City of Phoenix

State Route 85 Municipal Solid Waste Landfill
Title V Air Quality Operating Permit Renewal Application
(Permit No. V03-002)

Submitted to:

Maricopa County
Air Quality Department

1001 N. Central Avenue, Suite 125
Phoenix, AZ 85004
(602) 506-6010

Submitted by:

City of Phoenix
Public Works Department

3060 South 27th Avenue
Phoenix, Arizona 85009
(602) 534-3333

Prepared by:

TETRA TECH BAS
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Tetra Tech BAS, Inc.

3822 East University Drive, Suite 2
Phoenix, Arizona 85034
(602) 267-0336

EXPIRES 3 / 31 / 2016

Tetra Tech Project No. 197-2013.0133-1014

June 30, 2015

CERTIFICATION OF TRUTH, ACCURACY, AND COMPLETENESS

Certification of truth, accuracy, and completeness by a responsible official per Maricopa County Rule 210 §301.7 and §305.1(e):

"Based on information and belief formed after reasonable inquiry, the statements and information in the application are true, accurate, and complete." Additionally, I hereby certify that State Route 85 Landfill is in compliance with all applicable requirements.

Signed: _____ Date: 7-7-15

Jean M. (Marty) Arambel, P.E.

Title: Project Manager

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1.0 INTRODUCTION

The City of Phoenix (COP) owns and operates the State Route 85 Solid Waste Municipal Landfill (SR85 Landfill) in Maricopa County within COP city limits. The SR85 Landfill is located at 28631 West Patterson Road in Buckeye, Arizona in the southwestern portion of Maricopa County. The property consists of 2,652 acres where approximately 91 acres are currently in use for municipal refuse disposal. The SR85 Landfill currently has one active cell (Cell 1). Cell 1, to-date, includes Phase 1 through Phase 4. Only municipal solid waste comprised of residential and commercial wastes, and sewage sludge as well as construction debris from the City service area are disposed at the SR85 Landfill. The SR85 Landfill does not accept for disposal any hazardous wastes or asbestos-containing materials.

There are about 2,050 acres that will ultimately be used for solid waste disposal at the SR85 Landfill while the remainder of the landfill site (i.e., 602 acres) is occupied with ancillary facilities, storm water management structures, 350 foot to 500 foot buffer zones around the perimeter of the landfill, as well as a 160-acre storm water retention basin at the south end of the landfill site. Figure 1-1 shows the location of the SR85 Landfill within the vicinity of Maricopa County while Figure 1-2 provides a site map of the SR85 Landfill.

Initial, existing, and future landfill operations during the next five years, which is the subject of this permit renewal application, occur within an area of approximately 360 acres. The land outside of the 360-acre area will remain undisturbed in part and in agricultural use in part during the term of the permit renewal. These agricultural activities are not subject to the requested permit renewal and are not addressed in this application.

The SR85 Landfill began accepting waste in January 2006 and has a design capacity of 26.7 million metric tons of municipal solid waste. Currently the landfill contains a total of approximately 7.6 million tons of municipal solid waste. The SR85 Landfill did not accept for disposal any hazardous wastes or asbestos-containing materials. No hazardous or radioactive wastes were accepted at the landfill. The SR85 Landfill is subject to the New Source Performance Standards (NSPS) for Municipal Solid Waste Landfills (Subpart WWW), and it is considered a Title V source subject to the Title V permitting program until non-methane organic carbon (NMOC) emissions become less than 50 Mg/yr. Part of Maricopa County is designated as nonattainment for particulate matter smaller than 10 microns in diameter (PM_{10}). The SR85 Landfill lies outside the PM_{10} non-attainment area and has an approved dust control plan in place which describes various measures to control PM_{10} emissions. The SR85 Landfill lies within the part of Maricopa County designated as an ozone non-attainment area for the 8-hr standard.

The City presently operates under Title V Air Quality Operating Permit No. V03-002 (Attachment A). Permit V03-002 was renewed on April 14, 2011, and establishes compliance conditions for all industrial activities taking place at SR85 Landfill, including operation of the landfill gas flares and fugitive dust emission

sources. This application for a Title V permit renewal includes the addition of one flare from the Skunk Creek Landfill site, a current project for which a separate modification notification was submitted to MCAQD on July 30, 2014 along with design plans and specifications dated May 21, 2014, also submitted to MCAQD on July 30, 2014.

The original Title V permit was issued on April 4, 2005 and a permit renewal was issued on April 14, 2011. The COP is submitting this timely Title V permit renewal application to the Maricopa County Air Quality Department (MCAQD) per Rule 210 §301.2(a) as the existing Title V permit is due to expire on April 14, 2016.

