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-921-77-2-A

Departmental
Findings of Fact and Order
New Source Review
NSR #1

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 M.R.S.A., Section 344 and Section 590, the Department finds the following facts:

I. REGISTRATION

A. Introduction

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

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

B. Amendment Description

Juniper Ridge Landfill has submitted an application to permanently license the existing large utility flare (Flare #4) at a new location on site and the existing two backup flares (Flares #2 and #3) to combust the landfill gases collected by the active gas collection and control system. Flares #2 and #3 are not licensed to operate simultaneously with Flare #4. This license requires JRL to install and operate Total Reduced Sulfur (TRS) control equipment to reduce SO_2 emission rates. TRS is an aggregate of sulfur containing compounds, consisting of hydrogen sulfide (H_2S) as the primary compound along with other compounds such as mercaptans, ethyl methyl sulfide, and thipphene.

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826
RAY BLDG., HOSPITAL ST.

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04679-2094
(207) 764-0477 FAX: (207) 760-3143

web site: www.maine.gov/dep

C. Emission Equipment

The following equipment is addressed in this air emission license:

Fuel Burning Equipment

Equipment	Maximum Capacity (MMBtu/hr)	Max.Firing Rate (scfm landfill gas at 50% methane)	Fuel Type	Stack #
Flare #2	22.5	750	Landfill Gas	2
Flare #3	40.5	1350	Landfill Gas	3
Flare #4	106.5	3550	Landfill Gas	4

D. Application Classification

The modification of a major source is considered a major modification based on whether or not expected emissions increases exceed the "Significant Emission Increase Levels" as given in *Definitions Regulation*, 06-096 CMR 100 (as amended).

The emission increases for this license have been determined by subtracting the average actual emissions of the 24 months preceding the modification (or representative 24 months) or current licensed allowed, whichever is lower, from the maximum future license allowed emissions. The results of this test are as follows:

Pollutant	2009/2010 Baseline	Proposed Future Licensed Emissions (ton/year)	Change: Below or Above Significance Levels	Significance Level (ton/year)
PM	-	7.9	below	25
PM_{10}	-	7.9	below	15
$PM_{2.5}$	-	7.9	below	10
SO_2	-	449	above	40
NO_X	-	31.7	below	40
CO	-	172.6	above	100
VOC	0.1	40.0	below (39.9 tpy)	40
GHG including biogenic CO_2 (CO_2 eq)	38,133	97,356	below (59,223 tpy)	75,000
GHG excluding biogenic CO_2 (CO_2 eq)	3,135	8,004	below (4,869 tpy)	75,000

Based on the above comparison, this amendment is determined to be a major modification and has been processed under *Minor and Major Source Air Emission License Regulations* 06-096 CMR 115 (as amended) since the changes being made are not prohibited by the Part 70 air emission license.

Prior to submitting the major modification application, Juniper Ridge Landfill met and had contact with the Department various times for pre-application meeting purposes, held a public information meeting on July 27, 2011 at the Old Town City Council Chambers in Old Town, ME, and held a pre-submission meeting with the Department on August 5, 2011. The public notice of its intent to file the application was published on August 5, 2011 and the notice was republished on April 26, May 3, and May 10, 2012. The Federal Land Managers (FLMs) were notified of the project. The notification to the FLMs included a project summary, distances from the source to each of the Class I areas and the magnitude of proposed emissions increases on a pollutant-by-pollutant basis. In May 2011, an FLM representative from each of the affected Class I areas (Acadia National Park, Moosehorn National Wildlife Refuge, Roosevelt Campobello International Park, and Presidential Range/Dry River/Great Gulf Wilderness Area) determined that Class I Air Quality Related Values (AQRV) analyses would not be required.

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.

Before proceeding with the emission requirements, the following is provided as background information.

Facility Description and Historical Information

The State of Maine (Maine State Planning Office) owns the Juniper Ridge Landfill which is currently operated by NEWSME Landfill Operations, LLC under a February 5, 2004 Operating Services Agreement.

The Juniper Ridge Landfill has a solid waste disposal facility license. Originally issued on July 28, 1993 to the previous owner of the landfill for the disposal of pulp and paper residuals generated by its paper mill, the current license was issued on April 9, 2004 to Juniper Ridge Landfill to accept construction and demolition debris, residues (ash, front-end process residue, and over-sized bulky wastes) generated by municipal solid waste incinerators located in Maine, municipal solid waste by-pass from the incinerators, water/waste water treatment plant sludge, and lesser amounts of non-hazardous wastes.

An active gas collection and control system and two utility flares were installed at the facility to control odors and to reduce greenhouse gas emissions and an air emission license was issued on December 20, 2005 (A-921-70-A-I). These flares minimize odors by combusting the landfill gas which contains total reduced sulfur compounds (TRS). The combustion process converts TRS to sulfur dioxide, which is significantly less odorous than TRS. As part of this 2011 application process, JRL submitted modeling results using EPA-approved models demonstrating that SO_2 emissions from the flares at the proposed licensed emission rates will not cause or contribute to ambient air quality impacts above health-based ambient air quality standards, including EPA's new NO_2 and SO_2 standards promulgated in 2010 and EPA's new CO standard promulgated in 2011.

Since the issuance of the initial air emission license, Juniper Ridge Landfill has tested and estimated the landfill emissions on an ongoing basis and has brought various sized flares on-site with the Department's approval as temporary activities as it investigated different control options. Juniper Ridge Landfill also submitted a BACT analysis on June 27, 2008 which is superseded by the current application.

This license amendment addresses the permanent operation of the large utility flare with two others to be used as back-up. The license amendment application was submitted in August 2011 and updated in October 2011 and January 2012 based on discussions with the Department and a request for additional ambient air quality analysis information.

TRS, H_2S, and SO_2 – 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_2S 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_2S.

The combustion of TRS gases results in the formation of SO_2. The SO_2 emissions are directly correlated to the amount of sulfur in the landfill gas prior to combustion.

B. Landfill Gas Collection Rate

Projected gas emissions were estimated by a Landfill Gas Collection Rate Sensitivity Analysis conducted in February 2007 for Juniper Ridge Landfill. The US Environmental Protection Agency's (EPA's) Landfill Gas Emissions Model (LandGEM) was used and the input parameters were varied to assess a range of landfill gas collection rates. The sensitivity of estimated landfill gas collection rates to changes in degradable waste composition and changes in the two LandGEM input constants (methane generation rate (k) and methane generation potential (L_0)) were evaluated.

Fourteen sets of modeling results were generated based on two scenarios for waste composition and seven sets of model parameters. The LandGEM's landfill gas generation rates were converted to landfill gas collection rates based on estimated landfill gas collection efficiencies of 85% through landfill closure and 95% after closure. The projections indicated that the landfill gas collection rate will peak in the year 2018.

