

217/782-2113

CONSTRUCTION PERMIT - NESHAP SOURCE - NSPS SOURCE

PERMITTEE

North Shore Sanitary District
Attn: Brian Jensen
Wm. Koepsel Drive
Gurnee, Illinois 60031

<u>Application No.:</u> 01040045	<u>I.D. No.:</u> 097190ABI
<u>Applicant's Designation:</u> 010328MELT	<u>Date Received:</u> April 12, 2001
<u>Subject:</u> Sludge Dryer, Melter	
<u>Date Issued:</u> March 11, 2002	
<u>Location:</u> Dahringer Road, Waukegan	

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of a sludge processing facility, including a sludge receiving and storage area (bins, silos) controlled by two stage packed tower scrubbers, drying process (sludge dryer, double cyclone, condensers, dry granulate silo, truck loadout) controlled by two stage packed tower scrubbers, melting process controlled by a filter and scrubber/condenser, auxiliary heater equipped with low-NO_x burner technology, and associated equipment as described in the above-referenced application. This Permit is subject to standard conditions attached hereto and the following special condition(s):

1.0 Unit Specific Conditions

1.1 Unit: Sludge Processing Facility
Control: Scrubbers, Filters, Condenser

1.1.1 Description

Wet sludge will be delivered by truck and dumped into one of two receiving pits within an enclosed building. Additional sludge will be pumped directly into the wet sludge silo. The wet sludge will be conveyed from the pit to one of two wet sludge silos for storage until reclaimed for processing.

The sludge dryer is designed to yield a dried granulate of approximately 5% moisture. The dryer is heated indirectly, via a hot oil heat recovery loop from the melter. The dryer exhaust will be routed through a condenser and vented into the dry granulate silo. Dry granulate will be conveyed from the dryer, through a cooler, to a silo. The dry granulate silo will be vented to the odor control scrubber.

Dry granulate is drawn from the dry granulate silo, through a surge hopper, and into the melter. Oxygen is supplied from the air separation unit to support combustion. In the melter, the combustible fraction of the dry granulate burns, while the mineral portion forms molten glass. The glass flows through a drain port where it drops into a quench tank, forming the glass aggregate product. The melter exhaust gas passes through a heat exchanger where recovered energy heats an oil transfer fluid which is used to heat the sludge dryer. After the heat recovery unit, the exhaust passes through particulate and SO₂ emission control devices.

1.1.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Emission Control Equipment
Handling Process	Sludge Receiving and Storage Area (Bins, Silos)	Two stage packed tower scrubbers
Drying Process	Sludge Dryer, Double Cyclone, Condensers, Dry Granulate Silo, Truck Loadout	Two stage packed tower scrubbers
Melting Process	Melter	Filter and Scrubber/ Condenser
Auxiliary Heater	Auxiliary Heater	Low-NO _x Burner

1.1.3 Applicability Provisions and Applicable Regulations

- a. The auxiliary heater, which has a maximum design heat input capacity between 10 million Btu/hr and 100 million Btu/hr, is subject to the NSPS for Small Industrial-Commercial Institutional Steam Generating Units, 40 CFR 60 Subparts A and Dc, because the construction commenced after June 9, 1989. The Illinois EPA administers the NSPS for subject sources in Illinois pursuant to a delegation agreement with the USEPA. Because the auxiliary heater only burns natural gas it is only subject to the following requirements under the NSPS:

The Permittee shall maintain records of the amount of fuel combusted by the auxiliary heater during each day [40 CFR 60.48c(g)].

- b. i. The melter is subject to the NESHAP for Mercury, 40 CFR 61 Subparts A and E. The Permittee must comply with all applicable requirements of this NESHAP.

Note: The mercury emissions of the melter are limited by this permit to a level well below that allowed by the NESHAP, (refer to Condition 1.1.6(a)), and

- ii. The melting process shall comply with the requirements in the National Emission Standards for Beryllium, 40 CFR Part 61, Subpart C, pursuant to 40 CFR 503.43, under the Clean Water Act.

1.1.4 Non-Applicability of Regulations of Concern

- a. This permit is issued based on the melting process not being subject to the New Source Performance Standards (NSPS) for Glass Manufacturing Plants, 40 CFR Part 60, Subpart CC.
- b. This permit is issued based on the sludge dryer not being subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Mercury, 40 CFR Part 61, Subpart E, because the sludge dryer is heated indirectly.

