2003.09.30 Fed Stream Analysis Plan

Norlite Corporation
Cohoes, New York

Feedstream Analysis Plan (FAP) Pursuant to the HWC MACT Regulations

Revision: 0

ENSR Corporation
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1.0 INTRODUCTION

1.1 Program Summary [40 CFR 63.1209(c)]

This document represents the Feedstream Analysis Plan (FAP) for the two lightweight aggregate kilns (LWAKs) operated by Norlite Corporation at its Cohoes, New York facility. This Plan has been prepared in accordance with requirements promulgated in **NESHAPS: Final Standards for Hazardous Waste Air Pollutants for Hazardous Waste Combustors,** (generally referred to as the Hazardous Waste Combustor [or "HWC"] MACT Rule) published by US EPA on September 30, 1999 in 40 CFR 63 Subpart EEE. Since the Norlite LWAKs treat certain waste that are classified as hazardous under state and/or federal regulations, these units are subject to the requirements of the HWC MACT Rule. The specific FAP requirements within Subpart EEE are set forth in 40 CFR 63.1209(c)(2) with six key plan elements,as follows:

1. A list of parameters that will be analyzed for each feedstream to ensure compliance with facility operating limits;

2. A description of how feedstream constituent information will be obtained. For example, will the information be obtained by collecting and analyzing samples or by other methods such as using analytical information obtained from others or via published or documented sources;

3. A description of how the analysis results will be used to document compliance with feedrate limits for blended wastes if the analysis data is obtained prior to blending and not from the blended, as-fired waste;

4. Which test methods which will be used to obtain the analytical data;

5. Which sampling methods will be used to obtain a representative sample of each feedstream to be analyzed using sampling methods described in 40 CFR 266, Appendix IX, or equivalent; and

6. The frequency of review or repeat of the initial analysis of each feedstream to ensure that the analysis is accurate and up-to-date.

In addition, Section 7.0 of this plan outlines the record keeping requirements specified in 40 CFR 63.1209(c)(4).

1.2 Overlap and Differences Between the MACT FAP and the RCRA WAP

The MACT regulations require that a FAP be prepared and made part of the facility's operating record. The Norlite facility's Part 373 hazardous waste permit requires that a RCRA waste analysis plan (WAP) be prepared and submitted for NYSDEC approval. These MACT Rule and RCRA regulations have many of the same requirements, although there are several important differences between these two overlapping regulations. One fundamental difference is that the MACT Rule requires that the FAP address Hazardous Air Pollutants (HAPs), while RCRA regulates compounds listed in 40 CFR 261, Appendix VIII. For consistency between these two analysis plan requirements, Norlite has ameneded the LLGF Specification Sheet (Exhibit C-1 to the WAP) to request off-site generators and blenders to identify any HAPs in their wastes. In addition, this plan also addresses vent streams from the fossil fuel tank farm.

The MACT Rule specifies that any HAP analyses performed need only be done on the hazardous waste feedstreams. Additionally, sources are not required to monitor for metals and chlorine in natural gas, process air and vapor recovery feedstreams.

Many of the MACT Rule requirements are cross-referenced to Norlite's NYSDEC-approved WAP. Other MACT Rule requirements that are not addressed in the WAP are addressed within this FAP.

1.3 Cross-Reference of FAP Requirements

In order to minimize duplication of the overlapping requirements and for ease of regulatory completeness review, Table 1-1 provides a regulatory cross-reference to the Norlite WAP and/or the relevant section within this FAP.

Table 1-1 Cross Reference of FAP Requirements

Regulatory Citation	Requirement	Section No. in the WAP	Section No. in this Document
40 CFR 1209(c)(2)(i)	Parameters for analysis	C-2	2.0
40 CFR 1209(c)(2)(ii)	Obtain analysis by performing direct sampling and analysis or by other methods	C-5(a)	3.0
40 CFR 1209(c)(2)(iii)	Use of analysis to document compliance with feedrate limits (e.g., for blended wastes)	C-5(a)/(b)/(d)/(g)	3.0
40 CFR 1209(c)(2)(iv)	Test methods to obtain these analyses	C-4	4.0
40 CFR 1209(c)(2)(v)	Sampling methods to obtain a representative sample of each feedstream	C-3	5.0
40 CFR 1209(c)(2)(vi)	Frequency of review or repeat of initial feedstream analysis	C-6	6.0

2.0 KILN FEEDSTREAM DESCRIPTIONS

2.1 General Overview

This section provides a description of the primary waste streams that are managed within the Norlite facility and the parameters for analysis prior to combustion in the LWAKs.