The measured flow rates at the landfill have generally followed the projections from the 2007 study. The projections show that the maximum landfill gas flow rate at the site will almost equal the rated capacity of Flare #4 in the year 2018 before beginning a downward trend.

C. New Source Performance Standards 40 CFR Part 60, Subpart WWW

Standards of Performance for Municipal Waste Landfills, 40 CFR Part 60, Subpart WWW contains requirements for municipal solid waste landfills that commenced construction, reconstruction, or modification on or after May 30, 1991. Those facilities having a design capacity equal to or greater than 2.5

million megagrams by mass and 2.5 million cubic meters by volume are subject to the appropriate rule requirements and have to obtain a Part 70 air emission license. Those facilities under the design capacity thresholds only have to submit a design capacity report.

Juniper Ridge Landfill's June 2004 Design Capacity Report included a finding that the design capacity was above 2.5 million megagrams by mass and 2.5 million cubic meters by volume. Therefore, the facility is subject to 40 CFR Part 60, Subpart WWW. A Part 70 license, A-921-70-A-I, was issued on December 20, 2005.

§60.752(b) sets forth requirements to either calculate the Non-Methane Organic Compounds (NMOC) annually to demonstrate the emission rate is below 50 megagrams per year or install a collection and control system. If the annual calculated NMOC emission rate increases to 50 megagrams or greater, a collection and control system is required. Closure of the landfill prior to reaching the 50 megagram emission rate involves a closure notification.

Juniper Ridge Landfill previously demonstrated that NMOC emissions are less than 50 megagrams per year, however, the facility installed and operates a gas collection and control system that reduces emissions of methane, NMOCs, Volatile Organic Compounds (VOC), Total Reduced Sulfur (TRS), and Hazardous Air Pollutants (HAPs). The facility's annual NMOC report dated June 8, 2012 indicates pre-control NMOC emissions greater than 50 megagrams per year, so therefore it must now comply with all applicable requirements of 40 CFR Part 60, Subpart WWW; including, but not limited to, submission of a NMOC control system design plan to the Department within one year and operation of an NMOC control system in compliance with 40 CFR Part 60, Subpart WWW within 30 months. Although the facility currently operates a gas collection and control system, the design plan shall be submitted by June 7, 2013 documenting that the NMOC collection and control system will meet all of the applicable requirements in 40 CFR Part 60, Subpart WWW. The NMOC collection and control system shall be operating in compliance with 40 CFR Part 60, Subpart WWW requirements by December 8, 2014 unless Tier 2 or 3 sampling demonstrates the emission rate is less than 50 megagrams per year.

D. Landfill Gas Collection and Flares #2, #3 and #4

The landfill gas generated at Juniper Ridge Landfill is collected and then flared. The facility is equipped with an active gas collection and control system which consists of gas extraction wells and horizontal gas collection trenches that connect by a system of gas conveyance lines to a vacuum blower and then to the flares.

The primary flare at Juniper Ridge Landfill is Flare #4, rated at 106.5 MMBtu/hr (3550 scfm). Flares #2 and #3 are to be used as back-up and are rated at 22.5 MMBtu/hr (750 scfm) and 40.5 MMBtu/hr (1350 scfm), respectively. The flare landfill gas flow rates were calculated assuming the landfill gas consists of approximately 50% methane and has a heat content of 500 Btu/scf. Flares #2 and #3 are not licensed to operate simultaneously with Flare #4. Flares #2 and #3 are expected to be operated together to handle the gas flow when used as back-up to Flare #4 and shall be limited to 100 hours per calendar year each. All flares will be relocated to the southeast end of the facility. During the relocation period for Flare #4, the operational restriction for Flares #2 and #3 will not be in effect.

BACT
Juniper Ridge submitted a BACT analysis as part of the license application with additional supplemental information submitted October 17, 2011 and January 19, 2012. EPA's RACT/BACT/LAER Clearinghouse and EPA's Landfill Methane Outreach Program (LMOP) website were both reviewed for requirements on similar units.

The BACT analysis summary for the landfill gas and flares is as follows:

Options for the control and treatment of landfill gas include combustion of the landfill gas, purification of the landfill gas, or a combination of the two. Combustion systems can consist of non-energy recovery equipment, such as flares and thermal incinerators, and energy recovery equipment, such as gas turbines and internal combustion engines, which generate electricity from combusting the landfill gas. Purification techniques including adsorption, absorption, and membranes can be used to process raw landfill gas to pipeline quality natural gas, for the purpose of producing fuel for combustion.

PM, PM_{10}, $PM_{2.5}$ – Particulate matter is considered a by-product of combustion and is not generally present in landfill gas. At this time, the industry standard does not include pre- or post-landfill gas combustion flare controls that are practical for controlling particulate matter emissions.

The BACT emission limit for PM, PM_{10}, $PM_{2.5}$ from Flare #4 was based on the AP-42 Table 2.4-5 factor (dated 11/98) of 17 lb/10^6 dscf methane, a 50% methane concentration by volume, and a rated capacity landfill gas flow rate to the flare of 3550 scfm. The BACT PM, PM_{10}, $PM_{2.5}$ emission limit is 1.81 lb/hr.

Flares #2 and #3 shall be limited to 0.38 lb/hr and 0.69 lb/hr of PM, PM_{10}, $PM_{2.5}$, respectively, based on each flares' rated capacity flow rate (750 scfm and 1350 scfm).

SO_2 – SO_2 is emitted from the flare as a result of the combustion of total reduced sulfur (TRS) compounds, primarily hydrogen sulfide (H_2S) found in landfill gas. Options to minimize SO_2 emissions include changing landfill operations to reduce the generation of TRS compounds and installing sulfur control technology to treat the TRS coming out of the landfill.

Juniper Ridge Landfill investigated ways of reducing generation of TRS in the landfill, including a zeolite alternative daily cover and a temporary geosynthetic membrane cover. The zeolite cover was tested during the fall of 2008 after being proposed under the innovative control technology provisions of 06-096 CMR 115 to meet BACT at that time. The findings from test results demonstrated that its use was not a viable option for controlling TRS compounds. A temporary geosynthetic membrane cover is currently being used today and has resulted in a reduction in the concentration of TRS compounds in the landfill gas. The average TRS concentration is estimated to be 3500 ppmv, as compared to 7000 ppmv in 2008. The 3500 ppmv average was based on tested grab samples prior to the most recent 2011 amendment submittal. The corresponding overall SO_2 emission rate is reduced by approximately 500 tons per year with the membrane cover.