1.1.5 Operational Limits and Control Requirements

- a. The sludge dryer shall be heated indirectly, via a hot oil heat recovery loop from the melter or auxiliary heater. Accordingly, no combustion emissions will be associated from the dryer.
- b. The melter shall utilize an oxygen-rich combustion process via an air separation unit. The melting process shall be operated and maintained to ensure proper oxygen supply to the melter.

Note: The approach of using oxygen versus air to support combustion reduces nitrogen oxides (NO_x) emissions because the nitrogen (in air) is effectively stripped out. The air separation unit is electrically driven.

- c. The auxiliary heater shall be equipped, operated, and maintained with a low NO_x burner. The burner shall be operated and maintained in conformance with good air pollution control practices.
- d. i. Production rate of the drying process shall not exceed 20,000 pounds wet sludge per hour (daily average).

- ii. Production rate of the melting process shall not exceed 3,160 pounds dry sludge per hour (daily average).
- iii. The maximum firing rate of the auxiliary heater shall not exceed 20 mmBtu/hr.
- e. The average daily concentration of lead and arsenic, cadmium, chromium and nickel in the sewage sludge fed to the melter shall not exceed pollutant limits for the sludge established using the methodology of 40 CFR 503.43(c) and (d).
- f. The melting process shall be operated to comply with the applicable operational standards for total hydrocarbons as specified in 40 CFR 503.44.

1.1.6 Emission Limitations

- a. Emissions of volatile organic material (VOM), particulate matter (PM), nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂), and mercury from the melting process shall not exceed the following limits:

<u>Pollutant</u>	<u>Emissions</u>	
	<u>(Lb/Hr)</u>	<u>(Ton/Yr)</u>
VOM	0.28	1.25
PM	0.51	2.25
NO _x	19.55	85.61
CO	0.49	2.15
SO ₂	7.58	33.22
Mercury	0.011	0.046

- b. Emissions from the auxiliary heater shall not exceed the following limits:

<u>Pollutant</u>	<u>Emissions</u>	
	<u>(Lb/Hr)</u>	<u>(Ton/Yr)</u>
VOM	0.11	0.48
PM	0.15	0.67
NO _x	2.00	8.76
CO	1.68	7.36
SO ₂	0.01	0.05

- c. Emissions from the sludge receiving and storage area (bins, silos) and the drying process (sludge dryer, double cyclone, condensers, dry granulate silo, truck loadout) all controlled by two stage packed tower scrubbers shall not exceed the following limits:

<u>Pollutant</u>	<u>Emissions</u>	
	<u>(Lb/Hr)</u>	<u>(Ton/Yr)</u>
VOM	1.65	7.22
PM	0.30	1.30
NO _x	0.16	0.72
CO	0.40	1.73

- d. Compliance with the annual limits in this permit shall be determined from a running total of 12 months of data.
- e. The emission limitations of this permit effectively limit the potential emissions of air pollutants from the facility to less than major source thresholds (i.e., nitrogen oxides to less than 100 tons per year, individual hazardous air pollutants to less than 10 tons per year, and a combination of hazardous air pollutants to less than 25 tons per year). As a result, the facility is excluded from the requirements to obtain a Clean Air Act Permit Program (CAAPP) permit.

1.1.7 Testing Requirements

a. Emissions Testing

- i. Within 90 days of initial startup, the particulate matter emissions from each stack and the emissions of nitrogen oxides, mercury and metals from the melter process shall be measured by an approved testing service at the Permittee's expense while operating at a maximum throughput during conditions that are representative of maximum emissions.
- ii. The following methods and procedures shall be used for testing of particulate matter, nitrogen oxides, metals and mercury emissions, unless another USEPA Method is approved by the Illinois EPA: Refer to 40 CFR 60, Appendix A, and 40 CFR 61, Appendix B, for USEPA test methods.