The waste feed materials handled by the facility cover a wide range of waste codes and hazardous constituents. Review of the HAPs list indicates that 50 HAPs could be present in the LLGF material. These compounds are identified in Table 2-1 at the end of this section. As part of the waste characterization process, Norlite will review customer waste stream HAPs. Further information relative to the properties and characteristics of the kiln feed materials processed is provided in the following subsections.

2.2 Liquid Waste Feeds

2.2.1 Liquid Low Grade Fuel (LLGF)

LLGF is injected countercurrent to the product flow through the kiln through burners at the discharge (front) end of the kiln. A micromotion doppler flow meter is used to continuously monitor the fuel usage rate. LLGF consists of organic substances and mixtures immediately useful as fuel. Typical generic types of organic substances that may be present in LLGF at some level at any given time include:

Alcohols	Degreasers
Glycols	Chlorinated Organic Liquids
Polyols	Polymers, Copolymers,
Glycol Ethers	Oligomers and Resin Fragments to include:
Ketones	Epoxies
Esters	Aldehydes
Phenolics	Acrylics
Hydrocarbons	Urethanes
Ethers	Polyethylenes
Oxides & Epoxides	Polypropylenes
Petroleum Oils & Derivatives	Styrenes
Vegetable Oils & Derivatives	Vinyls

The above list is descriptive and not considered limiting. The substances contained in LLGF are typically those used each day in industry, commerce and around the home. They are found in products such as paints, varnishes, lacquers, thinners, cleaners, detergent formulations, spot removers, nail polish remover, lighter fluid and gasoline. Expected ranges for MACT-regulated parameters in the LLGF are shown in Table 2-2. Metal concentrations can exceed the values shown in Table 2-2, provided the feed is from agitated tanks and provided that the LLGF feed rate is reduced proportionately to compensate for the higher metals concentration and thereby reduce the net metal feed rate to comply with the mass feed limits in the Part 373 hazardous waste permit. Norlite does not use as LLGF any substances or mixtures of PCBs subject to NYCRR regulations pursuant to Part 371 or Federal PCB regulations pursuant to 40 CFR Part 761. The contents of streams vary greatly on a daily basis. Typical ranges of analyses for separate LLGF streams are shown in Table 2-3. Additional data for hazardous constituents in LLGF are provided in Table 2-4.

2.2.2 Used Oil

Norlite uses non-hazardous waste fuels that can be defined as used oil under 40 CFR 279 and 6 NYCRR 374-2, or Waste Fuel A as defined in 6 NYCRR 225-2. This fuel is used to supplement the hazardous waste LLGF in operating the lightweight aggregate kilns. Used oil is classified as either specification used oil fuel or off-specification used oil fuel. Specification used oil fuel is defined as used oil meeting the following criteria:

Parameter	Limitation
Arsenic	< 5 ppm
Cadmium	< 2 ppm
Chromium	< 10 ppm
Lead	< 100 ppm
Flash Point	> 100°F
Total Halogens	< 4,000 ppm *
PCBs	< 2 ppm

* any used oil containing greater than 1,000 ppm total halogens is considered a hazardous waste because it is presumed to be mixed with listed hazardous waste. This presumption may be rebutted by demonstrating that the used oil does not contain listed hazardous waste constituents pursuant to 40 CFR 279.10(b)(ii) and 6 NYCRR 374-2.2(a)(i).

Used oil that does not meet this specification is considered off-specification used oil fuel. Norlite uses specification used oil fuel for start up and shutdown of the kilns and any time the units are not operating under the Part 373 permit parameters (e.g. after an AWFCO). This fuel is considered equivalent to virgin fuel oils and may be used in place of virgin fuels as they are described in the permit. Waste Fuel A is defined under § 225-2 as any waste oil, fuel oil or mixture of these to be

burned which contains between 25 and 250 parts per million (by weight) lead and which meets the limitations of Table 2-1 of section 225-2.4 [reproduced below] of this Subpart and does not contain chemical waste.