The BACT analysis submitted by Juniper Ridge Landfill for this license amendment evaluated four TRS removal controls prior to combustion of the landfill gases. The technologies reviewed included Lo-Cat®, Sulfatreat®, Thiopaq®, and a caustic scrubber. Lo-Cat® is a TRS removal system (for primarily H_2S) on a large-scale that uses a regenerable catalyst in the iron-redox process to convert H_2S to elemental sulfur. Sulfatreat® is a smaller scale system which reduces TRS by reducing primarily H_2S concentrations using a solid scavenger. Thiopaq® is a bio-catalyzed gas desulfurization process. The caustic scrubber is a gas desulfurization system developed by Casella Waste Systems.

The cost estimates for each technology were based on reducing TRS down from 3500 ppmv (estimated worst case average without preconditioning) to 1000 ppmv after implementing the pre-conditioning technology. However, assessing control technology cost-effectiveness for landfill facilities contains uncertainties; including the prediction of future landfill gas production and TRS concentrations, estimations of the potential

emissions reductions and costs of the control options, and the achievement of a consistent level of control. There is limited historical information on the cost of installing and operating a sulfur treatment system at a landfill similar to Juniper Ridge Landfill for an extended duration.

The economic analysis was based on a 10 year life cycle of the capital cost of the equipment including installation and the annual operating cost. The calculation of a cost per ton of SO_2 controlled was based on amortizing the total capital cost over the 10 year period, adding the annual operating costs (utilities, chemicals, maintenance, and operating labor) and dividing this annualized cost by the estimated reduction in pollutant emissions. Information was obtained from Merichem Gas Technology Products (GTP), NEWSME, and by using engineering judgment.

The final summary for the four technologies is listed in the following table:

Landfill Control Costs and Emissions
(3500 ppmv TRS controlled to 1000 ppmv TRS)

	Lo-Cat ®	Sulfatreat®	Thiopaq®	Caustic Scrubber
Capital Investment Cost	$9,098,400	$3,328,800	$6,568,800	$2,518,800
Direct and Indirect Annual Operating Cost	$901,146	$2,456,352	$865,736	$2,154,940
Annualized Cost (10 yr, capital & Operating)	$2,672,892	$3,153,694	$2,148,853	$2,690,017
Annualized SO_2 Reduction (10 yr cycle)	288.5 tons	288.5 tons	288.5 tons	288.5 tons
BACT Cost Effectiveness	$9265/ton	$10,931/ton	$7448/ton	$9324/ton

Other Similar Maine Sources

Pine Tree Landfill in Hampden, Maine, uses landfill control technology operated by the same staff that operates Juniper Ridge Landfill. Controls on the closed Pine Tree Landfill include landfill gas combustion devices (gas-to-energy with three engines and a flare), a NATCO Thiopaq® sulfur treatment system to remove TRS prior to combustion, and a backup dual-compartment SulfaTreat® dry scrubbing system. This control was installed by Pine Tree Landfill to ensure SO_2 emissions would be maintained at levels meeting ambient air quality standards, would meet BACT, and would be protective of the engines.

Pipeline Project

A future project for SO_2 emission reductions from the landfill is to use the landfill gas as a fuel source. Juniper Ridge Landfill signed a proposed landfill gas pipeline agreement with the University of Maine, Orono (UMaine) in December of 2010. If the project moves forward, the landfill gas will be treated for sulfur removal at the Juniper Ridge Landfill facility and the cleaned gas will be conveyed to the UMaine to be fired in their boilers. The flare would have a reduced operating schedule in this scenario.

Additional Supplemental Information

Juniper Ridge Landfill's original SO_2 BACT proposal was the use of Flare #4 with an emission rate determined by the initial ambient air quality analysis results. The facility's BACT conclusion was based on the relatively high cost per ton of SO_2 removal, the uncertainty of quantifying future SO_2 emissions, the relatively unproven nature of the technologies available, the absence of entries in EPA's RACT/BACT/LAER Clearinghouse, and the lack of need for SO_2 removal to meet ambient air quality standards. Juniper Ridge Landfill also noted that the approximate average maximum TRS concentration of 3500 ppmv is equivalent to a sulfur content of 0.35% on a volume basis and approximately 0.4% on a mass basis. This is lower than the 0.5% sulfur content for #6 fuel oil required in Maine by 2018 through 38 MRSA §603-A and the 40 CFR Part 60, Subparts Db and Dc requirement for new sources of 0.5% sulfur.

Although Juniper Ridge Landfill believes the initial BACT proposal of no sulfur scrubbing was appropriate, Juniper Ridge Landfill submitted a revised, more conservative BACT approach after discussions with the Department regarding the Department's focus on the facility's total SO_2 emissions and possible license requirements for future SO_2 reduction; and the Department's request that Juniper Ridge Landfill revisit the ambient air quality analysis to account for different operating scenarios in addition to the projected maximum, including operations at lower flow rates.

The supplemental application information submitted by Juniper Ridge Landfill in their January 19, 2012 update included a revised BACT proposal consisting of the following: continued implementation of good operating practices to minimize formation of TRS gases (landfill waste moisture control, synthetic cover, daily cover, and infrastructure installation and operation); increased Flare #4 height; limiting maximum

daily short term H_2S concentration to 4500 ppmv; limiting total SO_2 emissions from Flare #4 to 449 tons/year; potential installation of future temporary sulfur removal equipment as reduction options are investigated; installation of future long-term sulfur removal equipment, as necessary, if the pipeline project proceeds; submittal of a report to the Department by July 1, 2016 updating landfill gas flows, TRS levels, emissions estimates, and the BACT analysis and implementation of any updated Department BACT determination by January 1, 2018.

The revised BACT level proposed (based on a maximum daily TRS concentration of 4500 ppmv, as H_2S) meets ambient air quality standards and is intended to address the actual projected landfill gas flow and concentration through 2013. The 449 tons/year limit as a result of the January 19, 2012 addendum is a reduction from 534 tons/year in the original 2011 application. The revised BACT limit results in a cost-effectiveness of approximately $7400/ton of SO_2 removed on a 10 year life cycle basis and $20,000/ton of SO_2 removed on a 2 year life cycle basis for the least costly of the TRS control options (Thiopaq®) reviewed in the original BACT. Costs were calculated based on 10 years to be comparative with the original BACT cost analysis. The 2 year life cycle cost basis was calculated specifically for only the years prior to the Phase 2 BACT requirements coming into effect. Juniper Ridge Landfill contends that significant capital expenditures are infeasible at the landfill until the technical parameters of the UMaine pipeline project are solidified. Requiring installation of a control technology prior to finalizing the details of UMaine pipeline project could result in a major control system overhaul or replacement to meet the final technical specifications needed to supply UMaine with acceptable treated landfill gas characteristics.