Location of Sample Points:	USEPA Method 1
Gas Flow and Velocity:	USEPA Method 2
Flue Gas Weight:	USEPA Method 3
Moisture:	USEPA Method 4
Particulate Matter	USEPA Method 5
Nitrogen Oxides	USEPA Method 7
Mercury	USEPA Method 101A
Metals	USEPA Method 29

iii. Additional emission testing shall be conducted upon a reasonable request by the Illinois EPA.

b. Sludge Sampling

i. The Permittee shall comply with the sludge sampling requirements of the NESHAP for mercury emissions (40 CFR 61.54). If the amount of mercury in the sludge exceeds 0.046 tons/year, an emission test for mercury from the drying process shall also be performed.

ii. The Permittee shall comply with the applicable sludge monitoring requirements specified in 40 CFR 503.46(a).

c. Air Dispersion Modeling and Emission Testing

The Permittee shall comply with the requirements for air dispersion modeling and emission testing specified in 40 CFR 503.43(e), as necessary to establish pollutant limits for the sludge for purposes of Condition 1.1.5(e).

1.1.8 Monitoring Requirements

a. The Permittee shall maintain an operating and maintenance log for each air pollution control system within the sludge processing facility.

b. i. The Permittee shall measure and record the pressure drop of the melter filter system on at least a daily basis.

ii. The Permittee shall monitor the following information for the packed tower odor scrubber system (C-01):

A. Scrubbant flow rate (gallons/minute); and

B. Gas flow rate through the control system (acfm).

iii. The Permittee shall monitor the following information for the melter scrubber system (C-04):

A. Scrubbant flow rate (gallons/minute); and

B. Pressure drop across the scrubber.

c. Unless the Permittee notifies the Illinois EPA that it will be conducting monitoring for total

hydrocarbons in accordance with Condition 1.1.7(d), below, emissions monitoring shall be conducted as follows, provided however that this emissions monitoring may be waived by the Illinois EPA and the demonstrated performance of the melter as monitored for no less than two years shows consistent compliance with Condition 1.1.8(c)(ii):

- i. The exit gas from the melter stack shall be monitored continuously for carbon monoxide, oxygen content and moisture.
 - ii. The monthly average concentration of carbon monoxide in the exit gas from the melter stack, corrected for zero percent moisture and to seven percent oxygen, shall not exceed 100 parts per million on a volumetric basis.
 - iii. The Permittee shall retain the following information for five years:
 - A. The carbon monoxide concentrations in the exit gas; and
 - B. A calibration and maintenance log for the instrument used to measure the carbon monoxide concentration.
 - iii. The Permittee shall promptly report to the Illinois EPA following the end of each calendar year the monthly average carbon monoxide concentrations in the exit gas.
- d. The Permittee has the option of complying with Condition 1.1.8(d), rather than Condition 1.1.8(c) as provided in 40 CFR 503.40(c):
- i. The Permittee shall install, calibrate, operate, and maintain an instrument that continuously measures and records the total hydrocarbons concentration in the melter stack exit gas [40 CFR 503.45(a)(1)].
 - ii. The total hydrocarbons instrument shall employ a flame ionization detector; shall have a heated sampling line maintained at a temperature of 150 degrees Celsius or higher at all times; and shall be calibrated at least once every 24-hour operating period using propane.
 - iii. The total hydrocarbons concentration and oxygen concentration in the exit gas from the

melter stack, the information used to measure moisture content in the exit gas, and the combustion temperatures for the melter shall be monitored continuously.

- iv. The Permittee shall maintain records of the following:
 - A. The total hydrocarbons concentrations in the exit gas from the melter stack.
 - B. A calibration and maintenance log for the instruments used to measure the total hydrocarbons concentration and oxygen concentration in the exit gas from the melter stack, the information needed to determine moisture content in the exit gas, and the combustion temperatures.

1.1.9 Recordkeeping Requirements

- a. The Permittee shall keep documentation indicating the maximum firing rate of the auxiliary heater.
- b. The Permittee shall maintain the following operational records:
 - i. Type of scrubbant used in the scrubber systems;
 - ii. Production rate for the drying process (lb wet sludge/hr, daily average);
 - iii. Production rate for the melting process (lb dry sludge/hr, daily average); and
 - iv. The operating combustion temperatures for the melter.
- c. The Permittee shall maintain records of the NO_x, CO, VOM, SO₂, PM, and mercury emissions (tons/month and tons/year) based on emission factors and control performance demonstrated by emission testing in accordance with Condition 1.1.7, monitoring data collected pursuant to Condition 1.1.8, and other operating records, with supporting calculations.
- d. The Permittee shall comply with the applicable recordkeeping requirements specified in 40 CFR 503.47.