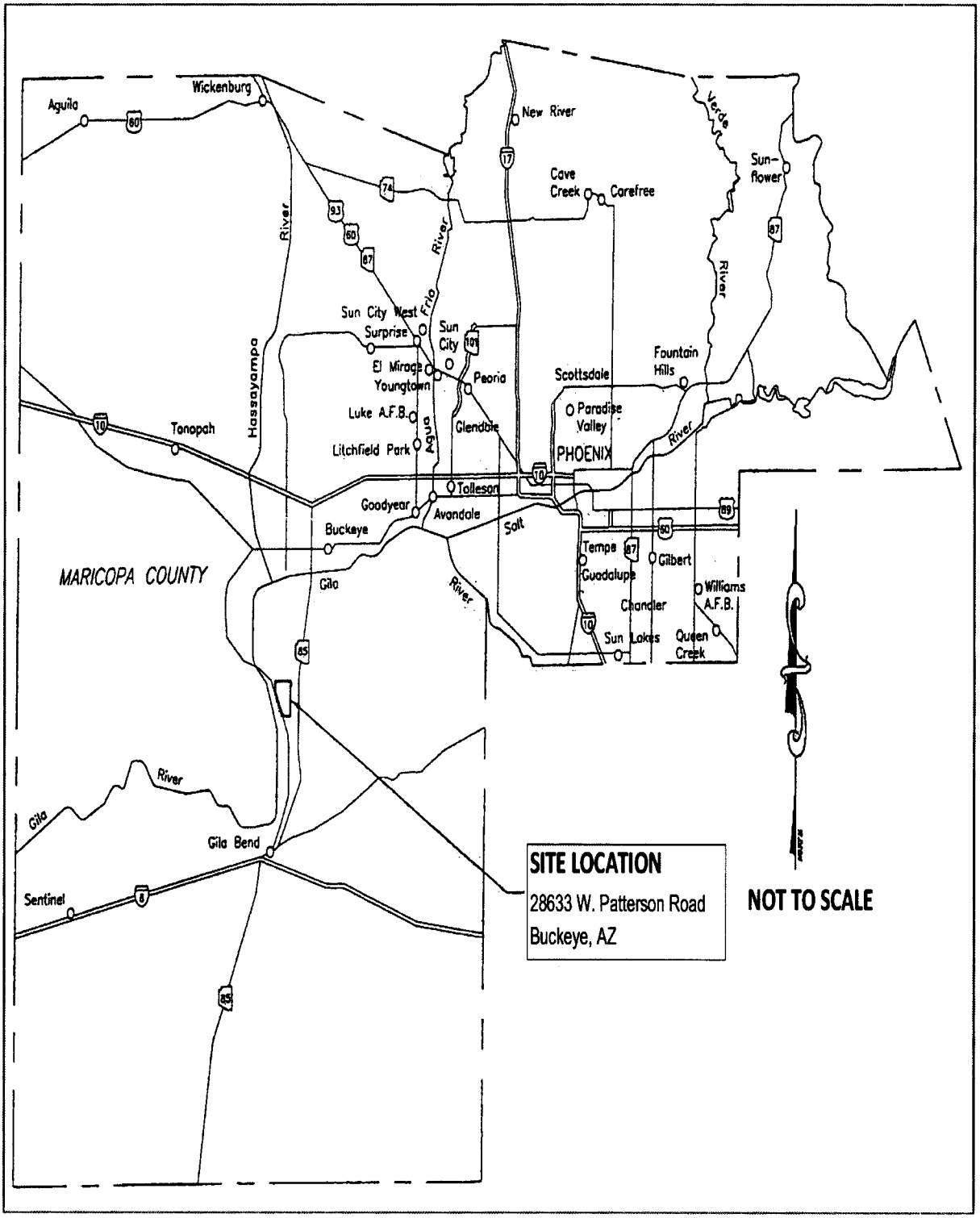

Figure 1-1: State Route 85 Landfill Site Vicinity Map

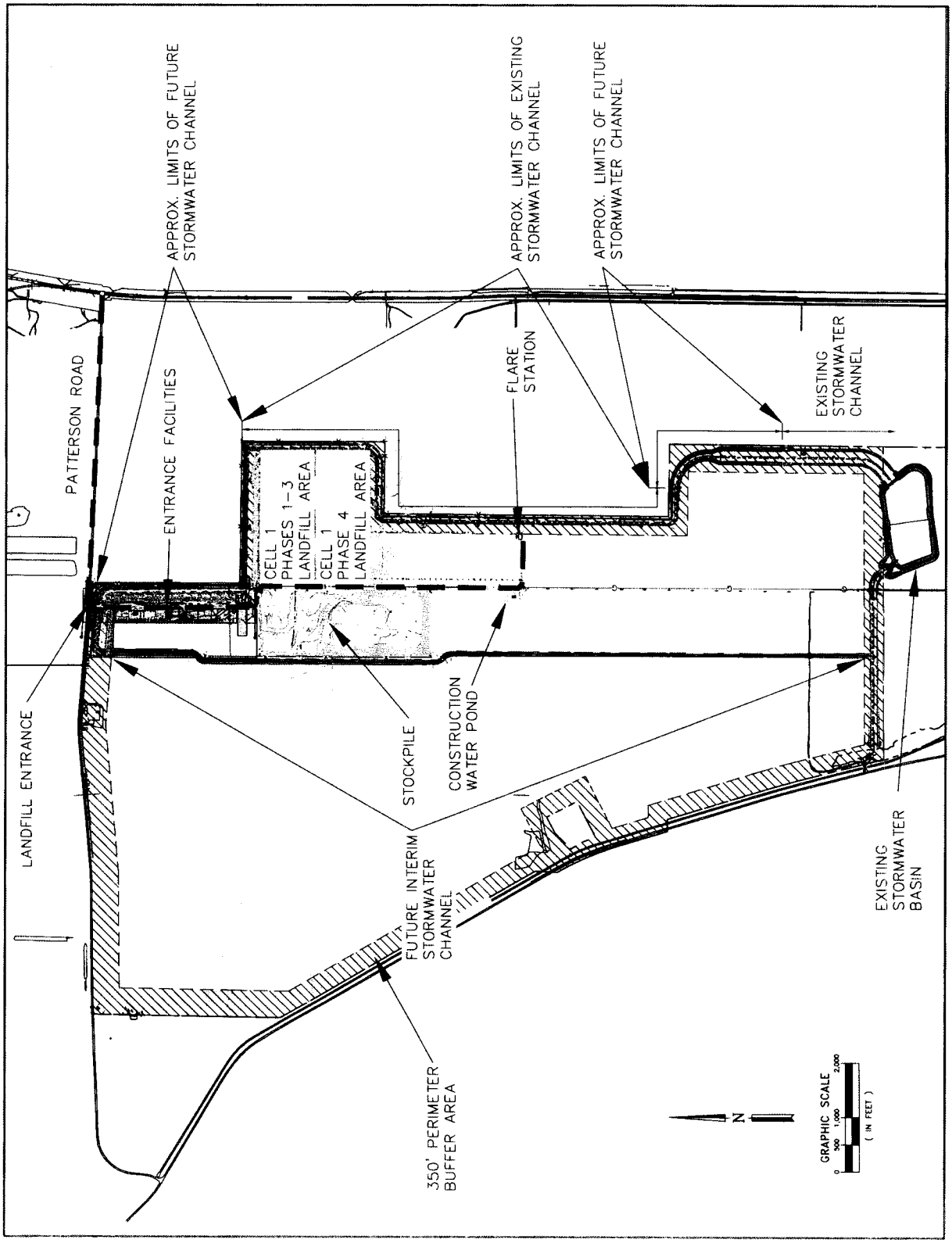

Figure 1-2: State Route 85 Landfill Site Map

2.0 TITLE V OPERATING PERMIT HISTORY

The initial Title V permit was issued on April 4, 2005. Table 2-1 below summarizes the Title V permit history for the SR85 Landfill.

Table 2-1: State Route 85 Landfill Title V Permit History

Permit Number	Issuance Date	Purpose of Issuance
V03-002	April 4, 2005	Initial Title V Operating Permit
V03-002	April 14, 2011	Title V Operating Permit Renewal
V03-002	TBD 04/2016 -04/2021	Title V Operating Permit Renewal

3.0 STANDARD PERMIT APPLICATION FORMS

The following pages include the Title V Air Quality Operating Permit Standard Application Form and corresponding Emission Source Forms.

Maricopa County
Air Quality Department

Return all applications to: One Stop Shop
501 N. 44th Street, Suite 200
Phoenix, AZ 85008
Phone: (602) 372-1341 Fax (602) 372 1078

STANDARD PERMIT APPLICATION FORM

(As required by A.R.S. §49-480, and Chapter 3, Article 3, Arizona Administrative Code)

1. Permit to be issued to: (Business license name of organization that is to receive permit)
   City of Phoenix Public Works
2. Mailing Address: 3060 South 27th Avenue
   City: Phoenix State: Arizona ZIP: 85009
3. Plant Name (if different from item #1)
   State Route 85 Landfill
4. Name (or names) of Owner or Operator:
   City of Phoenix Public Works
5. Name of Owner's Agent: None
   Phone: Not Applicable
6. Plant / Site Manager or Contact Person:
   Marty Arambel, PE
   Phone: (602) 534-1157
7. Proposed Equipment / Plant Location Address:
   28361 W. Patterson Road
   City: Buckeye County: Maricopa ZIP: 85326
   Indian Reservation (if applicable): Not Applicable
   Section / Township / Range: Sections 8, 9, 10, 15, 16, 17, 21, 22, and 27; T3S; R4W
   Latitude: 33° 11' 21" N Longitude: 112° 40' 31" W Elevation: 810 ft
8. General Nature of Business: Municipal Soild Waste Landfill (Open)
   Standard Classification Code: 4953
9. Type of Organization:
   ☐ Corporation ☐ Individual ☐ Partnership ☑ Government Entity (Government Facility Code: _____)
   ☐ Other :
10. Permit Application Basis:
    ☐ New Source ☐ Revision ☑ Renewal of Existing Permit ☐ Portable Source
    ☐ General Permit (Check all that apply)
    For renewal or modification, include existing permit number: V03-002
    Date of Commencement of Construction or Modification: Not Applicable
11. Permit Application Basis:
    Signature of Responsible Official of Organization _____
    Official Title of Signer: Project Manager
12. Typed or Printed Name of Signer: Jean M. (Marty) Arambel, P.E.
    Date: _____ Phone Number: (602) 534-1157

ADEQ/OAQ/100b Maricopa County Appendix B 10/26/93 B5

COMPANY NAME & LOCATION: CITY OF PHOENIX, STATE ROUTE 85 LANDFILL, 28361 W. PATTERSON ROAD, BUCKEYE, AZ

EMISSION SOURCES

PAGE 1 OF 3
DATE: 03/27/15

Estimated Potential-to-Emit per Rule 100.
Review of applications and issuance of permits will be expedited by supplying all necessary information on this Table.

