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**Technical Support Document
 City of Casa Grande – Casa Grande Solid Waste Municipal Landfill**

1.	BACKGROUND	3
	A. Applicant.....	3
	B. Project Location	3
	C. Attainment Classification.....	3
	D. Permitting History.....	3
2.	AGENCY AUTHORITY	3
3.	PROCESS DESCRIPTION	3
	A. General Process.....	4
	B. Waste for Disposal	4
	1. Approved Waste	4
	2. Dis-approved Waste.....	4
	3. Recycled Materials	5
4.	CALCULATION OF THE AMOUNT OF WASTE GENERATED OVER THE YEARS	6
	A. Period from 1949 to 1968	6
	B. Period from 1968 to 1998	6
	C. Period from 1998 to 2009	6
	D. Total Waste Accepted Throughout the Time Period.....	6
5.	EMISSION CALCULATIONS	6
	A. Calculating Landfill Gas Emissions	6
	B. Calculating Methane Emissions	7
	C. Non-methane Organic Compounds (NMOCs).....	7
	D. Calculating VOCs	8
	E. Calculating HAPs.....	8
	F. Calculating Haul Roads and Stockpiles Fugitive Emissions.....	8
	1. PM ₁₀ Emissions	8
	2. PM _{2.5} Emissions.....	8
	G. Dust Activities and Control Methods	9
	1. Dust Activities	9
	2. Control Measures.....	9
6.	LANDFILL EMISSIONS	9
7.	REGULATORY REQUIREMENTS AND MONITORING	10
	A. Title V/PSD Review.....	10
	B. Applicable Requirements	10
	1. NSPS Cf and Control System Requirements	10
	2. NESHAP, AAAA Requirements	10
	3. NSPS, IIII Requirements	10
	C. Greenhouse Gas Reporting	11
	D. Other Regulatory Emissions Limitations	11
	1. Opacity and Reasonable Precautions	11
	2. Soil Moisture Content.....	11
8.	COMPLIANCE ASSURANCE MONITORING (CAM)	11

9. CONCLUSION AND PROPOSED ACTION..... 11

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City of Casa Grande - Casa Grande Solid Waste Municipal Landfill, Permit #V20686.000

1. BACKGROUND

A. Applicant

City of Casa Grande
Public Works Department
3181 North Lear Avenue
Casa Grande, AZ 85122

B. Project Location

This application was submitted by City of Casa Grande to permit their existing solid waste municipal landfill located at 5200 ChuiChu Road, Casa Grande, Arizona. The site is located in Section 7, Township 7 South, Range 6 East and in unincorporated Pinal County, approximately three miles south of the City of Casa Grande.

C. Attainment Classification

The landfill is located in an area designated non-attainment for PM₁₀.

D. Permitting History

The facility is owned and operated by City of Casa Grande, a Government Entity. The landfill began operations in 1949 and is currently operating.

2. AGENCY AUTHORITY

The Arizona Legislature granted the Pinal County Board of Supervisors to establish a program to permit certain sources of regulated air pollutants. Generally, see ARS §§49-470 *et seq.* (ARS Title 49, Chapter 3, Article 3.)

The Pinal County Board of Supervisors adopted a Code of Regulations, which among other things establishes such a program for permitting stationary sources. Generally, see the Pinal County Air Quality District Code of Regulations, as amended January 12, 2009.

In accord with A.R.S. §49-480, Pinal County's permit program constitutes a "unitary" program, with a permit conferring both authority to construct and authority to operate.

Under authority of CAA §110, the EPA has approved relevant portions of the Pinal County permitting program as an element of the Arizona SIP. In particular, see 61 Fed. Reg. 15717 (4/9/96). Among other things, that SIP-approval approved Pinal County minor new source review program. A separate EPA SIP-approval allows Pinal County to define federally enforceable permit limitations. See 60 Fed. Reg. 21440 (5/2/95).

Under authority of CAA §§501 *et seq.*, the EPA has conferred interim and final approval upon Pinal County's Title V permitting program. See 61 Fed. Reg. 55910 (10/30/96), 66 Fed. Reg. 48402 (9/20/01).

