

EXHIBIT H

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# **TECHNICAL REVIEW**

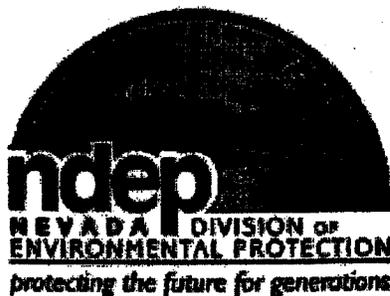
**AND DETERMINATION OF CONTINUED COMPLIANCE**

**FOR:**

## **REFUSE, INC. LOCKWOOD LANDFILL LANDFILL GAS-TO-ENERGY PROJECT**

**Storey County, Nevada, HA – 83**

**Class I (Title V) Air Quality Operating Permit  
AP4953-1148.01 (Significant Revision), FIN A0018  
Air Case #11AP0088**



**BY**

**STATE OF NEVADA  
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
DIVISION OF ENVIRONMENTAL PROTECTION  
BUREAU OF AIR POLLUTION CONTROL**

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**FEBRUARY 8, 2011 (Amended April 2011)**



## 1.0 INTRODUCTION

Refuse Inc. (Waste Management of Nevada, RI) has submitted a Class I Application for Significant Revision to the Nevada Division of Environmental Protection, Bureau of Air Pollution Control (NBAPC). RI currently holds Class I (Title V) Air Quality Operating Permit AP4953-1148.01 for the Lockwood Landfill. RI proposes to implement a landfill gas-to-energy (LFGTE) project involving the construction and operation of three (3) new reciprocating internal combustion (IC) engines designed to combust landfill gas (LFG). The goal of a LFGTE project is to convert the LFG into a useful form of energy, such as electricity. Currently, there are 279 LFGTE projects utilizing IC engines for electricity generation in the United States (see EPA *Landfill Methane Outreach Program*, <http://www.epa.gov/lmop/faq/lfg.html#ref2>).

RI currently operates an LFG collection and control system (GCCS) at Lockwood, in accordance with NSPS requirements. RI utilizes an open flare to destroy the combustible components of the LFG, but without any useful energy recovery. Routing the LFG to the IC engines will enable RI to produce useful electricity for running plant-wide operations and for sale to the local utility grid. The IC engines proposed at Lockwood will serve as the primary LFG abatement devices, with the existing flare acting as a back-up abatement device.

In addition to installation of the 3 new IC engines, RI is also seeking a facility-wide carbon monoxide (CO) emissions cap of 249 tons per year to stay below the PSD major stationary source threshold of 250 tons per year. The draft revised permit contains provisions that will ensure RI complies with the CO cap.

The application was received by the NBAPC on September 13, 2010. The official date of submittal of the application was November 13, 2010, 61 days after receipt. The NBAPC has 180 days after the official date of submittal (the technical review period) to make a preliminary determination to issue or deny the application for significant revision. The NBAPC has 12 months after the official date of submittal to issue or deny the permit. Additional information was requested from RI, adding 23 days on to the technical review period.

The purpose of this review is to determine the likely air quality impacts from continued operation of the Lockwood Landfill after the new IC engines are constructed and placed into service.



## 2.0 DESCRIPTION OF PROCESS

### 2.1 MUNICIPAL SOLID WASTE LANDFILL (LOCKWOOD LANDFILL)

The primary function of the Lockwood Landfill is for the disposal of municipal solid waste (MSW) and other wastes, which are brought to the landfill under contract to RI. LFG is produced by the decomposition of garbage in the landfill. The LFG contains dominantly methane and carbon dioxide (roughly 50/50), plus other gases including a variety of non-methane organic compounds (NMOCs). The control of these LFG emissions is required through the NSPS 40 CFR Part 60, Subpart WWW. The startup of the landfill gas (LFG) collection and control system (GCCS), including the currently-permitted open (candlestick) flare, was completed on January 6, 2009.

The Lockwood Landfill has equipment and space for wood chipping, asphalt grinding, and storage of petroleum-contaminated soil. The facility also has a variety of diesel-powered engines, all less than or equal to 750 HP, to power stationary equipment at the landfill site. Because the focus of the current application for significant revision is the addition of the three new IC engines, operation of the other systems that are currently permitted will not be discussed.

### 2.2 LANDFILL GAS-TO-ENERGY (LFGTE) PROJECT - CATERPILLAR IC ENGINES

The current application for significant revision involves the construction and operation of three internal combustion (IC) engines (Caterpillar, Model G3520C) utilizing LFG to generate usable electricity, with each engine having a maximum design rating of 2,233 HP (nominal 1.6 MW of electricity produced). RI has requested the ability to use each engine for up to 8,760 hours per year, each combusting 35,280 cu.ft. (nominal) of LFG per hour. The heating value of LFG is roughly 500 Btu/cu.ft., but can be somewhat variable within a certain range. As part of their compliance demonstration, RI will be required to sample and measure the heating value of the LFG on a monthly basis. The draft revised permit has heat input limits for each of the IC engines, set at 17.82 MMBtu/hr.