Constituent / Property	Allowable
PCBs	< 50 ppm *
Total Halogens	1,000 ppm * maximum
Sulfur	See Subpart 225-1 for fuel sulfur limitations
Lead	250 ppm * maximum
Gross Heat Content	125,000 Btu/gal minimum
* parts per million by weight (water free basis) of fuel.	

Off-specification used oil fuel and/or Waste Fuel A are not used during start up or shutdown of the kilns. They are used as the primary supplement to the hazardous waste LLGF when required by the operators. While being co-fired with the LLGF, Norlite ensures that the total metals and chlorine feed rates are not exceeded by the off-specification used oil fuel and/or Waste Fuel A. These fuels may also be used after an AWFCO provided the CO hourly rolling average (HRA) is below 500 ppm. Representative analytical data for used oil are summarized in Table 2-5.

2.3 Solid Feed Materials (i.e., shale)

The only solid material fed to the kiln is the raw shale from the quarry. No solid waste materials are processed. Representative analytical data for the shale is provided in Table 2-6.

2.4 Process Vent Streams

There are two (2) process vent streams that are sent to the kiln for incineration. Generally, the vapors fed to the kilns consist of nitrogen gas with trace amounts of organic vapors. The first stream is the vent from the nitrogen blanketed LLGF storage tanks. During the filling cycles of the storage tanks, any excess gaseous vapors are vented through a closed loop system to the burner end of the kiln. It is expected that the vent from the nitrogen-blanketed tanks would be primarily nitrogen with less than 2% by volume organic vapors and less than 10% oxygen. The second stream consists of vented material from the drum handling operations. Drums are emptied via a vacuum system. The vacuum system vents to the kiln and also includes vapors from the drum processing room, which is maintained under negative ventilation. This vent stream is mixed with ambient air and is used as primary combustion air for the burner. The drum processing vent would be expected to be primarily nitrogen and oxygen with less than 2% by volume organic vapors.

2.5 Supplemental Fuels

Fossil fuels or used oil is used to preheat the kiln during start-up. In cases where fuel oils or used oil is fired with LLGF, the metals content of the fuel oil is taken into account to comply with existing permit limits. Representative data for the fuel oil is summarized in Table 2-7. None of the regulated constituents would be expected to be present in natural gas.

2.6 Parameters and Rationale

The FAP regulation requires that, prior to feeding hazardous waste into the combustors, the facility must obtain an analysis of each feedstream that is sufficient to document compliance with the applicable feedrate limits (see Table 2-8). The MACT Rule allows regulatory officials to waive the comprehensive analysis of organic compounds if a source documents that the POHCs used to demonstrate compliance with the DRE standard continue to be representative of the organic HAPs in the hazardous waste feedstreams. In performing the Comprehensive Performance Test, Norlite has selected monchlorobenzene (MCB) is the POHC because it is a Class I POHC on the Thermal Stability ranking and is ranked 20th on that list. All HAPs processed at the facility have a Thermal Stability below MCB and therefore, MCB is more difficult to burn on that basis.

Target MACT feedrate limits are summarizd in Table 2-8. As discussed in Section C-2 of the Waste Analysis Plan approved under the Part 373 hazardous waste permit, additional limits pertaining to all feedstreams fired at the facility are presented in Table WAP-1.

