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**Technical Support Document  
Proposed Title V Permit Renewal  
Sierra Estrella Landfill  
Permit # V20634.000**

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**1. BACKGROUND**

1.1 Applicant/Application History

This permit renewal pertains to an existing solid waste landfill facility, owned and operated by Sierra Estrella Landfill, Inc., a subsidiary of Waste Management Arizona Landfills, an Arizona corporation. The facility opened in 1994, with an overall site area of about 300 acres. The facility, commonly known as the Sierra Estrella Landfill, is located on 22087 North Ralston Road, Maricopa, Arizona, upon a parcel also identified by Pinal County Assessor's Parcel #510-79-002C4.

This analysis reflects consideration of (at least) the following:

- Permit application signed by Dan Vermeer on 1/3/08.

1.2 Attainment Classification

This facility is located in an area designated as "attainment" for all pollutants.

1.3 Permitting History

The following is a list of permits applied for and/or issued since 1990 with respect to the Sierra Estrella Landfill:

Permit #	Permit Type	Issued Date	Changes
A20500	Installation Permit	4/22/94	
V20605.000	Title V	6/15/98	Initial Title V
V20618.000	Renewal	8/22/03	Addition to the list of allowed "daily covers", and non-road engines.

1.4 Compliance/Enforcement History

Sierra Estrella landfill has been inactive since 2000, and inspections have not been conducted during this shutdown period.

Annual NMOC report have been submitted in accordance with NSPS requirements, and Tier 2 modeling was conducted in 2006 to determine site-specific parameters to analyze when the landfill will reach 50 Mg/yr of NMOC emissions, the threshold for the requirement to install controls.

**2. PROCESS DESCRIPTION**

2.1 General Process

The principal business activity consists of providing a controlled and managed repository for solid wastes. Examples of such wastes include municipal solid waste, construction debris, demolition material, dead animals, auto shredder fluff, incinerator ash, non-infectious medical wastes, dried waste water treatment plant sludge and petroleum contaminated soils. Asbestos materials are independently managed and segregated in a controlled area.

The natural decomposition of the waste materials, and to some extent the evaporation of volatile compounds in the waste materials, constitute the primary sources of emissions.

Traffic delivering waste materials generates particulate emissions ("PM<sub>10</sub>") or dust. In addition, the daily application of a cover layer of soil also produces PM<sub>10</sub> emissions, resulting from soil stockpiling, cover layer distribution, and wind erosion. Soil is typically used as a daily cover material; however, other alternatives as expressly approved under this permit may also be used. Diesel-driven equipment also emit oxides of nitrogen ("NO<sub>x</sub>") and sulfur dioxide ("SO<sub>2</sub>") and may operate at the facility.

The facility design includes a liner system, which collects any liquids, or leachate, that drains from the mass of waste materials. A collection system and pump allows the leachate to be extracted, collected, and eventually sprayed back onto lined cells in the facility, effectively amounting to a leachate drying system. Eventually, any volatile fraction will evaporate or decompose, and those compounds will escape as emissions.

## 2.2 Process Changes - AOS

This landfill has been inactive since the start of 2000. As part of the permit renewal V20634.000, Permittee is proposing an alternative scenario (AOS) in which they would begin accepting rate at a much larger rate (up to 5,000 tons per day) than previously planned, and due to the increase in vehicle traffic and increase in landfill equipment, the landfill's potential to emit (PTE) would increase.

Also, with this alternative operating scenario, the site would reach the capacity that would trigger the requirement to install controls by the year 2010, as opposed to 2050 as planned with the primary scenario. Since the requirement to install controls could be triggered during this permit term, Permittee is proposing the installation of a collection and control (candlestick flare) system through this permit renewal.

## 3. EMISSIONS

### 3.1 General Methodology

#### 3.1.1 Landfill Gas Emissions

The natural decomposition of waste materials produces surface emissions of VOCs, HAPs and NMOCs. EPA policy memorandum from 10/21/1994 indicates that landfill gas emissions which are reasonably collectable are to be considered non-fugitive regardless of whether a gas system is in-place. AP-42 suggests that 65-85% of the landfill gas should be considered collectable. Therefore, permittee has used the industry acceptable 75% for purposes of calculations. The remaining 25% are considered fugitive.

Landfill gas generation estimates were developed using a landfill gas model which mimics EPA's LandGEM 3.02, using the parameters recommended<sup>1</sup> in AP-42. Disposal rate projections result in a peak disposal capacity of 17,410,000 tons.

- Collectable Emissions:

75% of the landfill gas emissions are considered collectable, and since under the

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<sup>1</sup>k = 0.02, L<sub>0</sub> = 100 m<sup>3</sup>/Mg

AOS, the landfill will reach 50 Mg/yr of NMOCs, the permittee is proposing a system that will collect landfill gas and control emissions of NMOCs with a destruction efficiency of at least 98%. The date of installation of this system will be determined by when the 50 Mg/yr level is triggered. NMOCs, VOCs and HAPs from the flare are estimated based on a 98% control efficiency. Emissions of PM10 and SOx are based on emission factors from AP-42, Section 2.4. And emissions of CO and NOx are based on manufacturer's guarantees.

- Fugitive Emissions:

NMOC emissions are based on the landfill's 2006 Tier 2 Survey to determine the site specific NMOC content (882.05 ppmv). VOC emissions were estimated by assuming 39% of the NMOCs are VOCs, as indicated in AP-42, Table 2.4-2.

Concentrations of HAPs were taken from the Waste Industry Air Coalition (WIAC) study of constituents of landfill gas.