3. PROCESS DESCRIPTION

A. General Process

The Casa Grande Landfill is operated solely as municipal solid waste landfill serving the City of Casa Grande, Arizona City and areas of unincorporated Pinal County within the Municipal Planning Area of the City of Casa Grande. No hazardous or infectious medical wastes are accepted for disposal. Incineration of wastes is not performed. No products will be generated at the site or the support operations.

The landfill site is 160 acres and is divided into two active cells; a western cell of 54.5 acres and an eastern cell of 51.5 acres. Area north of the western cell is reserved for retention and area North of the eastern cell may be used for disposal in the future.

B. Waste for Disposal

1. Approved Waste

The landfill operates under a Solid Waste Facility Plan (SWFP) approved by ADEQ in 2003. This plan allows to accept the following materials for disposal:

- o Municipal solid waste (household and commercial trash);
- o Construction debris (from demolition and construction activities);
- o Dead animals;
- o Containers (clean and perforated);
- o Industrial non-hazardous waste;
- o Limited medical waste;
- o Wastewater sludge from city treatment facility (if it passes paint filter test);
- o Green waste (if mixed with residential municipal waste loads);
- o ¹Nonfriable asbestos;

2. Dis-approved Waste

- o ²Friable asbestos;
- o Hazardous waste (ARS 49-921) except for CESQG amounts;
- o Biohazardous medical waste (AACR18-13-1401);
- o Liquid waste (40 CFR 258.28);
- o Special waste (ARS 49-852);
- o Tires;

¹Nonfriable asbestos is disposed off after thorough wetting, compaction and covering to limit emissions.

²The loads are inspected by trained gate house attendants and equipment operators for friable asbestos.

- o Automobiles;
- o Petroleum contaminated soils;

3. Recycled Materials

- o Green waste;
- o ⁴Large appliances;
- o Lead acid batteries;
- o Paints;
- o Glass;
- o Plastics;
- o Mattresses;
- o Scrap metal;
- o Newspapers;
- o Cardboard;

The landfill is primarily operated in accordance with the operational requirements in the SWFP which include;

- o Use of tarps for alternate daily cover;
- o Daily covering of solid waste with six inches of earthen material;
- o Limits for methane gas concentrations;
 - 25% of the Lower Explosive Limit (LEL) in on-site structures and
 - 100% of the LEL at the property boundary

4. CALCULATION OF THE AMOUNT OF WASTE GENERATED OVER THE YEARS

The landfill, with regard to refuse acceptance, has three periods of significance.

A. Period from 1949 to 1968

For this time period, the landfill was documented to have been an uncontrolled dump site where trash was dumped into trenches and burned. In accordance with NSPS subpart WWW definitions (§60.751), non-degradable waste means waste that does not decompose such as municipal waste or combustion ash. The LandGEM model instructions used to calculate emissions from the landfill allow to subtract the portion of the non-biodegradable waste from the total waste acceptance rates. Since the waste received during this time period was burnt, therefore the waste acceptance from this time period is not added to the total waste acceptance rate for calculating emissions.

⁴Refrigeration gas from the appliances shall be removed by a certified technician and then recycled.

B. Period from 1968 to 1998

No annual refuse records for this time period are available and the annual mass weights were based on the published population data and waste generation rates. EPA published formula in 40 CFR Part 98, Mandatory Green House Gas Emissions was used. This formula from §98.343 was used for the years when disposal quantities were not readily available. Following formula was used to calculate the waste acceptance rates:

$$W_x = (\text{POP}_x * \text{WGR}_x * \% \text{SWDS}_x) / 100\%$$

Where W_x = Quantity of waste placed in landfill in year x in metric tons

POP_x = Population served by the landfill in year x from city population

WGR_x = Average per capita waste generation rate for year x in metric tons

$\% \text{SWDS}_x$ = Percent of waste generated and subsequently disposed in landfills

C. Period from 1998 to 2009

Scale data was available from 1998 to 2009 and for the period from 2003 to 2009, scale data along with waste characterization was available. Although scale data was available for the period from 1998 to 2009, this scale data contained a large percentage of waste which was inert material from demolition and construction activities and can be excluded from the total refuse acceptance data. This percentage was determined to be roughly 54% and was calculated from the scale data and waste characterization data available from 2003 to 2009.