REGULATED AIR POLLUTANT DATA					EMISSION POINT DISCHARGE PARAMETERS										
EMISSION POINT[1]		CHEMICAL COMPOSITION OF TOTAL STREAM	AIR POLLUTANT EMISSION RATE		UTM COORDINATES OF EMISSION POINTS [5]			STACK SOURCES[6]					NONPOINT SOURCES[7]	
								HEIGHT ABOVE GROUND	HEIGHT ABOVE STRUCTURE	EXIT DATA				
NUMBER	NAME	REGULATED AIR POLLUTANT NAME[2]	#/HR[3]	TONS/YR[4]	ZONE	EAST (Mtrs.)	NORTH (Mtrs.)	(feet)	(feet)	DIA. (ft.)	VEL. (fps)	TEMP. (°F)	LENGTH (ft.)	WIDTH (ft.)
S1	Enclosed Flare	VOC	0.37	1.64				30.75		6.00	12.53	1045.1		
S1	Enclosed Flare	HAPs	0.05	0.22				30.75		6.00	12.53	1045.1		
S1	Enclosed Flare	CO	1.98	8.67				30.75		6.00	12.53	1045.1		
S1	Enclosed Flare	NOx	0.68	2.99				30.75		6.00	12.53	1045.1		
S1	Enclosed Flare	SOx	0.43	1.88				30.75		6.00	12.53	1045.1		
S1	Enclosed Flare	TSP	0.77	3.35				30.75		6.00	12.53	1045.1		
S1	Enclosed Flare	PM_{10}	0.77	3.35				30.75		6.00	12.53	1045.1		
S1	Enclosed Flare	$PM_{2.5}$	0.77	3.35				30.75		6.00	12.53	1045.1		

GROUND ELEVATION OF FACILITY ABOVE MEAN SEA LEVEL: 815 feet
ADEQ STANDARD CONDITIONS ARE 293 K AND 101.3 KILOPASCALS (A.A.C. R18-2-101)

General Instructions:

(1) Identify each emission point with a unique number for this plant site, consistent with emission point identification used on plot plan, previous permits, and Emissions Inventory Questionnaire. Include fugitive emissions. Limit emission point number to eight (8) character spaces. For each emission point use as many lines as necessary to list regulated air pollutant data. Typical emission point names are: heater, vent, boiler, tank, reactor, separator, baghouse, fugitive, etc. Abbreviations are O.K.

(2) Components to be listed include regulated air pollutants as defined in R18-2-101. Examples of typical component names are: Carbon Monoxide (CO), Nitrogen Oxides (NOx), Sulfur Dioxide (SO_2), Volatile Organic Compounds (VOC), particulate matter (PM), particulate less than 10 microns (PM_{10}), etc. Abbreviations are O.K.

(3) Pounds per hour (#/HR) is maximum potential emission rate expected by applicant, which takes into account process operating schedule.

(4) Tons per year is annual maximum potential emission expected by applicant, which takes into account process operating schedule.

(5) As a minimum applicant shall furnish a facility plot Plan as described in the filing instructions. UTM coordinates are required only if the source is a major source or is required to perform refined Modeling for the purposes of demonstrating compliance with ambient air quality guidelines.

(6) Supply additional information as follows if appropriate:
   (a) Stack exit configuration other than a round vertical stack. Show length and width for a rectangular stack. Indicate if horizontal discharge with a note.
   (b) Stack's height above supporting or adjacent structures if structure is within 3 "stack height above the ground" of stack.

(7) Dimensions of nonpoint sources as defined in R18-2-101.

COMPANY NAME & LOCATION: CITY OF PHOENIX, STATE ROUTE 85 LANDFILL, 28361 W. PATTERSON ROAD, BUCKEYE, AZ

EMISSION SOURCES

PAGE 2 OF 3
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NUMBER	NAME	REGULATED AIR POLLUTANT NAME[2]	#/HR[3]	TONS/YR[4]	ZONE	EAST (Mtrs.)	NORTH (Mtrs.)	(feet)	(feet)	DIA. (ft.)	VEL. (fps)	TEMP. (°F)	LENGTH (ft.)	WIDTH (ft.)
S2	Enclosed Flare	VOC	0.49	2.14				32.75		9.50	8.25	1475.4		
S2	Enclosed Flare	HAPs	0.07	0.30				32.75		9.50	8.25	1475.4		
S2	Enclosed Flare	CO	3.32	14.53				32.75		9.50	8.25	1475.4		
S2	Enclosed Flare	NOx	1.64	7.17				32.75		9.50	8.25	1475.4		
S2	Enclosed Flare	SOx	0.68	2.98				32.75		9.50	8.25	1475.4		
S2	Enclosed Flare	TSP	1.07	4.69				32.75		9.50	8.25	1475.4		
S2	Enclosed Flare	PM_{10}	1.07	4.69				32.75		9.50	8.25	1475.4		
S2	Enclosed Flare	$PM_{2.5}$	1.07	4.69				32.75		9.50	8.25	1475.4		

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S3	Enclosed Flare	VOC	0.19	0.84				32.5		8.83	15.45	1338.7		
S3	Enclosed Flare	HAPs	0.07	0.29				32.5		8.83	15.45	1338.7		
S3	Enclosed Flare	CO	1.36	5.96				32.5		8.83	15.45	1338.7		
S3	Enclosed Flare	NOx	1.48	6.48				32.5		8.83	15.45	1338.7		
S3	Enclosed Flare	SOx	0.69	3.04				32.5		8.83	15.45	1338.7		
S3	Enclosed Flare	TSP	1.02	4.47				32.5		8.83	15.45	1338.7		
S3	Enclosed Flare	PM_{10}	1.02	4.47				32.5		8.83	15.45	1338.7		
S3	Enclosed Flare	$PM_{2.5}$	1.02	4.47				32.5		8.83	15.45	1338.7		

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(7) Dimensions of nonpoint sources as defined in R18-2-101.

4.0 PROCESS DESCRIPTIONS AND LANDFILL PROCESS FLOW DIAGRAM

4.1 Landfill Waste Operations

The SR85 Landfill is designed and operated using an area fill method. Waste haul trucks deposit loads of solid wastes across the active landfill cell. Wastes are placed by spreading into thin layers, and then compacted to the smallest practical volume. Compacted waste is covered each day with soil or approved alternate daily cover. Excavated soils are used for daily and intermediate cover of the compacted waste, as well as construction of any future perimeter berms, final cover, and future roadways and dikes and their maintenance. Water is applied to the active areas during operations, as needed, to provide fugitive dust control.