Table 2-1 HAPs Potentially Present in LLGF

CAS #	Compound	CAS #	Compound
75058	Acetonitrile	1634044	Methyl tert butyl ether
107131	Acrylonitrile	75092	Methylene chloride (Dichloromethane)
71432	Benzene (including benzene from gasoline)	91203	Naphthalene
117817	Bis(2-ethylhexyl)phthalate (DEHP)	108952	Phenol
56235	Carbon tetrachloride	100425	Styrene
108907	Chlorobenzene	127184	Tetrachloroethylene (Perchloroethylene)
67663	Chloroform	108883	Toluene
1319773	Cresols/Cresylic acid (isomers and mixture)	79005	1,1,2-Trichloroethane
95487	o-Cresol	79016	Trichloroethylene
108394	m-Cresol	108054	Vinyl acetate
106445	p-Cresol	75014	Vinyl chloride
106467	1,4-Dichlorobenzene(p)	1330207	Xylenes (isomers and mixture)
140885	Ethyl acrylate	95476	o-Xylenes
100414	Ethyl benzene	108383	m-Xylenes
107062	Ethylene dichloride (1,2-Dichloroethane)	106423	p-Xylenes
107211	Ethylene glycol	N/A	Antimony Compounds
50000	Formaldehyde	N/A	Arsenic Compounds (inorganic including arsine)
110543	Hexane	N/A	Beryllium Compounds
302012	Hydrazine	N/A	Cadmium Compounds
67561	Methanol	N/A	Chromium Compounds
74873	Methyl chloride (Chloromethane)	N/A	Glycol ethers
71556	Methyl chloroform (1,1,1-Trichloroethane)	N/A	Lead Compounds
78933	Methyl ethyl ketone (2-Butanone)	N/A	Nickel Compounds
108101	Methyl isobutyl ketone (Hexone)	N/A	Polycyclic Organic Matter
80626	Methyl methacrylate	N/A	Selenium Compounds

Table 2-2 Typical LLGF Feed Properties

Parameter	Units	Expected Range
Arsenic	mg/kg	0.5-0.7
Beryllium	mg/kg	< 0.2
Chromium	mg/kg	7.1-52.0
Cadmium	mg/kg	0.5-1.6
Lead	mg/kg	30.8-82.4
Mercury	mg/kg	< 0.04
Heat Content	Btu/lb	3,200-11,000
Density	g/cc	0.88-0.94
Total Chlorine	% wt.	0.04-2.6
Ash Content	% wt.	0.5-2.1

Table 2-3 Typical LLGF Analyses for Compound Classes

Compound	Concentration Range, % wt.
Chlorinated solvents (Trichloroethane, Trichloroethene, Tetrachloroethylene, Methylene Chloride, Monochlorobenzene and Tetrachloromethane)	0 – 4%
Alcohols (Methanol, Ethanol, Propanol, Butanol and Isopropyl alcohol)	0 – 20%
Ketones (Methyl Ethyl Ketone, Methyl Isobutyl Ketone, Acetone and Cyclopentanone)	0 – 15%
Aldehydes (Formaldehyde, Butyl Aldehyde and Acetaldehyde)	0 – 0.5%
Petroleum Oils (Fuel oils, Hydraulic oils and Cutting oils)	0 – 25%
Acetates (Ethyl acetate, methyl acetate, Butyl acetate and Vinyl acetate)	0 – 25%
Phenol	0 – 5%
Aromatic Compounds (Benzene, Toluene, Xylenes and Naphthalene)	0 – 25%
Aliphatic Compounds (Hexane, Heptane and Pentane)	0 – 25%
Coal Tars	0 – 25%
Fatty Acids	0 – 5%
Waste Oils	0 – 15%
PCBs	< 25 ppm
Organic Halogens	< 5%

Table 2-4 Representative Data for LLGF Hazardous Constituents

Compound (Common Name)	Formula	Molecular Weight	Heat of Combustion (kcal/g)	Boiling Point (°C)	Fraction of LLGF (% wt.)
Carbon Tetrachloride	CCl_4	153.8	0.24	76.7	<3%
Tetrachloroethylene	C_2Cl_4	165.8	1.19	121.1	<3%
Trichloroethene	C_2HCl_3	131.4	1.74	86.7	<3%
1,1,1-Trichloroethane	CH_3CCl_3	133.4	1.99	74.0	<3%
Monochlorobenzene	C_6H_5Cl	112.56	6.60	132.2	<3%
Formaldehyde	HCHO	30	4.47	-19	<0.5%
Phenol	C_6H_5OH	94.11	7.78	181.7	<5%
Methyl Ethyl Ketone	$CH_3COCH_2CH_3$	72.11	8.07	79.4	<15%
Naphthalene	$ClOH_8$	128.17	9.62	217.8	<25%
Benzene	C_6H_6	78.11	10.03	80.0	<25%
Toluene	$C_6H_5CH_3$	92.14	10.14	110.6	<25%

