



STATE OF MAINE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION



PAUL R. LEPAGE  
GOVERNOR

PATRICIA W. AHO  
COMMISSIONER

**State of Maine and  
NEWSME Landfill Operations, LLC  
d/b/a Juniper Ridge Landfill  
Penobscot County  
Old Town, Maine  
A-921-77-3-M**

**Departmental  
Findings of Fact and Order  
New Source Review  
NSR #2**

**FINDINGS OF FACT**

After review of the air emissions license amendment application, staff investigation reports and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 Maine Revised Statutes Annotated (M.R.S.A.), Section 344 and Section 590, the Maine Department of Environmental Protection (Department) finds the following facts:

**I. REGISTRATION**

A. Introduction

FACILITY	State of Maine and NEWSME Landfill Operations, LLC d/b/a Juniper Ridge Landfill (JRL)
LICENSE TYPE	06-096 CMR 115, Minor Revision
NAICS CODES	562212
NATURE OF BUSINESS	Solid Waste Landfill
FACILITY LOCATION	Old Town, Maine

Juniper Ridge Landfill (JRL) is a solid waste disposal facility currently owned by the State of Maine (Bureau of General Services) and operated by NEWSME Landfill Operations, LLC.

B. Amendment Description

The Department issued new source review (NSR) amendment A-921-77-2-A to JRL on November 26, 2012 to address the combustion of landfill gas (LFG) at the facility's flares. Specific Condition (4)(B)(2) required JRL to submit an amendment application proposing SO<sub>2</sub> controls if actual construction had not begun on the University of Maine pipeline project by June 1, 2013. Construction on the pipeline project has not begun. Therefore, JRL has proposed installation of control equipment that will reduce SO<sub>2</sub> emissions to less than 1,000 ppmv on a 12-month rolling average basis as required by NSR amendment A-921-77-2-A.

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C. Application Classification

The application submitted by JRL does not violate any applicable federal or state requirements and does not reduce monitoring, reporting, testing or record keeping. It does seek to identify the control equipment that will be used to meet the Best Available Control Technology (BACT) limit established in NSR amendment A-921-77-2-A and to describe the associated periodic monitoring requirements.

The proposed revision will not change the facility's emission limits. Therefore, the amendment is determined to be a minor revision under *Minor and Major Source Air Emission License Regulations* 06-096 Code of Maine Rules (CMR) 115 (as amended). The procedures found in 06-096 CMR 115 (as amended) can be utilized to process this application because the proposed revision not prohibited by the Part 70 air emission license. This minor revision shall be incorporated into the Part 70 air emission license renewal currently in process.

II. **BEST PRACTICAL TREATMENT (BPT)**

A. Introduction

In order to receive a license the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in *Definitions Regulation*, 06-096 CMR 100 (as amended). Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in 06-096 CMR 100. BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

**TRS, H<sub>2</sub>S, and SO<sub>2</sub> – Clarification of Terms Used**

This license addresses the control of total reduced sulfur (TRS) present in the landfill gas. Based on actual periodic TRS grab sample tests performed at the facility, the speciation results show that H<sub>2</sub>S is the primary TRS constituent of the landfill gas (approximately 99%) with the remaining 1% consisting of additional various sulfur containing compounds. This license includes requirements for total TRS as well as TRS measured as H<sub>2</sub>S.

The combustion of TRS gases results in the formation of SO<sub>2</sub>. The SO<sub>2</sub> emissions are directly correlated to the amount of sulfur in the landfill gas prior to combustion.

**B. TRS Controls**

JRL has proposed installation and operation of a Paques THIOPAQ<sup>®</sup> Bio-Desulfurization (Thiopaq) scrubber system to control TRS compounds in the LFG sent to the flares, thereby controlling emissions of SO<sub>2</sub>.

The Thiopaq system works by sending LFG through an absorption tower (absorber) where it mixes with an aqueous caustic soda solution containing sodium hydroxide (NaOH) and thiobacillus bacteria (the extracting liquid). The absorption tower operates counter-currently with the LFG entering at the bottom of the column and flowing upwards while the extracting liquid is sprayed downwards from a nozzle at the top of the tower.