1.1.10 Reporting Requirements

- a. The Permittee shall notify the Illinois EPA, Compliance Section, within 30 days, of noncompliance of the sludge processing facility with the permit requirements as follows. Reports shall describe the probable cause of such deviations, and any corrective actions or preventive measures taken.
- b. Notification of Startup: The Permittee shall furnish the Illinois EPA with written notification as follows:
 - i. A notification of the anticipated date of initial startup of the melting process not more than 60 days nor less than 30 days before that date.
 - ii. A notification of the actual date of initial startup of the melting process within 15 days after that date.
- c. At least 60 days prior to the actual date of testing, a written test plan shall be submitted to the Illinois EPA for review. This plan shall describe the specific procedures for testing, including as a minimum:
 - i. The person(s) who will be performing sampling and analysis and their experience with similar tests.
 - ii. The specific conditions under which testing will be performed, including a discussion of why these conditions will be representative of maximum throughput and maximum emissions and the means by which the operating parameters for the emission unit and any control equipment will be determined.
 - iii. The specific determinations of emissions and operation that are intended to be made, including sampling and monitoring locations.
 - iv. The test method(s) that will be used, with the specific analysis method, if the method can be used with different analysis methods.
 - v. Any minor changes in standard methodology proposed to accommodate the specific circumstances of testing, with justification.

- vi. The format and content of the Source Test Report.
- d. The Illinois EPA shall be notified prior to these tests to enable the Illinois EPA to observe these tests. Notification of the expected date of testing shall be submitted a minimum of thirty days prior to the expected date. Notification of the actual date and expected time of testing shall be submitted a minimum of five working days prior to the actual date of the test. The Illinois EPA may at its discretion accept notifications with shorter advance notice provided that the Illinois EPA will not accept such notifications if it interferes with the Illinois EPA's ability to observe testing.
- e. Copies of the Final Report(s) for these tests shall be submitted to the Illinois EPA within 45 days after the test results are compiled and finalized. The Final Report shall include as a minimum:
 - i. A summary of results
 - ii. General information
 - iii. Description of test method(s), including description of sampling points, sampling train, analysis equipment, and test schedule
 - iv. Detailed description of test conditions, including
 - A. Process information, i.e., mode(s) of operation, process rate, e.g. fuel or raw material consumption
 - B. Control equipment information, i.e., equipment condition and operating parameters during testing, and
 - C. A discussion of any preparatory actions taken, i.e., inspections, maintenance and repair
 - v. Data and calculations, including copies of all raw data sheets and records of laboratory analyses, sample calculations, and data on equipment calibration
 - vi. An explanation of any discrepancies among individual tests or anomalous data

- f. Two copies of reports and notifications required by this permit concerning equipment operation or repairs, performance testing or a continuous monitoring system shall be sent to:

Illinois Environmental Protection Agency
Division of Air Pollution Control
Compliance Section (#40)
P.O. Box 19276
Springfield, Illinois 62794-9276

and one copy shall be sent to the Illinois EPA's regional office at the following address unless otherwise indicated:

Illinois Environmental Protection Agency
Division of Air Pollution Control
9511 West Harrison
Des Plaines, Illinois 60016

- g. The Permittee shall promptly submit to the Illinois EPA following the end of each calendar year the information specified in 40 CFR 503.47(b) through 40 CFR 503.47(h).

1.1.11 Compliance Procedures

Compliance with the emission limits established in Condition 1.1.6 shall be based on the recordkeeping requirements in Condition 1.1.9 and emission factor based calculations. For particulate calculations, site-specific emission factors derived from the stack tests required by Condition 1.1.7 shall be used.

- 2a. This permit for the above referenced project does not relieve the Permittee from responsibility to comply with all Local, State and Federal Regulations which are a part of the applicable Illinois State Implementation Plan, as well as all other applicable Federal, State and Local requirements.
- b. In particulate, this permit does not relieve the Permittee from the responsibility to carry out practices during the construction and operation of the plant, such as application of water or dust suppressant to unpaved traffic areas, to minimize fugitive dust and prevent an air pollution nuisance from fugitive dust, as prohibited by 35 IAC 201.141.
- 3. Operation of the sludge processing facility is allowed under this construction permit for a period of 365 days, during which period shakedown of equipment and emissions testing shall be performed. This period shall begin when sludge is first dried by the facility. This condition supersedes Standard Condition 6b.

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If you have any questions on this, please call Jason Schnepp at 217/782-2113.

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cc: Region 1