D. Total Waste Accepted Throughout the Time Period

The total landfill refuse accepted throughout from 1949 - 2009 using available scale data, waste characterization and Part 98 formula was calculated to be 1.47 million megagrams.

5. EMISSION CALCULATIONS

A. Calculating Landfill Gas Emissions

Methane (CH_4) and CO_2 are the primary constituents of landfill gas, and are produced by microorganisms within the landfill under anaerobic conditions. The annual tons degradable mass values were entered into the LandGEM model. This model calculates the annual emissions of Total Landfill Gas, Methane and NMOC.

B. Calculating Methane Emissions

Uncontrolled methane (CH_4) emissions were estimated by using a theoretical first-order kinetic model of methane production developed by the EPA. This model is known as the Landfill Gas Emissions Model and is represented by the following equation

$$Q_{\text{CH}_4} = \sum_{i=1}^n \sum_{j=0.1}^1 kL_o [M_i/10] e^{(-kt_{ij})}$$

Where Q_{CH_4} = Annual methane generation in the year of the calculation (m^3/yr)

i = 1-year time increment

$n = (\text{Year of calculation}) - (\text{Initial year of waste acceptance})$

$j = 0.1\text{-year time increment}$

${}^5k = \text{Methane generation rate (year}^{-1}\text{)}$

${}^6L_o = \text{Potential methane generation capacity (m}^3\text{/Mg)}$

$M_i = \text{Mass of waste accepted in the } i^{\text{th}} \text{ year (Mg)}$

$t_{ij} = \text{Age of the } j^{\text{th}} \text{ section of waste mass } M_i \text{ accepted in the } i^{\text{th}} \text{ year}$

C. Non-methane Organic Compounds (NMOCs)

Typically, landfill gas emission (LFG) contains a small amount of non-methane organic compounds (NMOC). This NMOC fraction often contains various VOCs, HAPs and greenhouse gases (GHG). This NMOC⁷ rate was estimated using equation (3) listed in AP42, 5th ed., Section 2.4, Municipal Solid Waste Landfills, dated 11/98.

$$Q_P = 1.82 * Q_{CH_4} * (C_P/1 \times 10^6)$$

Where $Q_P = \text{Emission rate of pollutant P (i.e. NMOC), m}^3\text{/yr}$

$Q_{CH_4} = \text{CH}_4 \text{ generation rate (from the Landfill Air Emissions Estimation model), m}^3\text{/yr}$

$C_P = \text{Concentration of P in landfill gas, ppmv}$

1.82 = Multiplication factor

D. Calculating VOCs

The NMOC is also used to express the annual estimated emission of VOC. To determine estimates of VOC emissions for inventory purposes, the emission of VOC is determined as a percentage of NMOC. The percentage of VOC in NMOC is 39% as published within AP-42 (Table 2.4-2).

E. Calculating HAPs

The percentage of fugitive HAPs was determined from the summation of default concentrations for HAPs in landfill gas as listed in AP-42, Table 2.4-1. These concentrations of HAPs in landfill gas from AP-42 and the total volume of landfill gas determined by LandGEM model were multiplied and converted to annual tons per listed HAP. The annual amounts for each HAP were then summed for an annual total of tons of combination of HAPs.

F. Calculating Haul Roads and Stockpiles Fugitive Emissions

⁵Default methane generation rate of 0.020 was used.

⁶Default potential methane generation capacity 170 was used.

⁷The current version of the Landfill Air Emissions Estimation model contains a proposed regulatory default value for total NMOC concentration of 4,000 ppmv.