### 3.1.2 Particulate Matter from Landfill Operations

The following activities on-site generate fugitive particulate matter (PM10 and PM2.5) emissions: the use of paved and unpaved roads by vehicles (refuse and others); construction activities including heavy equipment traffic; and, the excavation, transportation, stockpiling, deposition of cover materials. PM10 and PM2.5 emissions have been calculated using AP-42 methodologies.

### 3.1.3 Leachate Management

Leachate is generated by precipitation and other moisture that percolates through the refuse mass and is collected in the leachate collection system and sent to the leachate/evaporation pond. The collection and storage of leachate generates emissions of VOCs and HAPs. Emissions from the leachate management were calculated using mass balance.

### 3.1.4 Internal Combustion Engines

While no internal combustion engines are being used at the facility, the permit allows the use of a tipper engine, a light plant engine, a steam cleaner engine and a water pump. Under the alternative scenario (AOS), 2 of each engines will be used<sup>2</sup>. Emissions of NOx, CO, SOx, PM10 and VOCs will be generated by the engines. AP-42 emission factors have been used for calculating emissions from these equipment.

### 3.1.5 Underground Storage Tanks (USTs)

While no USTs are present on site, the permit allows the installation of up to 2 diesel and gasoline tanks on site, which due to their capacities will be considered Insignificant Activities. Most likely these tanks will be above ground storage tanks.

### 3.1.6 Asbestos

The landfill is permitted for disposal of both friable and non-friable asbestos-containing

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<sup>2</sup>The second tipper engine, light plant engine and steam cleaner engine were already permitted in V20618.000

waste in accordance with the applicable regulations, and in a separate area of the facility.

3.2 Actual and Potential Emissions

Pollutant	2006 Actual (tpy)	Primary Scenario PTE (tpy)	AOS PTE (tpy)
PM <sub>2.5</sub>	0.44	9.83	17.00
PM <sub>10</sub> <sup>3</sup>	0.90	37.67	79.07
CO	0.00	60.32	75.43
NOX	0.00	22.08	30.73
SO2	0.00	4.84	6.22
VOCs	3.29	16.49	20.69
NMOCs	8.43	41.41	51.27
HAPs	0.77	6.11	7.56

Notes: - Primary Scenario potential emissions are based on peak gas generation in the year 2050.  
 - AOS potential emissions are based on peak gas generation in the year 2010.

**4. REGULATORY REQUIREMENTS AND MONITORING**

4.1 TITLE V/PSD Applicability

In accordance with PCAQCD §1-3-140.80, this source is not a major source since all the emissions are below 100 tons per year, and 10 tons per year of any single HAP or 25 tons per year of combined HAPs. While not a major source, landfills with a design capacity equal or greater than 2.5 million Megagrams are subject to 40 CFR Part 60, Subpart WWW and also subject to Part 70 permitting requirements. This facility first obtained a Title V permit in 1998.

4.2 NSPS/NESHAP Applicability

Permittee has been subject to the requirements of Subpart WWW since 2003. As part of AOS, the collection/control requirements of WWW could be triggered as soon as 2010. Therefore, as part of this renewal, permittee has revised the emissions estimates to account for a 98% destruction efficiency of an open (candlestick) flare. Annual NMOC reports or a five year estimate, whichever is applicable, will continue to be the indicator for whether the 50 Mg/yr of NMOC emissions has been reached.

The permit already requires a revision within 12 months of the NMOC report showing the 50 Mg/yr exceedance: “submit a control system design, prepared by a professional engineer to meet the requirements of 40 CFR §60.743.b.2.ii, to the Control Officer for approval, as required under §60.752.b.2., as well as an application for a corresponding permit revision to incorporate such changes to this permit as may be required to accommodate the proposed control system physical configuration, operational requirements and compliance requirements arising under those provisions of Part 60.” Therefore any other requirements will be included in the permit at such

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<sup>3</sup>This includes fugitive emissions, which are not counted towards the major source or significance thresholds.

time.

4.3 Regulatory Emission Limitations and Compliance/Monitoring

4.3.1 Opacity

While the Pinal County’s opacity rule has been revised since the last permit was issued, the more stringent requirement of 20% only applies to point sources which already do not have an applicable opacity standard elsewhere in our rules, and are not regulated by an NSPS or NESHAP. Currently there are no affected sources of the 20% standard at this facility.

4.3.2 Compliance Assurance Monitoring (CAM)

The requirements of 40 CFR Part 64, CAM, do not apply to this source since it is not a major source for any pollutants.

**5. AMBIENT IMPACT ASSESSMENT - PM10**

The changes to the permit do not include significant increases in emissions of PM10, therefore, no additional impact assessments have been conducted for this revision.

**6. LIST OF ABBREVIATIONS**

AOS	Alternative Operating Scenario
AP-42	“Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources”, 5 <sup>th</sup> Edition
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CFR	Code of Federal Regulations
CO	Carbon Monoxide
EPA	Environmental Protection Agency
HAP	Hazardous Air Pollutant
hr	Hour
lb	Pound
MACT	Maximum Achievable Control Technology
MMBTU	Million British Thermal Units
NESHAP	National Emission Standards for Hazardous Air Pollutants
NMOC	Non-Methane Organic Compounds
NO <sub>x</sub>	Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
PCAQCD	Pinal County Air Quality Control District
PGCAQCD	Pinal-Gila Counties Air Quality Control District
PM <sub>10</sub>	Particulate Matter nominally less than 10 Micrometers
PM <sub>2.5</sub>	Particulate Matter nominally less than 2.5 Micrometers
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
SIC	Standard Industrial Code
SO <sub>x</sub>	Sulfur Dioxide
tpy	tons per year
TSD	Technical Support Document
UST	Underground Storage Tank

VOC ..... Volatile Organic Compound  
yr ..... year