Table 2-5 Typical Used Oil Specifications

Parameter	Units	Expected Range
Arsenic	mg/kg	< 5.0
Beryllium	mg/kg	< 0.1
Chromium	mg/kg	2.0-8.0
Cadmium	mg/kg	< 2.0
Lead	mg/kg	10-50
Mercury	mg/kg	< 0.1
Heat Content	Btu/lb	~ 17,000
Total Chlorine	mg/kg	< 1,000
Ash Content	% wt.	< 0.65

Table 2-6 Typical Shale Properties

Parameter	Units	Expected Range
Arsenic	mg/kg	3.6-13.7
Beryllium	mg/kg	0.6-0.9
Chromium	mg/kg	22.9-47.4
Cadmium	mg/kg	4.3-6.2
Lead	mg/kg	23.4-32.9
Mercury	mg/kg	0.24-0.50
Total Chlorine	% wt.	0.002-0.05

Table 2-7 Typical Fuel Oil Properties

Parameter	Units	Expected Range
Arsenic	mg/kg	< 0.1
Beryllium	mg/kg	< 0.01
Chromium	mg/kg	< 0.1
Cadmium	mg/kg	< 0.1
Lead	mg/kg	< 1.0
Mercury	mg/kg	< 0.01
Heat Content	Btu/lb	> 16,000
Total Chlorine	mg/kg	< 100
Ash Content	% wt.	< 0.1

Table 2-8 Summary of Target MACT Feedrate Limits*

Parameter	Feedrate Limit (lbs/hr)**
Chlorine/Chloride	115.0
Mercury	0.0104
Semi-volatile Metals (Cadmium and Lead)	6.72
Low-volatile Metals (Arsenic, Beryllium and Chromium)	9.57

* To be established during the MACT CPT.

** These are 12-hour rolling average limits.

3.0 FEEDSTREAM CHARACTERIZATION STRATEGY

Feedstream characterization will be performed by one of the following methods in accordance with Section C-5 of the WAP:

- Direct sampling and analysis at the on-site analytical laboratory;
- Sampling at the generator or blender facilities and analysis at off-site analytical laboratories; or
- Use of generator process knowledge.

4.0 TEST METHODS

Section C-4 of the Norlite WAP describes the test methods used during analyses of feedstreams. Tests are either performed by the on-site analytical laboratory or by off-site laboratories that are certified under New York State Environmental Laboratory Approval Program (ELAP). The Norlite laboratory is certified under NYS and National ELAP programs.

5.0 SAMPLING METHODS

Section C-3 of the Norlite WAP describes the sampling methods used to obtain a representative sample of each feedstream.

6.0 FREQUENCY OF ANALYSIS

In accordance with Section C-6 and Table WAP-1 of the Norlite WAP, analysis will be performed on the following feedstreams at the frequencies specified:

- On each load of incoming LLGF and Used Oil. In addition, Norlite requires generators and blenders to complete and submit a LLGF Specification Sheet (Exhibit C-1 to the WAP) for each new waste stream and at least annually.

- Blended tanks are sampled and analyzed weekly.

- Shale is sampled and analyzed after each blast in the quarry.

7.0 RECORD KEEPING OF FEEDRATES

Although not required in the written FAP, in order to comply with the applicable feedrate limits of the MACT Rule, the Norlite facility will monitor and record feedrates in accordance with 40 CFR 63.1209(c)(4), as follows:

(i) Determine and record the value of the parameter for each feedstream by sampling and analysis or other method;

(ii) Determine and record the mass or volume flowrate of each feedstream by a CMS. If determining the flowrate of a feedstream by volume, the facility will determine and record the density of the feedstream by sampling and analysis (unless reporting the constituent concentration in units of weight per unit volume (e.g., mg/l)); and

(iii) Calculate and record the mass feedrate of the parameter per unit time.

APPENDIX

NORLITE'S WASTE ANALYSIS PLAN (SECTION C OF THE PART 373 PERMIT)