4.2 Formation of Landfill Gas

The landfilled waste material decomposes through organic processes. This decomposition is aerobic until the oxygen is nearly depleted within the waste at which time anaerobic decomposition begins. The landfill gas (LFG) generated in the decomposition process is primarily composed of methane and carbon dioxide. Small amounts of non-methane organic compounds (NMOC), volatile organic compounds (VOCs), hazardous air pollutants (HAPS), and condensate/leachate (water which comes into contact with the waste mass) are also present in the gas. To limit the emission of the gaseous compounds through the landfill surface and into the atmosphere, a landfill gas extraction and treatment system (LFGES) was installed. The installation began in 2006 and continues to occur as the landfill operates in phases and is planned to continue through completion of a facility-wide system. At this time there are 74 horizontal collectors and 5 vertical wells.

The LFGES consists of vertical wells placed in the refuse prism and interconnected to a vacuum source by HDPE and PVC headers. The landfill gas (LFG) is removed under vacuum from the refuse prism as it is produced. The LFGES is designed to prevent lateral migration from the landfill. The extracted LFG is then delivered to high temperature enclosed flares at the SR85 Landfill flare station where the LFG is combusted under controlled conditions into carbon dioxide and water vapor. During this combustion process, various criteria air pollutants (NOx, SOx, and CO) are emitted. Also emitted through the extraction and treatment process is particulate (PM) and particulate matter condensable salts. Source emission testing is performed at regular intervals to verify the destruction efficiency of the LFGES.

Pursuant to the U.S. EPA memo from John Seitz dated October 21, 1994 regarding fugitive LFG at landfills, LFG that cannot reasonably be collected by the LFGES is treated as fugitive emissions and is not included in source-wide potential to emit (PTE) aggregation for Part 70 and NSR purposes. The collection efficiency for the SR85 LFGES is assumed to be 90%, the remaining 10% of LFG generated is considered fugitive. This is due to the installation of landfill gas collectors as the landfill is filled, full-time operation of the flare, quarterly surface sweeps, and monthly probe monitoring.

4.3 Landfill Flare Station Operations

There is currently one landfill gas flare station at the SR85 Landfill (Flare Station 1, FS1). Figure 4-1 provides a site layout for FS1. Construction on FS1 began in December 2006 and became operational in early 2007. FS1 is located on the eastern edge of SR85 Landfill site property, south of the Cell 1 operations (See Figure 1-2). FS1 consists of one 18 MMBtu/hr flare (Flare #1, FL-1), one 42 MMBtu/hr flare (Flare #2, FL-2), and a 40 MMBtu/hr flare from the Skunk Creek Landfill (FS-1-3) relocated to the SR85 Landfill on November 14, 2014 as Flare #3 (FL-3). This provides for future increased capacity projected for the SR85 Landfill site. LFG is combusted at FS1 in a manner compliant with State and Federal regulations. FS1 is operated 24 hours/day, 365 days/year.

The three (3) Perennial Energy Inc. (PEI) LFG enclosed flares [SCC #50100410] located at the SR85 Landfill are shown in Table 4-1. The current SR85 Landfill Title V Air Quality Operating Permit #V03-002 which is included in Appendix A herein lists FL-1 and FL-2. The additional flare, FL-3, is anticipated to be included on the equipment list of the permit renewal when issued.

Table 4-1: Existing SR85 Landfill Enclosed Flares

Operating Parameter	SR85 Landfill Flare Station Enclosed Flares		
	FL-1	FL-2	FL-3[(1)]
Minimum Operating Setpoint in Flare Combustion Zone (°F)	1,400	1,400	1,400
Maximum Inlet Landfill Gas Flow rate, scfm	1,500	2,100	2,000
Maximum Heat Rate, MMBtu/hr	18	42	40

(1) Note: *Subsequent to MCAQD approval, Flare FS-1-3 from the City of Phoenix Skunk Creek Landfill was relocated to the SR85 Landfill Flare Station as FL-3 on November 14, 2014.*