The IC engines do not have add-on control devices for pollutants, but they will serve to control VOCs and organic HAPs contained in the LFG. RI claimed in their application that the IC engines will comply with the NSPS, Part 60, Subpart WWW control efficiency (98% or 20 ppmv as hexane, 3% O<sub>2</sub>) for NMOC/VOC. RI also indicated in their application that the LFG engines will be compliant with NSPS Subpart JJJJ emission limits for CO and NO<sub>x</sub> (see Section 3.4.1).

Prior to its combustion in the IC engines, RI proposes to treat the LFG using particulate filtration, dewatering, and gas compression apparatus. According to RI's application for revision, the LFG treatment system apparatus will not have atmospheric vents, and RI proposes to capture and route all treated LFG to the new IC engines. As such, treated LFG will not be vented to the outdoor ambient air. The currently-permitted candlestick flare will serve as a back-up LFG control device.

### 2.3 LFGTE PROJECT - CARBON MONOXIDE (CO) CAP PROGRAM

RI has requested a facility-wide CO emissions cap of 249 tons per year to avoid being considered a major stationary source of CO emissions (PSD threshold is 250 tons per year). As such, CO-emitting sources at Lockwood will be subject to monitoring, recordkeeping, and reporting requirements to demonstrate compliance with the facility-wide cap. With the exception of fugitive CO from the landfill, there are 13 CO-emitting units at Lockwood. Enforceable provisions for RI to demonstrate compliance with the CO cap are contained in Section VII of the draft revised permit. Fugitive emissions of CO from the landfill itself (5.38 tons per year) are not subtracted from RI's requested cap.



### 3.0 APPLICABLE REGULATIONS

#### 3.1 NEVADA REVISED STATUTES

The Nevada Revised Statutes (NRS) are the current codified laws of the State of Nevada. The NRS is the statutory authority for the adoption and implementation of administrative regulations. The statutes relating to the control of air pollution are contained in Title 40, Public Health and Safety, Chapter 445B, Air Pollution, NRS 445B.100 through NRS 445B.640. The NRS specifies that the State Environmental Commission is the governing body given the power to adopt administrative regulations. Because the NRS is the enabling statutory authority, very few specific requirements are contained in the statutes. Rather, the NRS provides, generally, broad authority for the adoption and implementation of air pollution control regulations. The Lockwood Landfill will be subject to the NRS and needs to comply with all applicable regulations under the NRS. The NRS may be viewed at the following website:

<http://www.leg.state.nv.us/NRS/Index.cfm>

#### 3.2 NEVADA ADMINISTRATIVE CODE

The Nevada Administrative Code (NAC) contains the regulations that have been adopted by the State Environmental Commission (SEC), pursuant to the authority granted by the Nevada Revised Statutes (NRS), relating to the control of air pollution. The NAC requires that, where State regulations are more stringent in comparison to Federal regulations, the State regulations are applicable. The NAC sets forth, by rule, maximum emission standards for visible emissions (opacity), PM<sub>10</sub> (particulate matter less than 10 microns in diameter) and sulfur emitting processes. Other requirements are established for incinerators, storage tanks, odors and maximum concentrations of criteria air pollutants in the ambient air. Other NAC regulations specify the requirements for applying for and method of processing applications for operating permits. All the equipment considered in this application must meet, at a minimum, the applicable standards and requirements set forth in the NAC, specifically, the emission standards contained in NAC 445B.22027 through 445B.22033 for particulate matter, 445B.2204 through 445B.22047 for sulfur emissions, 445B.22017 for opacity, and the Nevada Ambient Air Quality Standards as set forth in NAC 445B.310 through 445B.311. The NAC may be viewed at the following website:

<http://www.leg.state.nv.us/NAC/CHAPTERS.HTML>

#### 3.3 NEVADA APPLICABLE STATE IMPLEMENTATION PLAN

The Applicable State Implementation Plan (ASIP) is a document that is prepared by a state or local air regulatory agency and required to be submitted to the U.S. EPA for approval. Title I of the Clean Air Act is the statutory authority for the U.S. EPA regulations that require a State to submit a ASIP. The contents of the ASIP are intended to show how a state, through the implementation and enforcement of the regulations contained in the ASIP, will either show how attainment of the national ambient air quality standards (NAAQS) will be achieved or how a state will continue to maintain compliance with the NAAQS.

#### 3.4 CODE OF FEDERAL REGULATIONS

The Code of Federal Regulations (CFR) are regulations adopted by the U.S. EPA and published in the Federal Register pursuant to the authority of the granted by Congress in the Clean Air Act. The CFR addresses multiple aspects, including but not limited to, permitting requirements, performance standards, testing methods, and monitoring requirements. The CFRs may be viewed online at the following website:

<http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=%2Findex.tpl>



### 3.0 APPLICABLE REGULATIONS (continued)

#### 3.4.1 NEW SOURCE PERFORMANCE STANDARDS

Section 111 of the Clean Air Act, "Standards of Performance of New Stationary Sources," (NSPS) requires EPA to establish federal emission standards for source categories which cause or contribute significantly to air pollution. Each NSPS defines the facilities subject to these requirements and prescribes emission limits for specified pollutants, compliance requirements, monitoring requirements, and test methods and procedures. Since December 23, 1971, the Administrator has promulgated 88 such standards and associated test methods. These standards can be found in the CFR at Title 40 (Protection of Environment), Part 60 (Standards of Performance for New Stationary Sources).

