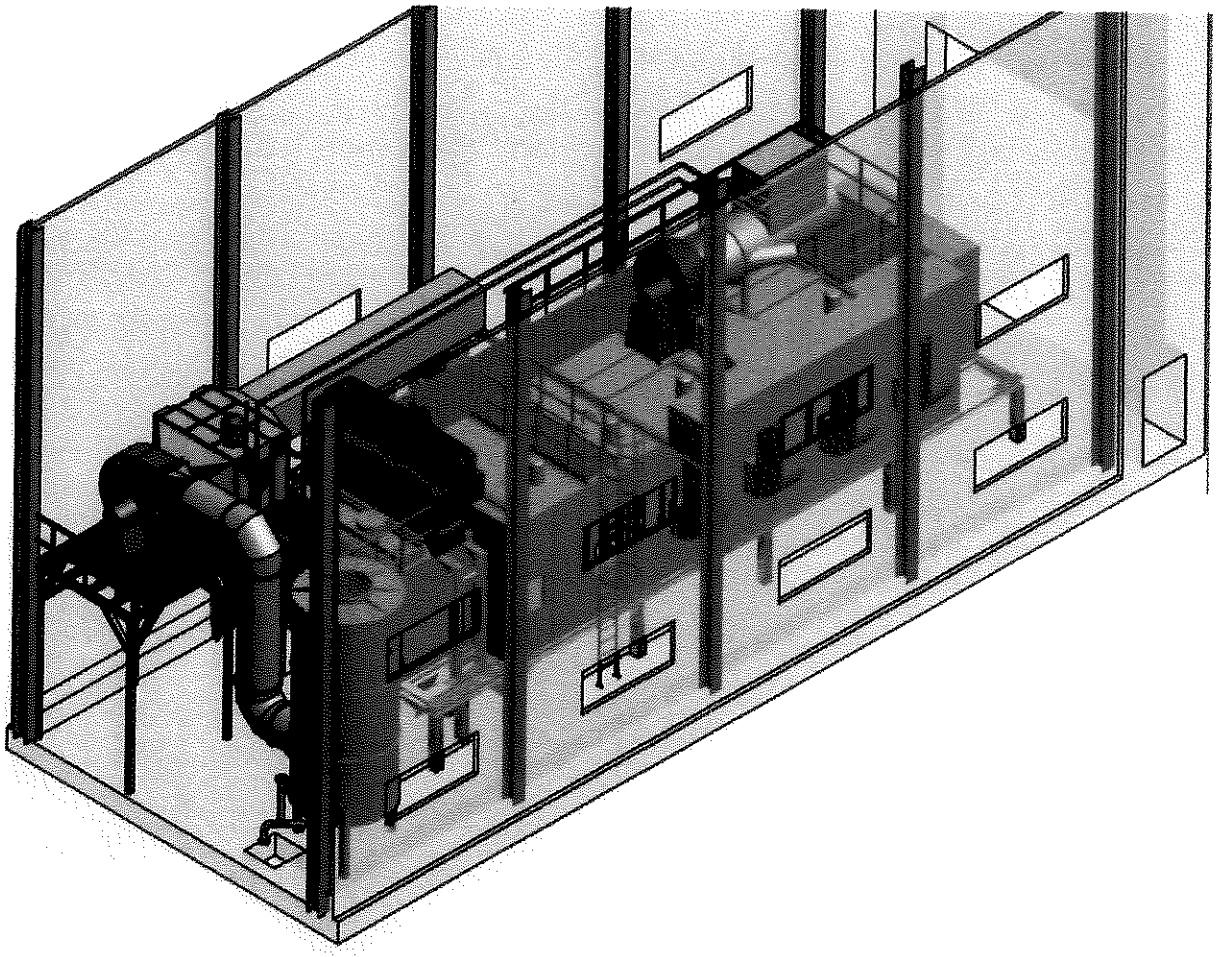
References

Belt Dryer in Anwil, Poland



Location:	Anwil, Wloclawek
Year of constructon:	2012
Dryer Type:	BT 3000/6
Type of heating:	Direct Heating, Exhaust Gas from Cogeneration and Burner for supplementary heat
Input:	Dewatered Sludge (ca. 20 % DS)
Water evaporation rate:	1000 kg/h