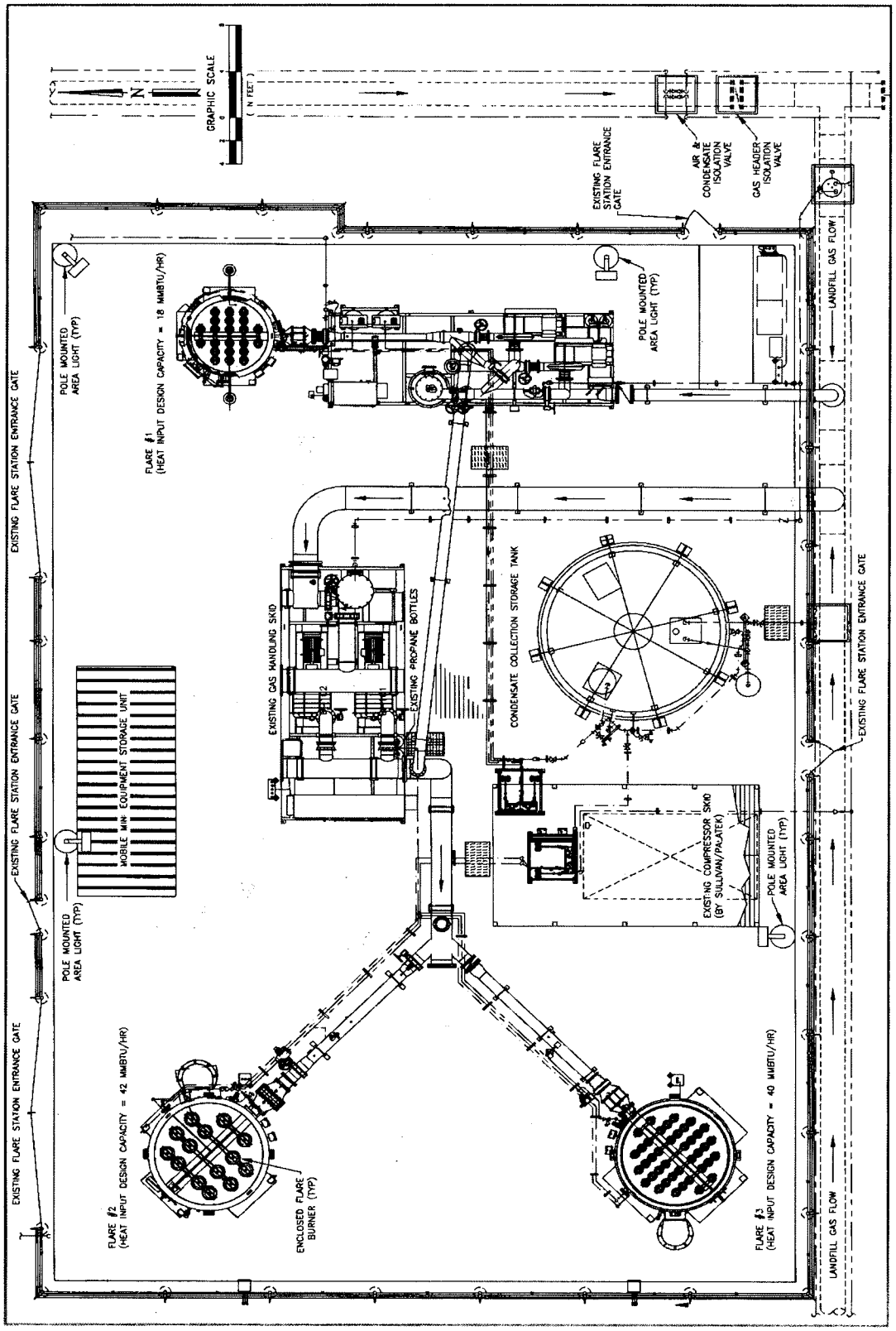


Figure 4-1: State Route 85 Landfill Flare Station Site Layout

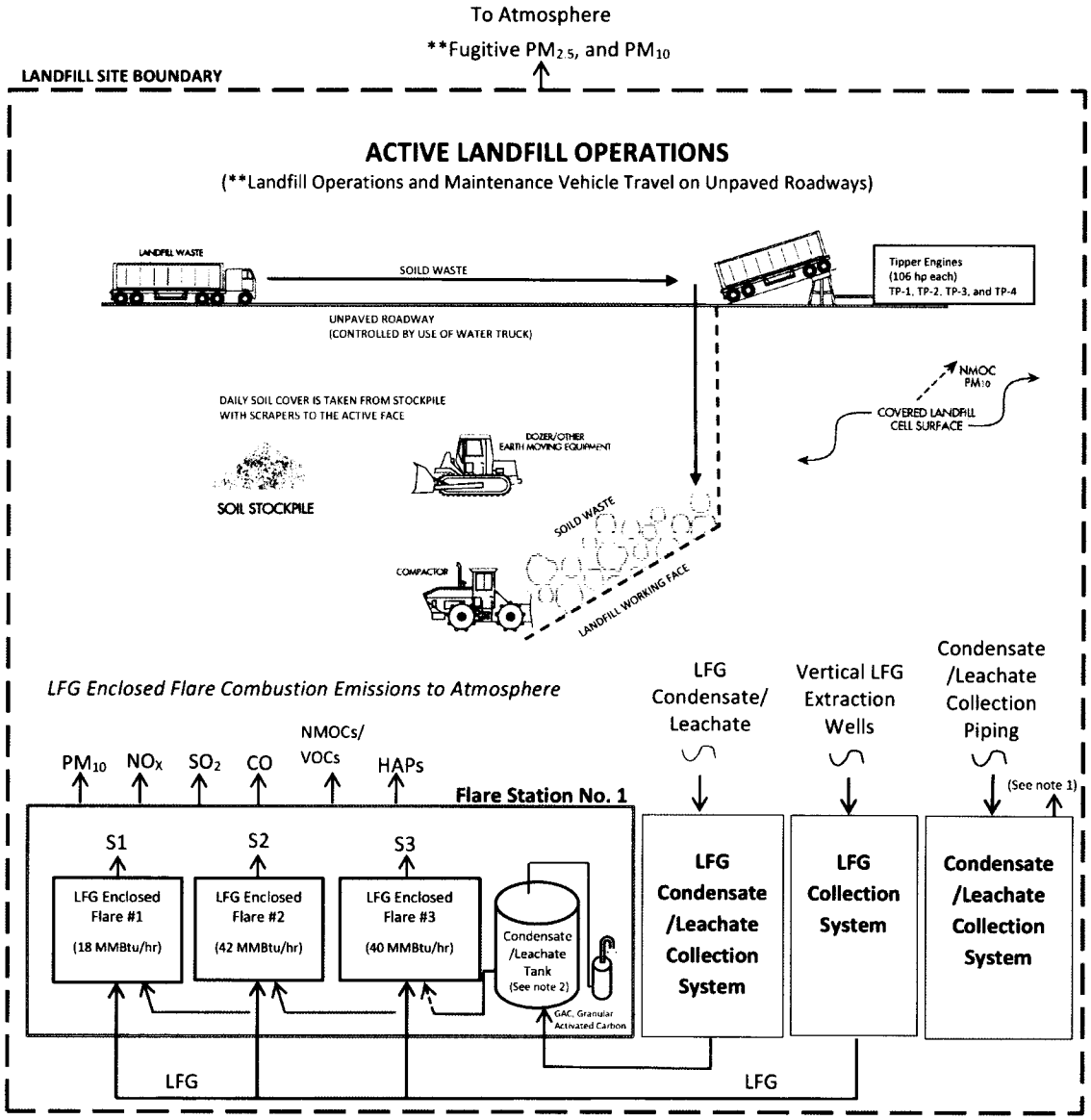
[Ref. Plan Set (Sheet #7), Sealed May 2014 – "SR-85 Flare #3 Installation Plan"]

4.4 Condensate/Leachate Collection System

A condensate/leachate collection system is installed within the lined portions of the landfill to remove the condensate/leachate in accordance with 40 CFR Part 258 requirements. The collection system consists of a liner, a sump located at the low point of the cell, collection pipe, a riser pipe, and a submersible pump for discharge of condensate/leachate collected in the sump. Also, a leachate tank is located at the northwest corner of Cell 1, Phase 1 and a condensate/leachate return line is currently being installed with the horizontal collectors to allow transport of condensate/leachate to the flare station for storage and/or destruction by the flare.

4.5 Process Flow Diagram

Process flow diagram for SR85 Landfill operations representative of both fugitive emission sources and non-fugitive emission sources is illustrated in Figure 4-2 on the following page.



Notes: (1) Fugitive VOCs are negligible from Condensate/Leachate Collection System and Condensate/Leachate Storage Tank GAC control unit exhaust.
(2) Collected LFG condensate/leachate is routed to the flares where it is atomized and combusted.

Legend

S1 – Flare Station 1, Flare #1 Stack (FL-1)
S2 – Flare Station 1, Flare #2 Stack (FL-2)
S3 – Flare Station 1, Flare #3 Stack (FL-3)
CO – Carbon Monoxide
VOCs – Volatile Organic Compounds
PM_{10} – Particulate matter ≤ 10 micron diameter
LFG – Landfill Gas
NOx – Nitrous Oxides (as NO_2, nitrogen dioxide)
HAPs – Hazardous Air Pollutants
SO_2 – Sulfur Dioxide

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Figure 4-2

State Route 85 Landfill
Process Flow Diagram

5.0 ALLOWABLE EMISSIONS LIMITATIONS

Table 5-1 provides a summary of estimated potential-to-emit (PTE) of regulated pollutants. All values shown in Table 5-1 are "worst-case", maximum PTE over the five-year term of the Title V Operating permit (i.e., until the year 2021). Detailed emission calculations are included in Appendix B.