1. PM₁₀ Emissions

For vehicle miles traveled on unpaved roads, Maricopa County Air Quality Department's uncontrolled emission factors developed from AP-42 were used. For landfill activities, equation AP-42, 13.2.4 was used. These emission factors are as follows:

3.2 lbs/VMT for heavy duty vehicles at 10 MPH

0.44 lbs/VMT for light duty vehicles at 10 MPH

630 lbs/acre-yr for stockpiles

⁸0.000121 lbs/ ton waste for landfill activities

2. PM_{2.5} Emissions

Emission factors for PM_{2.5} emissions were developed from AP-42 Municipal Solid Waste Landfills, using equation 13.2.2-1 for the silt content, equation 13.2.2-2 for the k factor, equation 13.2.2-4.1a for the unpaved roads and equation 13.2.4-4 for the aggregate handling and storage piles. The emission factors for the Total Suspended Particles (TSP) are corrected to derive PM_{2.5} emissions. These emission factors are as follows:

0.00451 lbs/VMT for heavy duty vehicles at 10 MPH

0.00168 lbs/VMT for light duty vehicles at 10 MPH

144 lbs/acre-yr for stockpiles

3.867E-06 lbs/ton waste for landfill activities

It was estimated that an average of 124 on-site and off-site heavy and light duty vehicles will travel 25.5 miles per day on the site under maximum waste transport conditions. Additional emissions from cover operations (1 scraper bringing cover soil to the surface) are included in these calculations. A 70% control efficiency was assumed for watering of the haul roads and other surfaces.

G. Dust Activities and Control Methods

1. Dust Activities

There are several types of sources of dust and PM₁₀ at the landfill site which are as follows:

- o Light, medium and heavy vehicle traffic on paved and unpaved internal roads;
- o The unloading of waste at the working face of the landfill and the compaction of waste and placement of daily cover;
- o The wind borne emissions from disturbed areas and stockpiles (160 acres total)
- o Construction activities (e.g. berms, roads, retention, barriers)

⁸Based on a moisture content of 12% for cover and fill materials and a mean wind speed of 6.2 mph.

2. Control Measures

The above dust generating sources are subject to the following control measures:

- o Watering (including pre-wetting, operational and site stabilization);
- o Cover of city haul vehicles;
- o Reduced speed limit of 15 mph;
- o Altering load-in/load-out procedures (reduction of working face or change of orientation);
- o Suspension of landfill activities when wind-borne dust is leaving the property boundary;
- o Prompt and careful movement of cover materials;
- o Road maintenance

6. LANDFILL EMISSIONS

Casa Grande Landfill submitted a Tier 2 NMOC Emission Rate Report dated February 18, 2020. Tier 2 evaluation was conducted in accordance with the New Source Performance Standards (NSPS) regulations in 40 CFR, Part 60, Subpart Cf, Emission Guidelines for Municipal Solid Waste (MSW) Landfills. Laboratory results indicated an average NMOC concentration of 1,259 parts per million by volume as hexane. Using LandGem Model and site-specific NMOC concentrations, the estimated 2019 NMOC emission rate for the Casa Grande Landfill is 27.9 Mg/yr. The estimated 2024 NMOC emission rate is 32.4 Mg/yr., and is therefore not projected to exceed the regulatory threshold of 34Mg/yr. during the next five year period.

7. REGULATORY REQUIREMENTS AND MONITORING

A. Title V/PSD Review

In accordance with 40 CFR 60.752(b), any landfill with a design capacity over 2.5 million megagrams by mass or 2.5 million cubic meters by volume is subject to Part 70 permitting (Title V). Potential emissions of any criteria pollutant are below PSD review thresholds.

B. Applicable Requirements

1. NSPS Cf and Control System Requirements

This facility is subject to the requirements of 40 CFR 60 Subpart Cf, Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills. This Subpart requires that each owner or operator of an MSW landfill having a design capacity greater than or equal to 2.5 million megagrams by mass and 2.5 million cubic meters by volume to collect and control MSW landfill emissions at each MSW landfill. This standard requires that a calculation of NMOC emissions be made annually. The initial application indicated that the potential NMOC annual emissions rate is 62 megagrams. However, a NMOC emission rate analysis conducted by the facility in February 2020 indicated the estimated 2019 NMOC emission rate to be 27.0 Mg/yr. and an estimated 2024 NMOC emission rate to be 32.4 Mg/yr. Since the NMOC emission rate is less than the regulatory threshold of 34 Mg/yr., the facility is not required to submit a design for a collection and control