Applicable NSPS provisions for emission units currently permitted at Lockwood are contained in the various sections of the draft revised permit, and new NSPS standards were added for the 3 new LFG engines.

- The diesel-powered engines currently permitted at Lockwood are exempt from 40 CFR Part 60, Subpart III, because they were placed into service prior to the Subpart III applicability dates for construction (July 11, 2005) and manufacture (April 1, 2006), but they are now subject to NESHAP requirements for reciprocating engines (see Section 3.4.2 below). It must be noted that Subpart III provisions were in the permit for those engines that could be changed out and replaced by an "equivalent" engine, but the permitted engines were actually never subject to Subpart III. But, with the new NESHAP requirement (see Section 3.4.2 below) for the existing engines, equipment change-outs can no longer be allowed, because the NESHAP applicable requirements could be different for the "equivalent" engine, thereby requiring that the applicable requirements be changed in the permit *before* the "equivalent" engine can be placed into service.
- The new LFG engines (System 09, S2.011 – S2.013) are subject to 40 CFR Part 60, Subpart JJJJ – *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*. Subpart JJJJ provisions are listed in the Section VI of the draft revised permit for System 09.
- The LFG treatment system for the IC engines will be subject to new regulations proposed for 40 CFR Part 60, Subpart WWW – *Standards of Performance for Municipal Solid Waste Landfills*. The proposed rule changes address, among other things, a formal definition of what constitutes an LFG treatment system, plus establishing monitoring and recordkeeping requirements for the treatment systems themselves (see 71 FR 53272 – 53293, 2006). The proposed amendments to the rule exempt IC engines from further compliance with Subpart WWW if they combust treated LFG. At the present time, the proposed rule amendments have not been made final.

A recent NSPS applicability determination made by EPA Region 5 (ADI, Control No. 0900058, November 14, 2008) confirms that IC engines combusting treated LFG are exempt from 40 CFR Part 60, Subpart WWW requirements, and the application of the policy prior to promulgation of the final rulemaking is known informally at the "treatment exemption." It must be noted that the current version of Subpart WWW does not contain any applicable requirements for LFG treatment systems. The EPA applicability determination made it clear, however, that MSW landfill plant operators using IC engines that combust treated LFG will have to comply with the new monitoring and recordkeeping requirements for the treatment systems when the proposed amendments to Subpart WWW become finalized.



### 3.0 APPLICABLE REGULATIONS (continued)

#### 3.4.2 FEDERAL NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

NESHAP for hazardous air pollutants (HAPs) are established in the CFR pursuant to Section 112 of the Clean Air Act Amendments of 1990. These standards regulate air pollutants that are believed to be detrimental to human health. The NESHAP program applies to all sources, both existing and new. These standards are codified in Title 40 CFR Parts 61 and 63.

NESHAPs may cover both major sources and area sources in a given source category. Major sources are defined as those facilities emitting, or having the potential to emit, 10 tons per year or more of one Hazardous Air Pollutant (HAP) or 25 tons per year or more of multiple HAPs. Major sources are required to comply with MACT standards. Area Sources are defined as those facilities that are not major sources.

The Lockwood Landfill is an *Area Source* of HAPs. The following points are considered below:

- New applicable NESHAP provisions for several diesel engines currently permitted at Lockwood had to be added to the draft revised permit, specifically those applicable requirements for *existing* reciprocating internal combustion engines (RICE) at area sources of HAPs set forth under 40 CFR Part 63, Subpart ZZZZ – NESHAP for *Reciprocating Internal Combustion Engines*. The affected emission units include S2.001 – S2.009. The applicable Subpart ZZZZ provisions are set forth in the various sections of the draft revised permit. For *existing* engines, May 3, 2013 is the Subpart ZZZZ compliance date, but fuel sulfur requirements apply immediately to those engines that have Subpart ZZZZ numerical emission limits. It must be noted that low sulfur (15 ppm) *non-road* diesel fuel is, in fact, available and mandated in Nevada, according to the Nevada Department of Agriculture.
- The LFG treatment systems (filtering, dewatering, compression) for the new LFG IC engines are potentially subject to monitoring and recordkeeping requirements which have been proposed as amendments to the existing rule 40 CFR Part 63, Subpart AAAA – NESHAP for *Municipal Solid Waste Landfills*. The amendments outlined in the 2006 Federal Register notice, 71 FR 53272 – 53293, have not been made final, but mirror those in the companion NSPS Subpart WWW. Because the NESHAP amendments have not yet been made final, there are no applicable Subpart AAAA requirements for the LFG treatment systems.
- Because RI is treating the LFG prior to combustion in the IC engines, the new engines will not be subject to NESHAP (and NSPS) NMOC emission limits, in accordance with EPA's current "treatment exemption" policy. However, RI will be required to comply with the new NESHAP monitoring and recordkeeping requirements for the LFG treatment system itself when the proposed amendments to Subpart AAAA become finalized.