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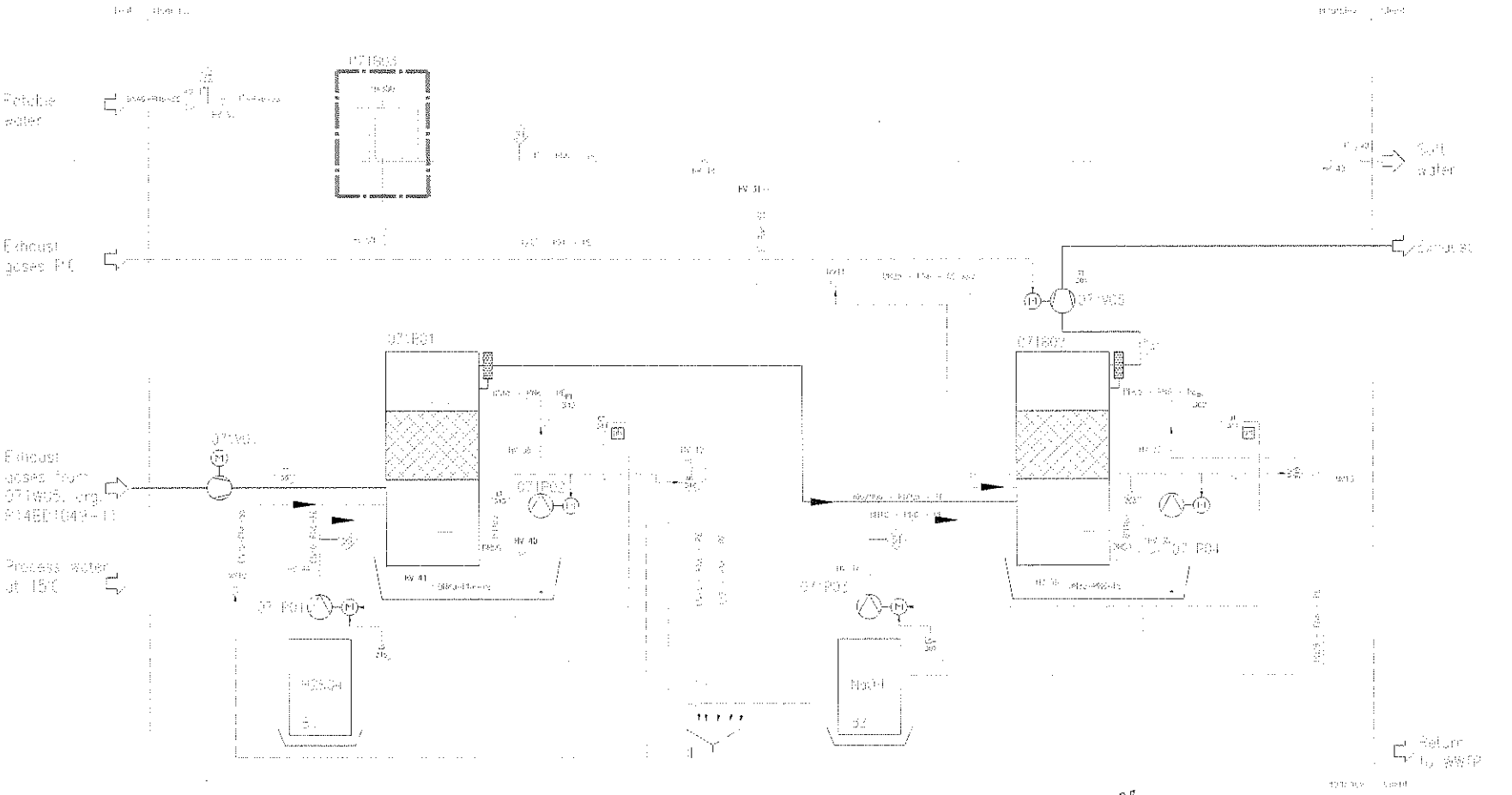

PRELIMINARY

SYNAGRO Technologies Inc.
Acid and Caustic Scrubbers – Odour Treatment Area

Karlsruhe-Germany

P14BD1049–13 - 0

A2

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Schutzvermerk DIN 34