SO_2 BACT Conclusion

After review of the information submitted, the Department recognizes Juniper Ridge Landfill's ongoing proposed project to supply treated landfill gas to UMaine as fuel, which includes the development of a sulfur pre-treatment technology. As such, the Department concludes that a two phased BACT is appropriate. Phase 1 shall be in place prior to the UMaine project coming on-line, but not beyond the Phase 2 deadlines. Phase 2 shall be in place no later than June 1, 2015 if the UMaine project does not move forward. If the UMaine project does not begin actual construction by June 1, 2013, Phase 2 requires an amendment application

submittal to the Department by December 31, 2013. The Department's two phased BACT determination is as follows:

- **PHASE 1**
  (effective within 60 days of license issuance, but not beyond the Phase 2 deadlines):

  - Utilizing Flare #4 while maintaining compliance with a SO_2 emission limit of 157 lb/hr and using Flares #2 and #3 as backup. For purposes of this license, backup is defined as operating no more than 100 hours per calendar year for each of Flares #2 and #3. The Flare #4 lb/hr limit was based on a TRS concentration of 4500 ppmv, measured as H_2S, a maximum flare flow rate of 3550 scfm, and a maximum flare heat input of 106.5 MMBtu/hr. Compliance with the lb/hr limit correlates directly with the 4500 ppmv concentration of H_2S.

  - A maximum H_2S concentration in the landfill gas going to the flares of 4500 ppmv on a daily average basis. The H_2S concentration shall be demonstrated with colorimetric tube H_2S samples, on a sampling schedule as detailed in the periodic monitoring section of this license.

  - Total licensed allowed SO_2 emissions from the flares of 449 ton/year, based on a 12 month rolling total. The limit shall be demonstrated by sampling the TRS content of the landfill gas entering the flares, on a sampling schedule as detailed in the periodic monitoring section of this license, and calculating the amount of SO_2 emissions generated based on the TRS content. The monthly recordkeeping shall begin within 60 days of license issuance.

- **PHASE 2**
  (effective once the UMaine pipeline comes on-line; or if actual construction on the pipeline has not begun by June 1, 2013, additional control technology must be in place by June 1, 2015 at which time a maximum pre-flare gas TRS limit of 1000 ppmv on a 12-month rolling average basis shall be met):

  - If the UMaine pipeline project progresses to completion, the landfill gas shall be treated and then either be sent through the pipeline or sent to the flares, with a pre-flare gas TRS limit of 1000

ppmv on a 12-month rolling average basis. This averaging time allows for temporary spikes due to the nature of landfill operations. Six months prior to installing the long-term TRS removal system needed to obtain pipeline quality gas, Juniper Ridge Landfill shall submit a report to the Department that includes descriptions of the control equipment and updated landfill gas flow projections, TRS levels, and flare emissions estimates.

- If the UMaine pipeline project has not begun actual construction by June 1, 2013, Juniper Ridge Landfill shall submit an amendment application to the Department by December 31, 2013 proposing TRS or SO_2 controls to be installed by June 1, 2015. At a minimum, the proposal shall include control technology that reduces TRS to at least 1000 ppmv or equivalent SO_2 emissions on a 12-month rolling average basis prior to the flares.

- **Immediate Requirements**:

  - Continued good operating practices to minimize the formation and release of the TRS laden landfill gases. These practices include but are not limited to; minimizing landfill waste moisture and ambient landfill gas releases through the use of synthetic intermediate cover, or an approved equivalent, the appropriate use of daily cover, and the proper design, installation, maintenance and operation of landfill gas management system infrastructure in accordance with the Solid Waste Management Regulations. [06-096 CMR 115, BACT]

  - By May 31, 2013, operate Flare #4 with a top-of-casing elevation of at least 265 feet above sea level at the proposed location.

  - Flares #2 and #3 shall be limited to 33.09 lb/hr and 59.56 lb/hr of SO_2, respectively.

NO_X – Nitrogen oxides are considered by-products of combustion and are not generally present in landfill gas. At this time, the industry standard does not include pre- or post-landfill gas combustion flare controls that are practical for controlling nitrogen oxides.

The BACT emission limit for NO_X from Flare #4 was based on the AP-42 Table 13.5-1 factor (dated 9/91) of 0.068 lb/MMBtu. The NO_X emission limit is 7.24 lb/hr.

Flares #2 and #3 shall be limited to 1.53 lb/hr and 2.75 lb/hr of NO_X, respectively.

CO – Carbon monoxide is considered a by-product of combustion and is not generally present in landfill gas. At this time, the industry standard does not include pre- or post-landfill gas combustion flare controls that are practical for controlling carbon monoxide emissions.

The BACT emission limit for CO from Flare #4 was based on the AP-42 Table 13.5-1 factor (dated 9/91) of 0.37 lb/MMBtu. The CO emission limit is 39.41 lb/hr.

Flares #2 and #3 shall be limited to 8.33 lb/hr and 14.99 lb/hr of CO, respectively.

VOC – Landfill gases contain a small amount of non-methane organic compounds (NMOC) and a portion of the NMOC is made up of volatile organic compounds (VOC). The NMOC/VOC emissions result from the volatilization of organic compounds in the waste, with smaller amounts possibly being created by biological processes and chemical reactions within the landfill. Control of VOC emissions from landfills typically involves a gas collection system and a combustion device.

AP-42 Section 2.4 approximates that out of the total NMOC as hexane, 39% is estimated to be VOC for landfills that only contain municipal solid waste or very little organic commercial/industrial wastes. The result of Tier 2 NMOC sampling conducted at the Juniper Ridge Landfill in November 2011 showed an average measured concentration for NMOC, as hexane, of 873 ppmv. Therefore, VOC emissions were calculated to be approximately 340 ppmv, as hexane. AP-42 Section 2.4 also estimates that active gas collection and control systems have capture efficiencies of 60 -95% and flares typically destroy approximately 98% of the collected NMOCs, VOCs, and methane (see Table 2.4-3).

The BACT emission limit for VOC from Flare #4 was based on the Juniper Ridge Landfill estimate of 340 ppmv VOC, as hexane, a rated capacity flow rate to the flare of 3550 scfm, and a 98% flare control efficiency. The VOC emission limit is 0.32 lb/hr.

Flares #2 and #3 shall be limited to 0.07 lb/hr and 0.12 lb/hr of VOC, respectively, based on each flares' rated capacity flow rate (750 scfm and 1350 scfm).

Opacity – Visible emissions from each flare shall not exceed 20% opacity on a six (6) minute block average basis.

Greenhouse Gases – Greenhouse gases are emitted from landfills. The active gas collection and control system at Juniper Ridge Landfill reduces greenhouse gases by converting methane (CH_4) to carbon dioxide (CO_2). Although CO_2 is considered a greenhouse gas in general terms, methane has an estimated global warming potential 21 times greater than carbon dioxide. Landfill gas is typically 50% methane. In addition, EPA has deferred for three years the applicability for Prevention of Significant Deterioration (PSD) and 40 CFR Part 70 permitting requirements of CO_2 emissions from the combustion or decomposition of biogenic materials, including CO_2 from combustion of landfill gas. The final rule was signed on July 1, 2011. At this time, the appropriate control for landfill greenhouse gases is the use of the active gas collection and control system, including flaring or treatment of the collected gases.