### 3.0 APPLICABLE REGULATIONS (continued)

#### 3.4.3 PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

The Prevention of Significant Deterioration (PSD) permitting program is a Clean Air Act permitting program for new and modified major stationary sources of air pollution. Implementation of the federal PSD regulations is delegated to the State of Nevada by U.S. EPA and these regulations are contained at 40 CFR Part 52.21. Therefore, NBAPC implements the federal PSD regulations directly. These regulations specify federally required permitting procedures for each "major stationary source". The PSD regulations define a "stationary source" as *"any building, structure, facility, or installation which emits or may emit any air pollutant subject to regulation under the Act."* A "building structure facility or installation" is defined as *"all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control) except the activities of any vessel. Pollutant-emitting activities shall be considered as part of the same industrial grouping if they belong to the same 'Major Group' (i.e., which have the same first two digit code) as described in the Standard Industrial Classification Manual, 1972, as amended by the 1977 Supplement."*

"Major" is defined as the potential to emit of a stationary source, which equals or exceeds a specified threshold (in tons per year) of any air pollutant regulated under the Clean Air Act (40 CFR 52.21(b)(1)). The first threshold is for a stationary source that emits or has the potential to emit 100 tons per year or more of any regulated NSR pollutant and is defined as one of 28 specific categories of sources (see 40 CFR 52.21(b)(1)(i)(a)). The other applicability threshold is for any other stationary source that emits or has the potential to emit 250 tons per year of any regulated NSR pollutant (see 40 CFR 52.21(b)(1)(i)(b)).

The SIC code for the Lockwood Landfill is 4953 for Sanitary Landfills. However, none of the 28 specific categories is representative of the facility. Therefore, major stationary source status is triggered for the Lockwood Landfill at the 250 ton per year threshold for any pollutant regulated under the Act.

As outlined in Section 4 of this review, RI has requested an emissions cap of 249 tons per year for CO. As such, RI qualifies as a "synthetic minor" source for PSD. Section VII of the draft revised permit contains detailed monitoring, recordkeeping, and reporting requirements that specify how RI will demonstrate compliance with the CO cap. It must be noted that the PTE for the new LFG engines alone would be over 250 tons per year without the CO cap, which has implications for a potential PSD major modification, should RI's actual emissions ever exceed the PSD applicability threshold.

One component of the compliance demonstration will be a requirement for RI to install CEMS for CO on the LFG engines. A CEMS for NO<sub>x</sub> will also be required to ensure permitted emission rates are not exceeded, given that the new LFG engines will not have any add-on controls for NO<sub>x</sub>. It must be noted that the area where the Lockwood Landfill is located is PSD-triggered for NO<sub>x</sub>.

In summary, the Lockwood Landfill is a Title V source, but will remain a "synthetic minor" for PSD, provided it complies with the facility-wide CO cap.



### 3.0 APPLICABLE REGULATIONS (continued)

#### 3.4.4 COMPLIANCE ASSURANCE MONITORING (CAM) – 40 CFR Part 64

Compliance Assurance Monitoring (CAM) plans are required for major sources required to obtain Title V (Part 70 or 71) permits. The CAM rule was signed on October 3, 1997 and came into effect on November 21, 1997. The U.S. EPA developed the CAM rule to focus on monitoring of certain operating parameters to ensure compliance with emission limitations in-between scheduled source tests. CAM requirements apply to stationary sources that: (1) are equipped with post-process pollutant control devices; (2) have pre-control device emissions equal to or greater than 100% of the major source threshold for a pollutant; and (3) are subject to the Title V permit program.

CAM requirements do not apply to the new LFG engines, because they will not have any post-process pollutant control devices.



## 4.0 EMISSIONS INVENTORY

### 4.1 PROPOSED EMISSIONS

The facility-wide emissions inventory for the Lockwood Landfill is presented in Table 4.1 below. As can be seen, the potential-to-emit (PTE) that includes the three new LFG IC engines, exceeds the Class I (Title V) thresholds for SO<sub>2</sub>, CO, and VOC (surrogate for ozone). RI requested H<sub>2</sub>S emission limits of  $5 \times 10^{-6}$  lb/hr for the new LFG engines, which is considered negligible from a permitting standpoint. The Lockwood Landfill is considered an *area source* of HAPs, with total HAP emissions of 14.4 tons per year, and the most prevalent HAP in the inventory is formaldehyde at 3.03 tons per year, emitted from the LFG IC engines, according to RI's emissions inventory submitted with its application for revision.

It must be noted that the NBAPC has not yet adopted the PM<sub>2.5</sub> ambient air quality standards into its administrative regulations. As such, the NBAPC does not require non-PSD sources to conduct emissions inventories or model for PM<sub>2.5</sub>. However, assuming all PM<sub>10</sub> equals PM<sub>2.5</sub>, the facility wide PTE for PM<sub>2.5</sub> at the Lockwood Landfill will be less than 22 tons per year, which is well below both the Title V and PSD major source thresholds. Moreover, the project emissions increase will only be 6.5 tons per year for the addition of the three new LFG engines, which is also below the NSR significant emissions level of 10 tons per year for PM<sub>2.5</sub>.