Table 5-1: Summary of Facility-Wide Potential to Emit Estimates

Emission Unit I.D.	Emission Unit Description	FACILITY-WIDE POTENTIAL-TO-EMIT (PTE) TOTALS, tpy									
		GHG	NMOC	VOC	HAPs	CO	NO_x	SO_x	PM	PM_{10}	$PM_{2.5}$
Landfill Site Point Source Emissions:[1,2]											
FL-1	Flare 1 (rated at 18 MMBtu/hr)	13,168	4.204	1.640	0.215	8.672	2.996	1.883	3.351	3.351	3.351
FL-2	Flare 2 (rated at 42 MMBtu/hr)	26,912	5.476	2.136	0.301	14.533	7.174	2.978	4.691	4.691	4.691
FL-3	Flare 3 (rated at 40 MMBtu/hr)	25,631	2.155	0.840	0.287	5.957	6.482	3.035	4.468	4.468	4.468
	Non-Fugitive PTE Totals [3] =	**65,711**	**11.83**	**4.62**	**0.80**	**29.16**	**16.65**	**7.90**	**12.51**	**12.51**	**12.51**
Landfill Surface Fugitive Emissions:											
	Solid Waste Handling Particulate Emissions =	-	-	-	-	-	-	-	0.153	0.072	0.011
	Storage Pile Particulate Emissions =	-	-	-	-	-	-	-	13.136	13.136	1.970
	Scraper Particulate Emissions =	-	-	-	-	-	-	-	3.235	3.235	0.485
	Paved Roadway Particulate Emissions =	-	-	-	-	-	-	-	1.136	1.136	0.170
	Light Duty Vehicles on Unpaved Roadways =	-	-	-	-	-	-	-	1.900	1.900	0.285
	Heavy Duty Vehicle on Unpaved Roadways =	-	-	-	-	-	-	-	15.302	15.302	2.295
	Landfill Site Scarification Operations =	-	-	-	-	-	-	-	0.082	0.082	0.012
	Landfill Compaction Operations =	-	-	-	-	-	-	-	0.021	0.021	0.003
	Fueling Storage Emissions =	-	-	0.0105	-	-	-	-	-	-	-
	Architectual Coatings Fugitive Emissions =	-	-	1.644	-	-	-	-	-	-	-
	Landfill Gas Fugitive Emissions[4,5,6,7] =	46,414	46.104	17.981	0.832	0.908	-	-	-	-	-
		46,414	**46.10**	**19.63**	**0.83**	**0.91**	**0.00**	**0.00**	**34.97**	**34.99**	**5.23**

Notes:

1 Flare 3 from Skunk Creek Landfill, Flare Station 1, was relocated to the City of Phoenix State Route 85 Solid Waste Municipal Landfill Site on November 14, 2014 and relisted as SR85 Flare 3 (FL-3). It was approved to source test it with the other two flares by February 24, 2017. Until then, it will be run for commissioning, calibration, and verification of operation.

2 Greenhouse gas (GHG) emissions from enclosed landfill gas flares include CO_2 emissions plus equivalent CO_2 emissions (CO2e) for N_2O and methane.

3 Used for Source Classification (e.g., Non-Categorical Source whereby fugitive emissions are not to be included in the source classification emissions total).

4 Landfill fugitive GHG emissions shown are conservative and include the maximum modeled methane generation rate over the Title V Permit Renewal period (e.g., 2021) as predicted by LandGEM multiplied by 10%, representing a 90% LFG collection efficiency, then the resultant value is multiplied by the Global Warming Potential index (GWPi) for methane of 25. LandGEM generally overpredicts landfill gas generation.

5 This is representing CO that may potentially be in LFG and is included because it is a factor included in AP42. The fugitive emission value reported for carbon monoxide(CO) is conservative and it is based on 10% of the LandGEM modeling result that uses the landfill gas CO default concentration of 141 ppmv and molecular weight of 28.01 per AP42, Chapter 2.4.4, Table 2.4-1. That is, the value reported assumes 90% of the CO from the landfill is captured and sent to the enclosed flare (e.g., non-fugitive - point source emissions).

6 The reported VOCs are 39% of NMOC per AP 42, Chapter 2.4, Table 2.4.2.

7 The reported HAPs are based on Toluene - No or Unknown Co-disposal - HAP/VOC which is the largest HAP per the LandGEM modeling inputs. In LandGEM, concentrations of HAPs were inputs and they reflect listed landfill gas contituents as shown in AP42, Chapter 2.4.4, Table 2.4-1.

8 The $PM_{2.5}/PM_{10}$ ratio of 0.15 taken from the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook, dated September 7, 2006 is used for fugitive dust emissions for fugitive emission sources where an AP42 source-specific particle size multiplier is not provided. The ratios of $PM_{2.5}$ to PM_{10} for fugitive dust sources published in Section 13 of AP-42 typically range from 0.10 to 0.20.

9 Emissions from non-road diesel engine equipment (i.e., emergency generator and other sources that are not stationary such as tipper engines are not included in the facility-wide PTE table.

Table 5-2 provides existing and proposed emission limits.

Table 5-2: Existing and Proposed Facility-Wide Emission Limitations

Regulated Pollutant	Current Rolling Twelve Month Emission Limits	Proposed Rolling Twelve Month Emission Limits
Particulate Matter 10 microns or smaller (PM_{10})	*Not Specified*	None Specified
Particulate Matter 2.5 microns or smaller ($PM_{2.5}$)	*Not Specified*	None Specified
Non-Methane Organic Compounds (NMOCs)	245 tons	245
Volatile Organic Compounds (VOCs)	76 tons	76
Carbon Monoxide (CO)	*Not Specified*	None Specified
Nitrogen Oxides (NOx)	25 tons	25
Sulfur Dioxide (SO_X)	*Not Specified*	None Specified

All calculated PTE values shown in Table 5-1 are well below the current and proposed permit emission limits shown in Table 5-2.

6.0 PRODUCT DESCRIPTION

The SR85 Landfill is an open landfill operates for the land disposal of municipal solid waste. No products are generated at the SR85 Landfill. Therefore, this item is not applicable.

7.0 ALTERNATE OPERATING SCENARIOS

There are presently no anticipated changes in operating conditions that will necessitate the permitting of alternate operating scenarios; therefore, this item is not applicable for the application.

8.0 ALTERNATE OPERATING SCENARIO PRODUCTS

SR85 LF is a closed landfill previously operated for the land disposal of municipal solid waste. No products are generated at SR85 LF. Therefore, this item is not applicable.

9.0 MASS BALANCES

Mass balance equations were not used for estimating emissions. All emission sources are discussed in Section 10 and emission calculations are presented in Appendix B.

10.0 EMISSION RELATED INFORMATION

Emissions are summarized on the "Emissions Sources" portion of the required "Standard Permit Application Form". All emissions are "worst-case", maximum PTE over the five-year term of the Title V Operating permit (i.e., until the year 2021). Total emissions and supporting calculations showing emissions from each source are presented in Attachment B. The following is a list of emission sources applicable to this Title V Permit Renewal Application. Pursuant to the U.S. EPA memo from John Seitz dated October 21, 1994 regarding fugitive LFG at landfills, LFG that cannot reasonably be collected by the SR85 landfill gas collection and control system (LFGCCS) is treated as fugitive emissions and is not included in source-wide potential to emit (PTE) aggregation Part 70 and NSR purposes. The SR85 LFGCCS collection efficiency is assumed to be 90% and the remaining 10% of LFG generated by the landfill is not considered to be controllable, and is thus fugitive.

10.1 Non-Fugitive Emission Sources

10.1.1 Landfill Gas Enclosed Flares

The SR85 LF currently contains three (3) flares, within the property that are utilized for landfill gas (LFG) combustion of gas collected in the existing gas collection system. The flares are located at the SR85 LF flare station (FS1), as previously illustrated in Table 4-1. Combustion of LFG in the enclosed flares results in the generation of the criteria air pollutants and hazardous air pollutants (HAPs). Table 15-1 provides existing enclosed flares exhaust data. VOC and HAP emissions from the flare were calculated assuming a 98% destruction efficiency of both VOC and HAP components of the combusted LFG. SO_2 emissions from the flare were calculated assuming that the total reduced sulfur (TRS) routed through the flare is converted entirely to SO_2.