Control Equipment

BACT control equipment for Juniper Ridge Landfill is the use of continued good operating practices to minimize the formation and release of the TRS laden landfill gases, and the use of an active gas collection and control system which includes Flare #4 (and Flares #2 and #3 as back-up) as Phase 1 control. Phase 2 BACT control includes pre-treatment using control equipment associated with the UMaine pipeline project or installation of control equipment to reduce TRS to 1000 ppmv on a 12 month rolling average basis by June 1, 2015 if the UMaine pipeline project does not begin actual construction by June 1, 2013.

Juniper Ridge Landfill shall meet a 95% uptime for all control equipment on a 12 month rolling total basis; including, but not limited to, schedule or unscheduled maintenance and repair and equipment malfunction. Periods of downtime due to maintenance, repair, and malfunction (not to exceed 438 hours per 12 month period) may be excluded when determining compliance with the H_2S and TRS ppmv limits. Juniper Ridge Landfill shall keep records documenting compliance with the uptime requirement.

Periodic Monitoring

Juniper Ridge Landfill shall maintain records of the operational hours of each flare, with documentation showing that Flares #2 and #3 do not operate simultaneously with Flare #4.

To demonstrate compliance with the Phase 1 4500 ppmv H_2S daily average concentration limit, Juniper Ridge Landfill shall sample twice in the same day (morning and afternoon, with at least 4 hours separating the two sample times) using colorimetric tubes and average the samples for that day. This sampling method shall occur at least two times each week, with at least three days between samples. However, if Juniper Ridge Landfill measures an average H_2S concentration of 4250 ppmv or more, then Juniper Ridge Landfill shall sample H_2S concentrations twice daily until the average daily measured concentration is less than 4000 ppmv for 7 consecutive days.

To demonstrate compliance with the 449 ton/year SO_2 limit and the 1000 ppmv TRS 12-month rolling average Phase 2 limit, Juniper Ridge Landfill shall sample the TRS content of the landfill gas entering the flare three times during a single day twice per month using a test method approved by the Department (such as laboratory analysis with ASTM Method D-5504). Juniper Ridge shall record the gas flow rates at the times the samples are taken. There shall be no fewer than 7 days between sampling events, unless lab scheduling or sample problems occur requiring a different frequency to accomplish two sampling events in one month. The average of the sampling results for each month, along with the associated gas flow rates, shall be used to estimate the monthly SO_2 emissions based on the assumption that TRS compounds are converted to SO_2 during combustion. The average of the sampling results for each month shall be used to calculate the TRS 12-month rolling average. Records for SO_2 shall be kept on a monthly and 12-month rolling total basis. Records for TRS shall be kept on a monthly and 12-month rolling average basis.

E. Annual Emissions

Juniper Ridge Landfill shall be restricted to the following annual emissions as the total allowable from all of the flares, based on a 12 month rolling total and calculated using the rated capacity of Flare #4 (106.5 MMBtu/hr, 3550 scfm of landfill gas with 50% methane) and the specific SO_2 annual limit:

Total Licensed Annual Emissions for the Facility in Tons/year
(used to calculate the annual license fee)

	PM	PM_{10}	PM2.5	SO_2	NO_x	CO	VOC
Total TPY	**7.9**	**7.9**	**7.9**	**449**	**31.7**	**172.6**	**40.0**

III. AMBIENT AIR QUALITY ANALYSIS

A. Overview

A refined ambient air quality modeling analysis was performed to show that emissions from Juniper Ridge Landfill, in conjunction with other nearby sources, will not cause or contribute to violations of National Ambient Air Quality Standards (NAAQS) for SO_2, PM_{10}, $PM_{2.5}$, NO_2 or CO or to Class II increments for SO_2, PM_{10} or NO_2.

The current licensing action for Juniper Ridge Landfill represents a major modification. Based upon the magnitude of proposed emissions increases and the distance from the source to any Class I area, the affected Federal Land Managers (FLMs) and MEDEP-BAQ have determined that an assessment of Class I Air Quality Related Values (AQRVs) is not required.

B. Model Inputs

The AERMOD-PRIME refined model was used to address standards and increments in all areas. If applicable, the modeling analysis accounted for the potential of building wake and cavity effects on emissions from all modeled stacks that are below their calculated formula GEP stack heights.

All modeling was performed in accordance with all applicable requirements of the Maine Department of Environmental Protection, Bureau of Air Quality (MEDEP-BAQ) and the United States Environmental Protection Agency (USEPA).

A valid 5-year hourly off-site meteorological database was used in the AERMOD-PRIME refined modeling analysis. The following parameters and their associated heights were collected at the Old Town Mill's meteorological monitoring site during the 5-year period 1991-1995:

TABLE III-1 : Meteorological Parameters and Collection Heights

Parameter	Sensor Height(s)
Wind Speed	10 meters, 76.2 meters
Wind Direction	10 meters, 76.2 meters
Temperature	10 meters, 76.2 meters
Standard Deviation of Wind Direction (Sigma A)	10 meters, 76.2 meters
Vertical Velocity	10 meters
Standard Deviation of Vertical Velocity (Sigma W)	10 meters
Standard Deviation of Vertical Wind (Sigma E)	10 meters
Delta Temperature	76.2 minus 10m

Per USEPA guidance, any small gaps (two hours or less) of missing on-site data were filled in using linear interpolation. Larger gaps of missing data (three or more hours) were coded as missing.

In addition, hourly Bangor NWS data, from the same time period, were used to supplement the primary surface data set for the required variables (cloud cover and ceiling height) that were not explicitly collected at the Old Town Mill's meteorological monitoring site.

Concurrent upper-air data from the Caribou NWS site were also used in the analysis. Missing cloud cover and/or upper-air data values were interpolated or coded as missing, per USEPA guidance.

All necessary representative micrometeorological surface variables for inclusion into AERMET (surface roughness, Bowen ratio and albedo) were calculated using AERSURFACE from procedures recommended by USEPA.

Point-source parameters, used in the modeling for Juniper Ridge Landfill are listed in Table III-2.