According to an evaluation prepared by SCS Engineers on behalf of RI, pre-modification CO<sub>2e</sub> emissions total 79,438 tpy, with CO<sub>2e</sub> for the modification itself (i.e. addition of the three new LFG engines) estimated to be 53584 tpy. Both of these emissions estimates are below the thresholds set forth under Step 2 of the GHG Tailoring Rule (i.e. the Step 2 100k/75k thresholds). Therefore, the NBAPC believes that the proposed modification to the Lockwood Landfill will not trigger PSD permitting requirements after the July 1, 2011 implementation date, particularly if biogenic CO<sub>2</sub> emissions are excluded under the EPA's proposed deferral (76 FR 15249).

Fugitive emissions of NMOC currently permitted at Lockwood include 223.6 Mg/yr (246.47 tpy). Fugitive emissions of CO and VOC total 5.38 and 96.95 tons per year, respectively. However, fugitive CO and VOC do not have limits in RI's air quality permit, nor does RI report fugitive CO and VOC to the NBAPC on an annual basis.

With the facility-wide CO cap of 249.0 tons per year in place, the Lockwood Landfill will qualify as a synthetic minor for PSD, with annual emission rates for all PSD pollutants less than 250 tons per year. Fugitive emissions of CO and VOC were included for System 01 in RI's application. But, fugitive CO emissions were not subtracted from RI's requested cap, because fugitive emissions are not required to be included for determination of major stationary source status (i.e. landfills are not on the list of the 28 specific 100 tpy PSD source categories).

Section VII of the draft revised permit contains detailed monitoring, recordkeeping, and reporting requirements to ensure that RI complies with its requested CO emissions cap.



#### 4.0 EMISSIONS INVENTORY (continued)

<b>System 01 - MSW Landfill (Fugitive Emissions)</b>	<b>NMOC of 223.6 Mg/yr (246.47 tons per year)</b>				<b>5.56</b>	<b>96.95</b>
<b>System 02 - Wood Chipping Circuit</b>	7.61	4.32	0.83	5.24	1.39	0.15
<b>System 03 - Asphalt Grinding Circuit</b>	1.41	0.79	0.21	3.21	0.69	0.26
<b>System 04 - Petroleum-Contaminated Soil Storage</b>	0.00	0.00	0.00	0.00	0.00	2.00
<b>System 05 - Truck Tipper Engines (3 x 130 HP)</b>	0.75	0.75	0.70	10.65	2.50	0.87
<b>System 06 - Light Plant Engines (3 x 10.5 HP)</b>	0.10	0.10	0.09	1.39	0.30	0.11
<b>System 07 - Diesel Generator 96 HP</b>	0.26	0.26	0.24	3.70	0.80	0.30
<b>System 08 - Candlestick Flare</b>	9.20	9.20	86.60	19.32	10.240	2.00
<b>System 09 (New) - LEGIE Engines (3 x 2,233 HP)</b>	6.48	6.48	38.55	38.82	232.97	11.22
<b>Non-Permit Equipment</b>	0.00	0.00	0.00	0.00	0.00	0.12
<b>Total =</b>	<b>25.81</b>	<b>21.90</b>	<b>127.22</b>	<b>82.33</b>	<b>365.23</b>	<b>113.98</b>
<b>Facility-wide Cap =</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>249.0</b>	<b>N/A</b>

**Note:** Fugitive emissions are counted in the facility-wide PTE. Refuse, Inc. has requested a facility-wide cap of 249 tons per year for carbon monoxide to qualify as a synthetic minor for PSD. Fugitive emissions are not included in the facility-wide cap. PTE for Systems 01 - 08 are the current permit limits, but there are no permit limits for fugitive CO and VOC, nor does Refuse, Inc. report these on an annual basis for System 01.



## 5.0 AMBIENT AIR IMPACT ANALYSIS

### 5.1 INTRODUCTION/ PURPOSE

The purpose of this analysis is to determine the likely air quality impacts resulting from continued operation of the Lockwood Landfill after the proposed LFG engines are constructed and operating.

### 5.2 CLASSIFICATION OF AIR BASIN

The Lockwood Landfill is located in Air Quality Hydrographic Basin (HA) 83, the Tracy Segment of the Truckee River Basin. HA 83 is currently unclassified for all criteria pollutants. The unclassifiable designation was developed due to lack of available monitoring data to properly classify the air basin. HA 83 is a PSD-triggered 107(d) Planning Area. Therefore, this evaluation will address the dual issues of compliance with the Nevada AAQS and the PSD increments.

### 5.3 AIR QUALITY MODELING ANALYSIS

#### 5.3.1 AIR DISPERSION MODEL

RI performed the requisite air dispersion modeling analysis and environmental evaluation for their proposed LFGTE project using the currently approved/preferred U.S. EPA model AERMOD (v. 09292) to determine likely air quality impacts (subcontracted to SCS Engineers and LNM Consulting). Currently, applicants are allowed to use the U.S. EPA Scheffe screening tool to determine worst-case ozone impacts.