system. In an event the NMOC emission of 34 Mg/yr. is exceeded, then either a collection and control system is required in accordance with Sections §60.33f.(b) and (c) of the Subpart Cf WWW, or Permittee has an option to determine a site-specific NMOC concentration and recalculate the NMOC emission rate using either the Tier 1 methodology as listed in Section §60.35f.(a).(2), Tier 2 methodology as listed in Section §60.35f.(a).(3), or Tier 3 methodology listed in Section §60.35f.(a).(4) For existing MSW landfills covered by this subpart with a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters, the NMOC emission rate report must be submitted no later than 90 days after the effective date of EPA approval of the state's plan under section 111(d) of the Clean Air Act. The NMOC emission rate report must be submitted to the Administrator annually via CEDRI except if the estimated NMOC emission rate as reported in the annual report to the Administrator is less than 34 megagrams per year in each of the next 5 consecutive years, the owner or operator may elect to submit, an estimate of the NMOC emission rate for the next 5-year period in lieu of the annual report. This estimate must include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the 5 years for which an NMOC emission rate is estimated. The Administrator may request such additional information as may be necessary to verify the reported NMOC emission rate.

2. NESHAP, AAAA Requirements

This facility is also subjected to the requirements of 40 CFR Part 63 Subpart AAAA, National Emission Standards for Hazardous Air Pollutants for Municipal Solid Waste Landfills. This subpart requires landfills to meet the startup, shutdown, and malfunction (SSM) requirements and also includes additional reporting requirements. The SSM plan is effective upon the installation of collection and control system.

3. NSPS, IIII Requirements

The facility is subjected to the requirements of 40 CFR Part 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. The facility has a 95 HP fire pump engine which is manufactured after April 2006.

C. Greenhouse Gas Reporting

On October 30, 2009, the U.S. Environmental Protection Agency (EPA) published the final version of the Mandatory Greenhouse Gas (GHG) Reporting Rule in the Federal Register. Affected landfills that generate equivalent amounts of CO_{2e} (CO₂ equivalent based greenhouse warming potential) equal to or more than 25,000 metric tons are required to monitor and report emissions. On-going annual GHG reporting will be due March 31 of each calendar year for GHG emissions in the previous calendar year. This report shall be submitted directly to EPA.

D Other Regulatory Emissions Limitations

1 Opacity and Reasonable Precautions

The facility must meet the federally enforceable 40% opacity limitation. For this purpose the permit also requires that reasonable precautions be taken, and it includes a list of the methods to employ.

While PCAQCD has a locally enforceable 20% opacity standard (§2-8-300), it does not apply to fugitive sources, sources which already have another opacity standard under PCAQCD rules, or have an applicable NSPS. Therefore, 20% does not apply to the fugitive emissions from the landfill surface.

In line with other permits issued by PCAQCD, a semi-annual opacity screening requirement has been added to the permit. If such opacity screening shows there are visible emissions, a full Method 9 test is required.

2 Soil Moisture Content

Since the soil moisture content used for emission calculations is from AP-42 and not site specific, PCAQCD requires that a sampling program be conducted when the tipping rate exceeds 750 tons per day. The soil moisture content obtained will be used for determining the emissions under AP-42 Section 13.2.4

8. COMPLIANCE ASSURANCE MONITORING (CAM)

The requirements of 40 CFR 64 do not apply to this facility, since this facility is not a major source and no single emission unit satisfies the criteria of §64.2(a)(3). No single unit has a pre-control device emissions of 100 tpy or more of any regulated pollutant.

9. CONCLUSION AND PROPOSED ACTION

Based on the information supplied by the applicant, analyses conducted by the PCAQCD it is determined that the proposed project will not cause or contribute to a violation of any federal ambient air quality standards. Therefore, PCAQCD intends to issue to the applicant a unitary permit, including both approval to construct/modify pursuant to CAA Title I, and authority to operate, pursuant to CAA Title V, subject to the conditions set forth in the accompanying draft permit.