TABLE III-2: Point Source Stack Parameters

Facility/Stack	Stack Base Elevation (m)	Stack Height (m)	GEP Stack Height (m)	Stack Diameter (m)	UTM Easting NAD27 (km)	UTM Northing NAD27 (km)
CURRENT/PROPOSED						
Juniper Ridge Landfill						
• Flare	63.00	26.77*	--	1.81*	522.164	4980.129
U Maine						
• Stack #1	26.12	42.06	24.76	3.20	525.726	4971.533
• Stack #4	26.12	45.72	24.76	1.52	525.738	4971.564

Old Town Fuel & Fiber						
• Riley Boiler	25.17	45.42	106.89	2.74	528.864	4973.745
• #5 Boiler	27.68	54.86	89.99	2.29	528.723	4973.714
• Biomass Boiler	26.95	41.15	86.69	1.98	528.734	4973.635
• Recovery Boiler	24.87	76.20	105.94	2.95	528.866	4973.676
• Smelt Dissolving Tank	24.93	76.20	105.09	1.50	528.864	4973.688
• Lime Kiln	27.28	49.68	104.72	1.22	528.786	4973.828
• Gas Turbine	27.64	24.38	33.11	2.44	528.709	4973.504

* Flare effective release height and diameter, calculated per USEPA guidance

Emission parameters for the NAAQS and increment modeling are listed in Table III-3. For the purposes of determining PM_{10} and $PM_{2.5}$ impacts, all PM emissions were conservatively assumed to convert to PM_{10} and $PM_{2.5}$. For the purpose of determining NO_2 impacts, all NO_x emissions were conservatively assumed to convert to NO_2.

TABLE III-3: Stack Emission Parameters

Facility/Stack	Averaging Periods	SO_2 (g/s)	PM_{10} (g/s)	$PM_{2.5}$ (g/s)	NO_2 (g/s)	CO (g/s)	Stack Temp (K)	Stack Velocity (m/s)
MAXIMUM LICENSE ALLOWED								
Juniper Ridge Landfill								
• Flare	All	19.74	0.23	0.23	0.91	4.96	1273.15	20.00
UMaine								
• Stack #1 – Scenario 2	All	-	2.19	-	6.02	-	450.00	1.66
• Stack #4 – Scenario 2	All	-	1.52	-	4.18	-	450.00	5.11
• Stack #1 – Scenario 6	All	12.35	-	-	-	-	450.00	2.08
Old Town Fuel & Fiber								
• Riley Boiler	All	1.62	0.93	-	6.17	-	499.80	10.23
• #5 Boiler	All	16.00	2.51	-	8.78	-	455.40	9.50
• Biomass Boiler	All	0.84	1.00	-	8.35	-	444.00	15.34
• Recovery Boiler	All	18.02	4.32	-	19.45	-	505.40	17.65
• Smelt Dissolving Tank	All	0.42	0.95	-	0.01	-	348.70	3.78
• Lime Kiln	All	0.89	4.15	-	4.54	-	338.70	10.30
• Gas Turbine	All	0.05	0.10	-	2.00	-	735.90	78.22
BASELINE – 1987								
Juniper Ridge Landfill								
• No sources existed in the 1987 baseline year; no baseline credit to be taken.								
UMaine								
• Juniper Ridge Landfill conservatively assumed no credit for UMaine sources existing in the 1987 baseline year.								
Old Town Fuel & Fiber								
• Juniper Ridge Landfill conservatively assumed no credit for OTF&F sources existing in the 1987 baseline year.								

BASELINE – 1977
Juniper Ridge Landfill
• No sources existed in the 1977 baseline year; no baseline credit to be taken.
UMaine
• Juniper Ridge Landfill conservatively assumed no credit for UMaine sources existing in the 1977 baseline year.
Old Town Fuel & Fiber
• Juniper Ridge Landfill conservatively assumed no credit for OTF&F sources existing in the 1977 baseline year.

C. Single Source Modeling Impacts

AERMOD-PRIME refined modeling was performed for a total of three operating scenarios that represented a range of maximum, typical and minimum operations. Modeling results for Juniper Ridge Landfill alone are shown in Table III-4.

Maximum predicted impacts that exceed their respective significance level are indicated in boldface type. No further modeling was required for pollutant/terrain combinations that did not exceed their respective significance levels.

TABLE III-4: Maximum AERMOD-PRIME Impacts from Juniper Ridge Landfill Alone

Pollutant	Averaging Period	Max Impact ($\mu g/m^3$)	Receptor UTM E (km)	Receptor UTM N (km)	Receptor Elevation (m)	Class II Significance Level ($\mu g/m^3$)
SO_2	1-hour	**271.34**[a]	521.854	4980.715	65.73	**10**[b]
	3-hour	**174.20**	522.400	4979.950	59.37	**25**
	24-hour	**45.85**	522.400	4979.950	59.37	**5**
	Annual	**1.73**	522.500	4979.900	56.39	**1**
PM_{10}	24-hour	0.84	522.006	4980.462	66.31	5
	Annual	0.02	522.050	4980.400	65.87	1
$PM_{2.5}$	24-hour	0.84	522.006	4980.462	66.31	1.2
	Annual	0.02	522.050	4980.400	65.87	0.3
NO_2	1-hour	**16.09**[a]	521.854	4980.715	65.73	**10**[c]
	Annual	0.09	522.050	4980.400	65.87	1
CO	1-hour	87.68	521.854	4980.715	65.73	2000
	8-hour	43.53	521.450	4980.950	60.96	500

[a] Value based on the H1H (highest-1st-high) concentration from five years of meteorological data
[b] Interim Significant Impact Level (SIL) adopted by Maine
[c] Interim Significant Impact Level (SIL) adopted by NESCAUM states

D. Combined Source Modeling Impacts

For predicted modeled impacts from Juniper Ridge Landfill alone that exceeded significance levels, as indicated in boldface type in Table III-4, other sources not explicitly included in the modeling analysis must be accounted for by using representative background concentrations for the area.

Background concentrations, listed in Table III-5, are derived from representative rural background data for use in the Eastern Maine region.

TABLE III-5: Background Concentrations

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)
SO_2	1-hour	24
	3-hour	18
	24-hour	11
	Annual	1
NO_2	1-hour	49

All background values derived from the MicMac Site, Presque Isle

MEDEP examined other area sources whose impacts would be significant in or near Juniper Ridge Landfill's significant impact area. Due to the applicant's location, extent of the significant impact area and other nearby source emissions, MEDEP has determined that two sources would be considered for combined source modeling: UMaine (Orono) and Old Town Fuel & Fiber (Old Town).

For pollutant averaging periods that exceeded significance levels, the maximum modeled impacts for all sources were added with conservative rural background concentrations to demonstrate compliance with NAAQS, as shown in Table III-6. Because impacts for all pollutants using this method meet all NAAQS, no further modeling analyses need to be performed.