During the review of RI's modeling analysis, it was found that some of the variable emission rate scalars in AERMOD were inappropriately applied (i.e. application of scalars not supported by permit restrictions). However, these deficiencies did not rise to a level that would prompt rejection of a model. Instead, the NBAPC performed check model runs to test the sensitivity of the model to changes in the variable emission rate scalars so that they matched the restrictions in the current permit and those proposed by RI in their application for significant revision.

The NBAPC used Lakes Environmental's *AERMOD-View* graphical-user interface to input source information, generate receptors, and to actually run AERMOD. The NBAPC imported Refuse, Inc.'s digital modeling files into *AERMOD-View* for this purpose.

#### 5.3.2 AVERAGING PERIODS

The NBAPC performed check model runs for PM<sub>10</sub> (24-hour, Annual), SO<sub>2</sub> (3-hour, 24-hour, Annual), NO<sub>x</sub> (Annual), and CO (1-hour, 8-hour). A worst-case modeling analysis for H<sub>2</sub>S was also conducted, even though RI requested a negligible emission rate for this pollutant (5 x 10<sup>-6</sup> lb/hr). The hourly requested H<sub>2</sub>S emission rates were artificially increased by several orders of magnitude to determine worst-case impacts. The newer PM<sub>2.5</sub>, 1-hour NO<sub>2</sub>, and 1-hour SO<sub>2</sub> standards have not yet been adopted for inclusion in the Nevada air quality regulations. As such, these newer standards are not applied at the present time to non-PSD permit actions. Because variable emission rate scalars were used, the NBAPC ran short-term (ST, 1-, 3-, 8-, and 24-hour periods) and long-term (LT, Annual) models for comparison with the Nevada AAQS.



## 5.0 AMBIENT AIR IMPACT ANALYSIS (CONTINUED)

### 5.3.3 SOURCE PARAMETERS

Source input parameters were provided by RI. Although it is not possible to verify all source release parameters used by an applicant, a review of the models indicated that the input data used by RI was reasonable and not out of the ranges typically encountered in models submitted to this agency by applicants.

Hourly emission rate scalars were used in the model, chosen to match the corresponding permit restrictions, or proposed permit restrictions, with the maximum permitted or calculated emission rates used as inputs to AERMOD. As was mentioned previously, RI did not use the variable emission rate functions in AERMOD appropriately for some emission units. Consequently, both short-term (ST) and long-term (LT) models were evaluated by the NBAPC for each met year for each pollutant with properly established emission rate scalars.

### 5.3.4 RECEPTORS

Plant boundary receptors were spaced at 25 meter intervals. Receptors were spaced at 50 meter intervals up to 2 km from the plant boundary. A total of 9,484 receptors were included in the model. The plant boundary was provided by the applicant in NAD 83 UTM coordinates.

### 5.3.5 METEOROLOGICAL DATA

The NBAPC requested that RI perform modeling using pre-processed surface and upper air (.SFC and .PFL) files provided to them by the NBAPC. The surface met data was collected at the NV Energy Tracy Power Plant during 2000 and 2001. This same met data is used by the NBAQP for PSD increment tracking in HA 83. The maximum pollutant concentrations modeled are associated with the Y2000 meteorology. NBAPC check model runs were performed using both the Y2000 and 2001 met from Tracy.

### 5.3.6 BUILDING DOWNWASH

In accordance with current U.S. EPA and NBAPC guidelines, building downwash was considered for all model runs. Building downwash effects were evaluated using the BPIPPRIME algorithm to calculate projected building heights and widths for each point source in the model. This information is used by AERMOD to determine whether plume dispersion from a particular point source will be influenced by building downwash.

### 5.3.7 TERRAIN

AERMOD requires that elevated terrain be considered in air dispersion modeling analyses. Therefore, elevations for sources, receptors, and buildings were processed in AERMAP using appropriate U.S.G.S. DEM files for the project area. AERMAP performed the necessary conversions between the DEM datum and the NAD 83 project datum.

### 5.3.8 BACKGROUND CONCENTRATIONS

RI provided background concentrations for PM<sub>10</sub>, NO<sub>x</sub>, CO, and ozone. The NBAPC recommended background concentrations for SO<sub>2</sub>. Background values used in the Nevada AAQS compliance demonstration are tabulated in Table 5.4-1. The NBAPC has determined that these background values are very conservative, because they were derived from ambient monitoring conducted in the Reno urbanized area by the Washoe County AQMD. Noteworthy is that the Reno urbanized area is not in the same hydrographic basin as the Lockwood Landfill.



## 5.0 AMBIENT AIR IMPACT ANALYSIS (CONTINUED)

### 5.4 AIR QUALITY IMPACT ASSESSMENT

Results of air dispersion modeling are presented in Table 5.4-1. As can be seen, operation of the Lockwood Landfill after the construction and operation of the new LFGTE engines will not result in violations of the Nevada AAQS. It must be noted that there was very good correspondence between model results obtained by RI and the NBAPC.