10.1.2 Non-Fugitive Exempt Sources

Landfill gas generated in the refuse prism is saturated with water vapor. As the LFG is extracted and moves through the conveyance headers to the flare stations it cools and the water vapor condenses, becoming condensate/leachate. The condensate/leachate contains absorbed organic gases (NMOC, VOC, and HAPs). The condensate/leachate is collected in sumps located at engineered low points in the header system and then conveyed to a central storage tank at the appropriate flare station. To prevent buildup of desorbed gases in the tank, an exhaust vent system was designed such that any air leaving the tank is passed through a 5 gallon granulated activated charcoal canister. This canister is installed to remove any

organic gases and odor desorbed from the condensate/leachate into the air above the liquid in the tank. The canister is monitored on a regular basis using a PID and/or FID organic gas-analyzing instrument to determine if gas breakthrough has occurred.

10.2 Fugitive Emission Sources

The SR85 LF generates fugitive PM emissions from vehicle travel on unpaved roadways and fugitive emissions from inactive areas. The inactive areas are vegetated and stabilized for dust mitigation while unpaved roadways incorporate asphalt millings as dust suppression mitigation measures. In addition to particulate fugitive emissions, the landfill gas not captured by the LFG collection system is emitted as fugitive emissions. These emissions contain methane, non-methane organic compounds (NMOCs), volatile organic compounds (VOCs), and hazardous air pollutants (HAPs), generated by the microbial degradation of buried refuse. The modeling of landfill gas generation was performed using EPA's LandGEM – Landfill Gas Emission Model, version 3.02. Results of the modeling of LFG generation, including recorded municipal solid waste tonnage placed in the SR85 LF, are included in Appendix C.

11.0 CITATION AND DESCRIPTION OF ALL APPLICABLE REQUIREMENTS

Table 11-1 contains information on the regulatory applicability analysis completed for the SR85 LF as part of the Title V operating permit renewal application process. A compliance demonstration, including applicable reporting, record keeping and test method requirements, is presented in Table 19-1.

The SR85 LF is subject to Title V regulations as part of conformance to the Emission Guidelines (EG) for Municipal Solid Waste (MSW) Landfills, promulgated under 40 Code of Federal Regulations (CFR) Part 60, Subparts Cc and WWW, and codified under Maricopa County Rule 321. Maricopa County Rule 321 adopts and incorporates 40 CFR 60, Subpart WWW by reference.

The facility is classified as a minor stationary source, for Prevention of Significant Deterioration (PSD) as the facility has a potential to emit for each regulated pollutant that is less than the applicability threshold for PSD major source status.[1] As the facility is not one of the listed 28 source categories listed in 40 CFR 52.21(b)(1)(i)(c)(iii), fugitive emissions are not considered for PSD applicability purposes.

[1] Greenhouse gases become a regulated pollutant for these purposes only when a facility has a potential to emit (PTE) of 100,000 tpy CO_2e and makes a modification of 75,000 tpy CO_2e or greater. The existing facility's PTE is greater than 100,000 tpy CO_2e, but no modification to increase emissions is being made. Therefore, greenhouse gases are not a regulated pollutant for the purposes of this renewal application.

Table 11-1
City of Phoenix State Route 85 Municipal Solid Waste Landfill
Title V Operating Permit Renewal Application
Summary of Regulatory Applicability Analysis

Regulatory Citation [1,2]	Regulatory Title	Applicable	Not Applicable	In Compliance Yes	In Compliance No
40 CFR Part	**Federal**				
50	National Primary and Secondary Ambient Air Quality Standards		X		
51	Requirements for Preparation, Adoption, Submittal of Implementation Plan		X		
52	Approval and Promulgation of Implementation Plans		X		
53	Ambient Air Monitoring Reference and Equivalent Methods		X		
54	Prior notice of Citizen Suit		X		
55	Outer Continental Shelf Air Regulations				
56	Regional Consistency		X		
57	Primary nonferrous Smelter Orders		X		
58	Ambient Air Quality Surveillance		X		
59	National volatile organic compound emission standards for consumer and commercial products		X		
60	New Source Performance Standards (Subparts B through WWW)	X[3]		X	
61	National Emission Standards for Hazardous Air Pollutants (Subparts A through FF)		X[4]		
62	National Emission Standards for Hazardous Air Pollutants (Subparts B-FF, except M)		X		
63	Approval and Promulgation of State Plans for Designated Facilities and Pollutants	X[4]		X	
64	National Emission Standards for Hazardous Air Pollutants for Source Categories		X		
65	Delayed Compliance Orders		X		
66	Assessment and Collection on noncompliance Penalties for EPA		X		
67	EPA Approval of State noncompliance Penalty Program		X		
68	Chemical Accident Prevention Provisions		X		
69	Special Exemptions from Requirements of Clean Air Act		X		
70	State Operating Permit Program		X[5]		
71	Federal Operating Permit Program		X		
72	Permit Regulations		X		
73	Sulfur Dioxide Allowance System		X		
74	Sulfur Dioxide Opt-Ins		X		
75	Continuous Emission Monitoring		X		
76	Acid Rain Nitrogen Oxides Emission Reduction Program		X		
77	Excess Emissions		X		
78	Appeal Procedures for Acid Rain Program		X		
79	Registration of Fuels and Fuel Additives		X		
80	Regulation of Fuels and Fuel Additives		X		
81	Designation of Areas for Air Quality Planning Purposes		X		
82	Protection of Stratospheric Ozone, Subpart F	X		X	
85	Control of Air Pollution for Motor Vehicles and Motor Vehicle Engines		X		
86	Control of Air pollution from New and In-use Motor Vehicles and New and In-use Motor Vehicle Engines		X		
87	Control of Air Pollution from Aircraft and Aircraft Engines		X		
88	Clean Fuel Vehicles		X		
89	Control of Emissions from New and In-use Nonroad Engines		X		

Table 11-1
City of Phoenix State Route 85 Municipal Solid Waste Landfill
Title V Operating Permit Renewal Application
Summary of Regulatory Applicability Analysis

Regulatory Citation [1,2]	Regulatory Title	Applicable	Not Applicable	In Compliance Yes	In Compliance No
90	Control of Emissions from Non-road Spark Ignition Engines		X		
93	Determining conformity of Federal Actions to State or Federal Implementation Plans		X		
95	Mandatory Patent Licenses		X		
98	Mandatory Greenhouse Gas Reporting	X		X	
Clean Air Act	**Federal**				
Title I	New Source Review		X[6]		
Title II	Mobile Sources		X[6]		
Title III	Hazardous Air Pollutants Program		X[6]		
Title IV	Acid Deposition Control		X[6]		
Title V	Operating Permit Program		X[6]		
Title VI	Stratospheric Ozone Protection		X[6]		
Article	**State of Arizona Administrative Code, AAC, Title 18, Chapter 2**				
1	General (R18-2-101 through R18-2-103)		X		
2	Ambient Air Quality Standards, Area Designations, Classifications (R18-2-201 through R18-2-220)		X		
3	Permits and Permit Revisions (R18-2-301 through R18-2-333)		X		
4	Permit Requirements for New Major Sources and Major Modifications to Existing Sources (R18-2-301 through R18-2-411)		X		
5	General Permits (R18-2-501 through R18-2-525)		X		
6	Emissions from Existing and New nonpoint Standards (R18-2-601 through R18-2-610)		X		
7	Existing Stationary Source Performance Standards (R18-2-710)		X		
8	Emissions from Mobile Sources (R18-2-801 through R18-2-805)		X		
9	New Source Performance Standards (R18-2-901)		X		
10	Motor Vehicles: Inspections and Maintenance (R18-2-1001 through R18-2-1031)		X		
11	Federal Hazardous Air Pollutants (R18-2-1101 through R18-2-1102)		X		
14	Conformity Determination (R18-2-1401 through R18-2-1438)		X		
Rule	**Arizona State Implementation Plan, SIP [7]**				
1	Emission Required: Policy Legal Authority	X		X	
2	Definitions	X		X	
3	Air Pollution Prohibited	X		X	
220	Permits to Operate	X		X	
20	Permits Required	X		X	
21	Procedures for Obtaining and Installation Permit	X		X	
23	Permit Classes	X		X	
24	Installation Permit Fees				
25	Emissions Test Methods/Annual Operating Permit Fees and Procedures	X		X	
26	Portable Equipment	X		X	
26	Air Quality Models	X		X	
27	Performance Tests	X		X	
28	Permit Fees	X		X	
30	Visible Emissions	X		X	
31	Emissions of Particulate Matter	X		X	
32	Odors and Gaseous Emissions	X		X	
33	Storage and Handling of Petroleum Products	X		X	