After the extraction liquid has mixed with the LFG and removed sulfur compounds, it flows to the aerobic bioreactor tanks (bioreactors). In the bioreactors, thiobacillus bacteria biologically convert the H<sub>2</sub>S into elemental sulfur. The bacteria consume the absorbed sulfide ions and excrete elemental sulfur which is filtered out of the circulating solution. The hydroxide ion that is produced regenerates the caustic soda solution to be reused in the absorption tower.

From the bioreactors, the solution flows to a decanter. Sulfur is separated from the liquid with a centrifuge that will produce a sulfur cake. The sulfur cake can be beneficially used as a fertilizer or in industrial processes. The extracting liquid is re-circulated to the absorber column.

The Thiopaq system is designed to remove TRS in the LFG to below 1,000 ppmv on a 12-month rolling average basis. It is designed for a flow rate of up to 5,000 scfm. This is more than the projected maximum LFG flow rate of 3,550 scfm.

JRL maintains the flexibility to operate other temporary or additional TRS control equipment (e.g. SulfaTreat) for cases of scrubber downtime or temporary surges in LFG flow or TRS concentration, provided licensed emission limits are met.

C. Periodic Monitoring

JRL shall monitor and record the following for the Thiopaq system as indicated in the following table.

Item to be Monitored	Units of Measure	Monitoring Tool/Method	Frequency
TRS concentration entering TRS control equipment	ppmv	Periodic TRS grab sample tests (or equivalent method)	See Note 1
TRS concentration exiting TRS control equipment	ppmv (12-month rolling average basis)	Periodic TRS grab sample tests (or equivalent method)	See Note 1
LFG flow to flare	scf	Flow meter	Totalized Monthly; See Note 1
LFG flow entering TRS control equip (daily average)	scf/hr	Flow meter	See Note 2
LFG flow exiting TRS control equip (daily average)	scf/hr	Flow meter	See Note 2
H <sub>2</sub> S concentration entering TRS control equip	ppmv	Colorimetric tubes	See Note 2
H <sub>2</sub> S concentration exiting TRS control equip	ppmv	Colorimetric tubes	See Note 2
Control Equipment Downtime	Hours	Record in logbook with explanation	As occurs
Unscrubbed bypass	Hours	Record in logbook with explanation	As occurs
Calibration of flow meters	Dates	As specified by manufacturer	Once per year

Note 1: JRL shall sample the landfill gas TRS concentration three times on one day per month (i.e. three samples at the inlet to the scrubber and three samples at the scrubber outlet) using a test method approved by the Department. JRL shall record the gas flow rate on the days of the sampling events. The average

of the three inlet samples and three outlet samples shall determine the result for that month. It will be assumed that all remaining sulfur in the landfill gas is converted to SO<sub>2</sub> and emissions calculated accordingly. Compliance with the SO<sub>2</sub> lb/hr limit and the ppmv limit shall be based on a 12-month rolling average of the results of these testing events.

Note 2: JRL shall sample the landfill gas H<sub>2</sub>S concentration (both entering and exiting the control equipment) twice in the same day (morning and afternoon, with at least four hours between the two sample times) using colorimetric tubes and average the samples for that day. This sampling method shall occur at least two times per week with at least three days between samples. The colorimetric tube data shall be used as an operational tool and not for determining compliance with numerical emission limits.

D. Incorporation into the Part 70 Air Emission License

The requirements in this 06-096 CMR 115 New Source Review amendment shall apply to the facility upon amendment issuance. Per *Part 70 Air Emission License Regulations*, 06-096 CMR 140 (as amended), Section 1(C)(8), for a modification that has undergone NSR requirements or been processed through 06-096 CMR 115, the source must then apply for an amendment to the Part 70 license within one year of commencing the proposed operations as provided in 40 CFR Part 70.5.

### III. AMBIENT AIR QUALITY ANALYSIS

JRL previously submitted an ambient air quality analysis demonstrating that emissions from the facility, in conjunction with all other sources, do not violate ambient air quality standards (see A-921-77-2-A issued 11/26/12). An additional ambient air quality analysis is not required for this renewal.