Pollutant	AAQS Averaging Period	NBAPC Model Year	Lockwood Model Conc.	NBAPC Model Conc.	Backgr. Conc.	NBAPC Total Impact	AAQS	NBAPC Percent of Standard	NBAPC Exceedance (UTM, NAD83)
			µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	%	m
PM <sub>10</sub>	24-hr	2000	30.3	41.6	69	118.4	150	79	274,777 m <sup>2</sup> 4,374,207 m <sup>3</sup>
	Annual	2000	4.6	9.7	28	37.7	50	75	274,777 m <sup>2</sup> 4,374,207 m <sup>3</sup>
*PM <sub>2.5</sub>	24-hr	N/D	N/D	N/D	N/D	N/D	35	N/D	N/D
	Annual	N/D	N/D	N/D	N/D	N/D	15	N/D	N/D
SO <sub>2</sub>	*1-hr	N/D	N/D	N/D	N/D	N/D	145	N/D	N/D
	3-hr	2000	58.2	81.5	26	83.5	1,200	7	274,088 m <sup>2</sup> 4,374,365 m <sup>3</sup>
	24-hr	2000	16.7	17.5	10	27.4	345	8	274,088 m <sup>2</sup> 4,374,365 m <sup>3</sup>
	Annual	2000	1.5	1.99	4	6.9	80	8	274,088 m <sup>2</sup> 4,374,365 m <sup>3</sup>
NO <sub>x</sub>	*1-hr	N/D	N/D	N/D	N/D	N/D	140	N/D	N/D
	Annual	2000	2.9	4.8	37	41.9	100	42	274,084 m <sup>2</sup> 4,374,302 m <sup>3</sup>
CO	1-hr	2000	816	850	3,142	5,992	40,500	15	274,088 m <sup>2</sup> 4,374,365 m <sup>3</sup>
	8-hr	2000	288	246	3,511	3,759	10,500	36	274,115 m <sup>2</sup> 4,374,186 m <sup>3</sup>
H <sub>2</sub> S	1-hr	2000	N/D	68	0	68	10	61	274,068 m <sup>2</sup> 4,374,365 m <sup>3</sup>
O <sub>3</sub>	1-hr	N/A	32 (Scheffe)	32 (Scheffe)	180	212	235	90	275,407 m <sup>2</sup> 4,360,005 m <sup>3</sup>

\*Note: These standards have not yet been adopted in Nevada regulations, so model values were not determined (N/D). The new 1-hour NO<sub>x</sub>, 1-hour SO<sub>2</sub>, and PM<sub>2.5</sub> standards are only applied to new PSD facilities or existing PSD facilities proposing significant revisions. H<sub>2</sub>S emissions were modeled at very conservative emission rates, several orders of magnitude higher than those requested by RI for the LFG engines. The Lockwood Landfill will be a synthetic minor for PSD. Background concentrations were provided by the applicant, and are very conservative, because most of them were derived from monitoring conducted in the Reno urban area (Washoe County), west of the Lockwood Landfill. Meteorology from the Tracy Power plant was used for modeling (2000 and 2001). The Y2000 met produced the highest model concentrations.



## 5.0 AMBIENT AIR IMPACT ANALYSIS (CONTINUED)

### 5.5 PSD INCREMENT FOR HA 83 - TRACY SEGMENT, TRUCKEE R. BASIN

The following summary of increment tracking results was provided by the Nevada Bureau of Air Quality Planning (NBAQP).

Emissions resulting from Refuse, Inc.'s significant revision do not cause the increment standards for  $\text{NO}_x$ ,  $\text{PM}_{10}$  or  $\text{SO}_2$  to be exceeded in HA83, as described below.

Increment was analyzed on a paired-in-time basis at each receptor in the HA83 study receptor grid to reflect the Class I permit significant revision by Refuse, Inc.

Note that this is a different fenceline than was used previously in the last increment analysis for Lockwood Landfill due to a shift from NAD27 to NAD83 as well as a slightly different fenceline shape. With this shift and slightly new shape for the fenceline, two additional receptors were modeled in this increment analysis. In all, six receptors were commented out from the original HA83 receptor grid due to being contained within the fenceline for Lockwood Landfill.

Tables 5.5-1, 2, and 3 present the results of the HA83 increment analysis of Refuse, Inc.'s Class I significant revision. The tables list all receptors with modeled concentration in excess of the increment standard or the receptors with the highest modeled concentration for each pollutant and averaging period. In addition, the tables list the receptor with the highest modeled contribution attributed to Refuse, Inc.'s Class I significant revision.



## 5.0 AMBIENT AIR IMPACT ANALYSIS (CONTINUED)

Table 5.5-1 – Refuse, Inc. PM<sub>10</sub> Increment Consumption

PM <sub>10</sub> Results							
Increment Std. = 30 µg/m <sup>3</sup> 24-hour avg							
Increment Std. = 17 µg/m <sup>3</sup> annual avg							
Met Year	Avg. Period	Increment Receptors				RF Contrib.	Max. RF Conc.
		Rec. No	X Coord.	Y Coord.	Total Conc.		
2000	24	2922	302500	4388500	63.48016	0.00164	--
		2984	303500	4389000	53.87526	-0.00093	--
		2983	303000	4389000	44.25916	0.00573	--
		2982	302500	4389000	36.14110	0.00162	--
		3044	303000	4389500	34.26601	0.00329	--
		2923	303000	4388500	27.47479	-0.00093	--
	1288	276500	4375000	5.01706	0.89316	0.89316	
	Annual	13	273500	4358000	-2.57874	-0.00117	--
1159		274500	4374000	-17.59702	0.35115	0.35115	
2001	24	2922	302500	4388500	31.26916	0.00472	--
		3294	283900	4381200	28.89546	0.00443	--
		1220	273500	4374500	9.30548	2.95667	2.95667
	Annual	13	273500	4358000	-2.27307	-0.00110	--
		1160	275000	4374000	-14.98864	0.34209	0.34209