TABLE III-6: Maximum Combined Source Impacts

Pollutant	Averaging Period	Max Impact ($\mu g/m^3$)	Receptor UTM E (km)	Receptor UTM N (km)	Receptor Elevation (m)	Back-Ground ($\mu g/m^3$)	Max Total Impact ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
SO_2	1-hour	146.77	--	--	--	24	170.77	196
	3-hour	174.21	522.400	4979.950	59.37	18	192.21	1150
	24-hour	64.46	525.700	4971.000	25.50	11	75.46	230
	Annual	2.90	526.500	4971.000	30.18	1	3.90	57
NO_2	1-hour	94.92	--	--	--	49	143.92	188

E. Increment

AERMOD-PRIME refined modeling was performed to predict the maximum Class II increment impacts. Juniper Ridge Landfill did not exist during the 1987 or 1977 baseline years, so their emissions are considered to be entirely increment consuming. In addition, Juniper Ridge Landfill conservatively assumed no credit

would be taken for any reductions from UMaine or Old Town Fuel & Fiber sources that existed during the baseline years.

Class II increment standards are in place for select pollutants at specific averaging times. With the exception of 3-hour, 24-hour and annual SO_2, all modeled maximum impacts for pollutants having increment standards were below their respective significant levels; therefore, no increment modeling was required for these pollutants (annual and 24-hour PM_{10} and $PM_{2.5}$, and annual NO_X). There are no Class II increment standards for 1-hour NO_X and 1-hour SO_2.

Results of the Class II SO_2 increment analysis for 3-hour, 24-hour, and annual averaging times are shown in Table III-7. All SO_2 modeled maximum impacts were below the increment standards. Because all predicted increment impacts meet increment standards, no further Class II increment modeling needed to be performed.

TABLE III-7: Class II Increment Consumption

Pollutant	Averaging Period	Max Impact ($\mu g/m^3$)	Receptor UTM E (km)	Receptor UTM N (km)	Receptor Elevation (m)	Class II Increment ($\mu g/m^3$)
SO_2	3-hour	174.21	522.400	4979.950	59.37	512
	24-hour	64.46	525.700	4971.000	25.50	91
	Annual	2.90	526.500	4971.000	30.18	20

Federal guidance and 06-096 CMR 115 require that any major new source or major source undergoing a major modification provide additional analyses of impacts that would occur as a direct result of the general, commercial, residential, industrial and mobile-source growth associated with the construction and operation of that source.

General Growth: Very minimal increases in local emissions due to construction-related activities are expected to occur, as the proposed modification will involve relatively minor and short-lived general construction. Emissions increases due to additional traffic at the facility will be minimal, based on an insignificant increase in construction truck traffic in and out of the area.

Residential, Commercial and Industrial Growth: Population growth in the impact area of a proposed source can be used as a surrogate factor for the growth in emissions from combustion sources. Since the population in Penobscot County has increased approximately 1.9% between 1990 and 2009 and the modification will not create any new jobs, no new significant residential, commercial or industrial growth will follow from the modification associated with this source.

Mobile Source and Area Source Growth: Since area and mobile sources are considered minor sources of NO_2, their contribution to increment has to be considered. Technical guidance from USEPA points out that screening procedures can be used to determine whether additional detailed analyses of minor source emissions are required. Compiling a minor source inventory may not be required if it can be shown that little or no growth has taken place in the impact area of the proposed source since the baseline dates (1977/1988) were established. Very little growth has taken place in the area of Juniper Ridge Landfill since the baseline dates were established. In addition, no increase in Vehicle Miles Travelled (VMT) is expected as a result of the modification. No further analyses of mobile or area source growth are needed.

F. Impacts on Soils and Vegetation

Federal guidance and 06-096 CMR 115 require that any major new source or major source undergoing a major modification provide additional analyses of impacts on Soils and Vegetation. NAAQS, by their very nature, are designed to protect health and welfare, including their effects on water, vegetation, and soils, and are a useful benchmark for evaluating soil and vegetation impacts.

For completeness purposes, the maximum predicted concentrations were explicitly compared to the screening levels for sensitive species presented in USEPA's "A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals," (USEPA 450/2-81-078, 1980), and "Air Quality Criteria for Oxides of Nitrogen, Summary of Vegetation Impacts" (USEPA 600/8-91/049b, 1993). The results of this analysis can be found in Table III-8.

TABLE III-8 : Maximum AERMOD-PRIME Soils and Vegetation Impacts

Pollutant	Averaging Period	Max Impact ($\mu g/m^3$)	Minimum Sensitivity Level ($\mu g/m^3$)
SO_2	1-hour	170.77	917
	3-hour	192.21	786
	Annual	3.90	18
NO_2	4-hour	143.92[a]	3760
	8-hour	143.92[a]	3760
	Annual	0.09	94 - 188
CO	1 week	87.68[a]	1,800,000

[a] Value based on the maximum 1-hour concentration

Since the maximum impacts do not exceed NAAQS or the EPA screening thresholds for sensitive soils and vegetation, the analysis demonstrates that there will be no harmful effects to soils and vegetation.

G. Visibility

Any perceptible changes in local visibility, in the form of plume blight, will be controlled by the opacity and PM limits set forth in the Specific Conditions section of the license.

H. Class I Impacts

The current licensing action for Juniper Ridge Landfill represents a major modification. Based upon the magnitude of proposed emissions increases and the distance from the source to any Class I area, the affected Federal Land Managers (FLMs) and MEDEP-BAQ have determined that an assessment of Class I Air Quality Related Values (AQRVs) is not required.

I. Summary

In summary, it has been demonstrated that Juniper Ridge Landfill will not cause or contribute to a violation of any MAAQS or NAAQS for SO_2, PM_{10}, $PM_{2.5}$, NO_2 or CO; or any SO_2, PM_{10} or NO_2 Class II increment standards.

ORDER

Based on the above Findings and subject to conditions listed below, the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards,
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-921-77-2-A 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

(1) TRS Laden Landfill Gas Minimization

Juniper Ridge Landfill shall continue to use good operating practices to minimize the formation and release of the TRS laden landfill gases. These practices include but are not limited to; minimizing landfill waste moisture and ambient landfill gas releases through the use of synthetic intermediate cover, or an approved equivalent, the appropriate use of daily cover, and the proper design, installation, maintenance and operation of landfill gas management system infrastructure in accordance with the Solid Waste Management Regulations. [06-096 CMR 115, BACT]

(2) Flare #4 Stack

By May 31, 2013, the elevation of the top of Flare #4 shall be at least 265 feet above sea level at the proposed location on the southeast end of the facility. [06-096 CMR 115, BACT]

(3) Flares #2, #3, and #4 Emissions and Operations

A. Emissions from the flares at Juniper Ridge Landfill shall not exceed the following [06-096 CMR 115, BACT]:

Unit	PM (lb/hr)	PM_{10} (lb/hr)	PM2.5 (lb/hr)	SO_2 (lb/hr)	NO_X (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Flare #2 (22.5 MMBtu/hr) back-up unit	0.38	0.38	0.38	33.09	1.53	8.33	0.07
Flare #3 (40.5 MMBtu/hr) back-up unit	0.69	0.69	0.69	59.56	2.75	14.99	0.12
Flare #4 (106.5 MMBtu/hr) primary unit	1.81	1.81	1.81	157.0	7.24	39.41	0.32