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## ORDER

The Department hereby grants Air Emission License Minor Revision A-921-77-3-M pursuant to the preconstruction licensing requirements of 06-096 CMR 115 and subject to the standard and special conditions below.

Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

### SPECIFIC CONDITIONS

**Special Condition (4)(B) of Air Emission License A-921-77-2-A is deleted.**

#### (1) TRS Control Equipment

- A. JRL shall install and operate the Thiopaq system no later than June 1, 2015.  
[06-096 CMR 115, BACT]
- B. JRL shall install and operate TRS control equipment as necessary on the landfill gas to achieve (on a 12-month rolling average basis) an outlet concentration of 1,000 ppmv or less and to control emissions of SO<sub>2</sub> to the emission limits in Condition (3) of Air Emission License A-921-77-2-A. JRL may utilize alternative control equipment in conjunction with the Thiopaq system as necessary to meet the TRS and SO<sub>2</sub> emission limits in this license. Any change in the type or configuration of the TRS control equipment used must be submitted to the Department prior to use. Compliance testing of any alternative control equipment shall be performed within 60 days of beginning operation. If alternative control equipment is used, JRL shall notify the compliance inspector at least 30 days prior to any TRS compliance testing.  
[060-96 CMR 115, BACT]
- C. Compliance with the SO<sub>2</sub> lb/hr limit, SO<sub>2</sub> ton/year limit and the TRS ppmv limit shall be based on sampling of the landfill gas entering and exiting the TRS control equipment three times on one day per month (i.e. three samples at the inlet to the scrubber and three samples at the scrubber outlet) using a test method approved by the Department. JRL shall record the gas flow rate on the days of sampling events. The average of the three inlet samples and three outlet samples shall determine the result for that month. It will be assumed that all remaining sulfur in the landfill gas is converted to SO<sub>2</sub> and

emissions calculated accordingly. Compliance with the SO<sub>2</sub> lb/hr limit and the TRS ppmv limit shall be based on a 12-month rolling average.  
[060-96 CMR 115, BACT]

D. Periodic Monitoring [060-96 CMR 115, BACT]

JRL shall monitor and record the following periodic monitors for the flares and associated TRS control equipment:

<b>Item to be Monitored</b>	<b>Units of Measure</b>	<b>Monitoring Tool/Method</b>	<b>Frequency</b>
TRS concentration entering TRS control equipment	ppmv	Periodic TRS grab sample tests (or equivalent method)	See Note 1
TRS concentration exiting TRS control equipment	ppmv (12-month rolling average basis)	Periodic TRS grab sample tests (or equivalent method)	See Note 1
LFG flow to flare	scf	Flow meter	Totalized Monthly; See Note 1
LFG flow entering TRS control equip (daily average)	scf/hr	Flow meter	See Note 2
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Control Equipment Downtime	Hours	Record in logbook with explanation	As occurs
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Calibration of flow meters	Dates	As specified by manufacturer	Once per year

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Note 2: JRL shall sample the landfill gas H<sub>2</sub>S concentration (both entering and exiting the control equipment) twice in the same day (morning and afternoon, with at least four hours between the two sample times) using colorimetric tubes and average the samples for that day. This sampling method shall occur at least two times per week with at least three days between samples. The colorimetric tube data shall be used as an operational tool and not for determining compliance with numerical emission limits.

- (2) If it hasn't already been incorporated through the renewal process, JRL shall submit an application to incorporate this amendment into the Part 70 air emission license no later than 12 months from commencement of the requested operation. [06-096 CMR 140, Section 1(C)(8)]

DONE AND DATED IN AUGUSTA, MAINE THIS 7 DAY OF February, 2014.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Marc Allen Robert Cone for  
PATRICIA W. AHO, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 12/23/13

Date of application acceptance: 12/30/13

Date filed with the Board of Environmental Protection:

This Order prepared by Lynn Poland, Bureau of Air Quality.