As can be seen in Table 5.5-1, above, at all receptors where the modeled concentration exceeds the increment standard, activities related to Refuse Inc.'s, Class I Significant Revision do not significantly contribute (i.e., concentrations > 0.5 ug/m<sup>3</sup> for the 24-hour standard and >0.1 ug/m<sup>3</sup> for the annual standard) to concentrations that exceed the standard.

Table 5.5-2 – Refuse, Inc. NO<sub>x</sub> Increment Consumption

NO <sub>x</sub> Results							
Increment Std. = 25 µg/m <sup>3</sup> annual avg							
Met Year	Avg. Period	Increment Receptors				RF Contrib.	Max. RF Conc.
		Rec. No	X Coord.	Y Coord.	Total Conc.		
2000	Annual	1587	274000	4377500	22.42728	0.02240	--
		1282	273500	4375000	3.237333	1.36056	1.36056
2001	Annual	1587	274000	4377500	21.26962	0.02173	--
		1282	273500	4375000	3.23954	1.30782	1.30782

Table 5.5-2 shows no receptors where the concentration exceeds the increment standards for NO<sub>x</sub> as the result of activities related to Refuse, Inc.'s Class I Significant Revision.



## 5.0 AMBIENT AIR IMPACT ANALYSIS (CONTINUED)

Table 5.5-3 – Refuse, Inc. SO<sub>2</sub> Increment Consumption

		SO <sub>2</sub> Results					
		Increment Std. = 512 µg/m <sup>3</sup> 3-hour avg					
		Increment Std. = 91 µg/m <sup>3</sup> 24-hour avg					
		Increment Std. = 20 µg/m <sup>3</sup> annual avg					
Met Year	Avg. Period	Increment Receptors				RF Contrib.	Max. RF Conc.
		Rec. No	X Coord.	Y Coord.	Total Conc.		
2000	3	3788	284250	4381250	253.31705	0.00009	--
		1146	275500	4374000	22.09736	18.32911	18.32911
	24	3788	284250	4381250	65.29959	0.01525	--
		1269	273500	4375000	4.89190	3.96253	3.96253
	Annual	2105	287500	4382000	3.91785	0.01088	--
		1267	273500	4375000	-0.04320	1.05787	1.05787
2001	3	3788	284250	4381250	170.23370	0.00007	--
		1267	273500	4375000	24.83612	21.67597	21.67597
	24	3788	284250	4381250	81.28755	0.00027	--
		1267	273500	4375000	5.58910	4.81024	4.81024
	Annual	1981	285000	4381000	3.56040	0.01270	--
		1267	273500	4375000	-0.02718	1.03442	1.03442

Table 5.5-3 shows no receptors where the concentration exceeds the increment standards for SO<sub>2</sub> as the result of activities related to Refuse, Inc.'s Class I Significant Revision.

### 5.6 OZONE SCREENING

The NBAPC performed an assessment of worst-case, potential ozone impacts from operation of the Lockwood Landfill. Ozone screening was performed using reference tables in the U.S. EPA document entitled, *VOC/NO<sub>x</sub> Point Source Screening Tables*, by Richard Scheffe (1986). Based upon the annual PTE for NO<sub>x</sub> and VOCs, the NBAPC has confirmed the analysis by RI that the 1-hour ozone increment will be 32 µg/m<sup>3</sup>. With a conservative background of 180 µg/m<sup>3</sup> added, the total impact would be 212 µg/m<sup>3</sup> (the standard is 235). Based on these results, the NBAPC believes that continued operation of the Lockwood Landfill after the proposed revisions are made will not result in future exceedances of the AAQS for ozone.

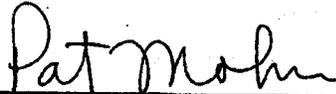


## 6.0 CONCLUSIONS / RECOMMENDATIONS

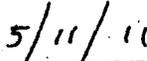
Based on the above review and supporting data and analyses, operation of Lockwood Landfill, under the draft revised permit conditions, will not result in violations of any applicable ambient air quality standards. Therefore, I recommend that the draft facility-wide operating permit be formally issued, with those applicable requirements, conditions, and restrictions contained therein.

Appendix 1 - NBAPC Detailed Emissions Inventory for the LFG Engines

Appendix 2 - NBAPC Draft Revised Class I (Title V) Air Quality Operating Permit AP4953-1148.01



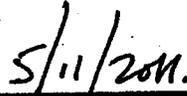
Pat Mohn, Staff Engineer III



Date



Lawrence P. Kennedy, P.E.  
Permitting Supervisor  
Bureau of Air Pollution Control



Date