B. Visible emissions from each flare shall not exceed 20% opacity on a six (6) minute block average basis. [06-096 CMR 115]

C. Total SO_2 Annual Flare Emissions

1. Total SO_2 emissions from the Juniper Ridge Landfill flares shall not exceed 449 ton/year, based on a 12 month rolling total. [06-096 CMR 115, BACT]
2. Juniper Ridge Landfill shall sample the TRS content of the landfill gas to be flared three times during a single day twice per month using a test method approved by the Department (such as laboratory analysis with ASTM Method D-5504) and record the gas flow rate rates at the times the samples are taken. No fewer than 7 days shall be between sampling events, unless lab scheduling or sample problems occur requiring a different frequency to accomplish two sampling events in one month. The average of the sampling results for each month, along with the associated gas flow rates, shall be used to estimate the monthly SO_2 emissions based on the assumption that TRS compounds are converted to SO_2 during combustion. Records shall be kept on a monthly and 12 month rolling total basis. The monthly recordkeeping shall begin within 60 days of license issuance. [06-096 CMR 115, BACT]

D. Operation of Flares #2, #3, and #4

Flares #2 and #3 shall not operate when Flare #4 is operating. Flares #2 and #3 shall be used as backup to Flare #4, with backup defined for the purpose of this license as each of the Flares #2 and #3 operating no more than 100 hours per calendar year. The backup restriction on Flares #2 and #3 shall be in effect once Flare #4 is operational in its permanent location. Juniper Ridge Landfill shall keep records demonstrating compliance with the flares' operational restriction.

(4) Control Technology Requirements

A. Phase 1 - Effective upon license issuance, but not beyond the Phase 2 deadlines:

1. Juniper Ridge Landfill shall flare the collected gases. Flare #4 shall be used as the primary control unit, with Flares #2 and #3 as backup. Backup is defined for the purpose of this license as each of the Flares #2 and #3 operating no more than 100 hours per calendar year.

2. H_2S
   a. H_2S concentration in the landfill gas going to the flares shall not exceed 4500 ppmv on a daily average basis as demonstrated by the procedures in Condition (4)(A)(2)(b). [06-096 CMR 115, BACT]
   b. Juniper Ridge Landfill shall sample the landfill gas H_2S concentration twice in the same day (morning and afternoon, with at least 4 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. If a daily average H_2S concentration of 4250 ppmv or more is measured, then Juniper Ridge Landfill shall sample H_2S concentrations twice daily until the average daily measured concentration is less than 4000 ppmv for 7 consecutive days. Records shall be maintained on site documenting the H_2S measurements. [06-096 CMR 115, BACT]

B. Phase 2

1. If the pipeline has begun actual construction by June 1, 2013, the following shall be effective once the pipeline comes on-line [06-096 CMR 115]:
   a. Juniper Ridge Landfill shall treat the landfill gas and either send it through pipeline or send it to the flares, with a pre-flare gas H_2S limit of 1000 ppmv on a 12-month rolling average basis.
   b. Six months prior to installing the sulfur removal system needed to obtain pipeline quality gas, Juniper Ridge Landfill shall submit a report to the Department that shall include descriptions of the control equipment, and updated landfill gas flow projections, sulfur levels, and flare emissions estimates.

2. By June 1, 2013, if the UMaine pipeline project has not begun actual construction [06-096 CMR 115]:
   a. Juniper Ridge Landfill shall submit an amendment application to the Department by December 31, 2013 proposing SO_2 controls that minimally reduce TRS emissions to 1000 ppmv on a 12-month rolling average basis.
   b. By June 1, 2015 Juniper Ridge Landfill shall have installed, and be operating, pre-flare control technology that reduces TRS to at least 1000 ppmv on a 12-month rolling average basis. Emissions from the control technology shall then be flared.

3. To demonstrate compliance with the TRS limit of 1000 ppmv on a 12-month rolling average basis, Juniper Ridge Landfill shall sample the TRS

content of the landfill gas to be flared three times during a single day twice per month using a test method approved by the Department (such as laboratory analysis with ASTM Method D-5504). No fewer than 7 days shall be between sampling events, unless lab scheduling or sample problems occur requiring a different frequency to accomplish two sampling events in one month. The average of the sampling results for each month shall be used to calculate the TRS 12-month rolling average. Records shall be kept on a monthly and 12- month rolling average basis. The monthly recordkeeping shall begin within 60 days of license issuance. [06-096 CMR 115, BACT]

C. Control Equipment Uptime

1. Juniper Ridge Landfill shall utilize the flares at all times, unless all treated gases are sent through the UMaine pipeline, or switching is occurring between the primary flare and the backup flares. Switching to and from primary Flare #4 and backup Flares #2 and #3 shall be performed as expediently as possible. Records shall be maintained documenting the date and timeframe when no flaring occurs. [06-096 CMR 115]
2. Juniper Ridge Landfill shall meet a 95% uptime for all H_2S control equipment on a 12-month rolling total basis; including, but not limited to, scheduled or unscheduled maintenance and repair and equipment malfunction. Periods of downtime (not to exceed 438 hours per 12 month period) may be excluded when determining compliance with the H_2S and TRS ppmv limits. Juniper Ridge Landfill shall keep records documenting compliance with the uptime requirement. [06-096 CMR 115]
3. Per 38 M.R.S.A. §349.9 The Commissioner may exempt from civil penalty an air emission in excess of license limitations if the emission occurs during start-up or shutdown or results exclusively from an unavoidable malfunction entirely beyond the control of the licensee and the licensee has taken all reasonable steps to minimize or prevent any emission and takes corrective action as soon as possible. There may be no exemption if the malfunction is caused, entirely or in part, by poor maintenance, careless operation, poor design or any other reasonably preventable condition or preventable equipment breakdown. The burden of proof is on the licensee seeking the exemption under this subsection. In the event of an unavoidable malfunction, the licensee must notify the commissioner in writing within 48 hours and submit a written report, together with any exemption requests, to the Department on a quarterly basis. **State Enforceable Only**

(5) Juniper Ridge Landfill shall meet the applicable requirements of *Standards of Performance for Municipal Waste Landfills*, 40 CFR Part 60, Subpart WWW.

(6) Juniper Ridge Landfill 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 of Flare #4. [06-096 CMR 140, Section 2(J)(2)(c)]

DONE AND DATED IN AUGUSTA, MAINE THIS 26 DAY OF November , 2012.

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: August 5, 2011
Date of application acceptance: August 5, 2011

Date filed with the Board of Environmental Protection:

This Order prepared by Kathleen E. Tarbuck, Bureau of Air Quality.

Filed
NOV 27 2012
State of Maine
Board of Environmental Protection