Table 11-1
City of Phoenix State Route 85 Municipal Solid Waste Landfill
Title V Operating Permit Renewal Application
Summary of Regulatory Applicability Analysis

Regulatory Citation [1,2]	Regulatory Title	Applicable	Not Applicable	In Compliance Yes	In Compliance No
34	Organic Solvents VOC	X		X	
35	Incinerators		X		
Regulation IV	Production of Records: Monitoring, Testing, and Sampling Facilities	X		X	
Regulation V	Unlawful Open Burning	X		X	
Regulation VI	Violations	X		X	
Regulation VII	Ambient Air Quality Standards	X		X	
Regulation VIII	Validity and Operation	X		X	
Rule	**Maricopa County**				
100	General Provisions and Definitions	X		X	
110	Violations	X[8]		X	
120	Conditional Orders	X		X	
200	Permit Requirements for New Major Sources and		X		
201	Emission Caps		X[9]		
204	Emissions Reduction Credits with the Arizona Emissions Bank		X[9]		
210	Title V Permit Provisions	X		X	
220	Non-Title V Permit Provisions		X		
230	General Permits		X		
240	Permits for New Major Sources and Major Modifications to Existing Major Sources		X		
241	Permits for New Sources and Modifications to Existing Sources		X		
245	Continuous Source Emission Monitoring		X		
270	Performance Tests	X		X	
280	Fees	X		X	
300	Visible Emissions	X		X	
310	Open Fugitive Dust Sources	X		X	
311	Particulate Matter from Process Industries		X		
312	Abrasive Blasting		X		
313	Incinerators		X		
314	Open Outdoor Fires		X		
315	Spray Coating Operations		X		
316	Nonmetallic Mineral Mining and Processing		X		
317	Medical Waste Incinerators		X		
318	Approval of Residential Wood burning Devices		X		
319	Ginning Operations		X		
320	Odors and Gaseous Air Contaminants	X		X	
321	Solvent Cleaning				
330	Volatile Organic Compounds	X[10]		x	
331	Solvent Cleaning		x		
332	Perchloroethylene Dry Cleaning		x		
333	Petroleum Solvent Dry Cleaning		x		
334	Rubber Sports Ball Manufacturing		x		
335	Architectural Coatings		x		
336	Surface Coating Operations		x		
337	Graphic Arts		x		
338	Semiconductor Manufacturing		x		
339	Vegetable Oil Extraction Processes		x		
340	Cutback and Emulsified Asphalt		x		
341	Metal Casing		x		
342	Coating Wood Furniture and Fixtures		x		
343	Commercial Bread Bakeries		x		
344	Automotive Windshield Washer Fluid		x		
345	Vehicle Refinishing		x		
346	Coating Wood Millwork		x		

Table 11-1
City of Phoenix State Route 85 Municipal Solid Waste Landfill
Title V Operating Permit Renewal Application
Summary of Regulatory Applicability Analysis

Regulatory Citation [1,2]	Regulatory Title	Applicable	Not Applicable	In Compliance Yes	In Compliance No
350	Storage of Organic Liquids at Bulk Plants and Terminals		x		
351	Loading of Organic Liquids		x		
352	Gasoline Delivery Vessels		x		
353	Transfer of Gasoline into Stationary Storage Dispensing Tanks		x		
	Dispensing Tanks				
360	New Source Performance Standards (Sections 100, 200, 300 Subparts A and WWW)	x		x	
370	Federal Hazardous Air Pollutant Program (Sections 300 Subparts A and AAAA and Section 400, except subparts 301.1 and 301.8)	X		X	
371	Acid Rain		x		
372	Maricopa County HAPs Program		X[11]		
400	Procedure Before the Hearing Board	X[12]			
500	Attainment Area Classification	X[12]			
510	Air Quality Standards	X[12]			
600	Emergency Episodes	X[12]			

Notes:

1	Only the substantive regulations that impose specific requirements on the facility are identified as "applicable".
2	CFR - Code of Federal Regulations, September 2014.
3	The New Source Performance Standards (NSPS) of 40 CFR Part 60 are incorporated by reference in Maricopa County Rule 360.
4	The National Emission Standards for Hazardous Air Pollutants (NESHAP's) in 40 CFR Part 61 are incorporated by reference in Maricopa County Rule 370.
5	This minimum requirements rule applies to states not to individual sources. Individual sources are subject to Maricopa County Rules 200 and 210.
6	These provisions are shown as not applicable because they mainly provide the statutory authority for the state and county air quality programs and do not impose specific requirements on the facility. The facility's daily operation will be governed by the provisions in the Maricopa County air quality regulations.
7	Only currently codified Arizona State Implementation Plan (SIP) rules for Maricopa County are presented here.
8	This provision is shown as not applicable because it is obsolete and has been superseded by the Maricopa County air quality rules which are at least as stringent as this provision.
9	This provision is shown as not applicable because it is administrative in nature and merely specifies the classification of violations of the County rules.
10	This provision applies to existing municipal solid waste landfills for which construction commenced prior to May 30, 1991.
11	This provision is shown as not applicable because the facility qualifies for the exemption in Rule 330, Section 307.2.
12	This provision is shown as applicable; however it is administrative in nature and applies to all regulated sources within Maricopa County.

12.0 VOLUNTARY ACCEPTED LIMITS AND PROPOSED EXEMPTIONS

No voluntary limits are proposed as part of this permit application.

13.0 PROCESSING INFORMATION

The following information was used to determine emissions, and to comply with Rule 210.

a) For the purposes of this Title V Permit Renewal, the potential to emit (PTE) value for emissions from the landfill, that are not routed and combusted in one of the enclosed flares, are based on the maximum LFG constituent generation rates (e.g., methane, NMOC, etc.) as calculated with EPA's LandGEM – Landfill Gas Emission Model, version 3.02. The LandGEM model provides a conservative average estimate of these generation rates. The "maximum generation" occurs in the year following the cessation of waste placement in the refuse prism. In this case, the landfill will continue filling, so the maximum landfill gas generation for the renewal period will occur in 2021. Consequently, these maximum values *"over the permit renewal period"* are used as the basis for PTE calculations in this permit renewal application. Results of the modeling of LFG generation, including historical municipal solid waste tonnage placed in the SR85 LF, are included in Appendix C.

b) The unpredictable nature of the decomposition of refuse results in an hourly maximum rate of LFG emissions that is considered an estimate only. This variability subsequently affects the maximum rate of emissions of criteria pollutants from the combustion of LFG at the Flare Station.

13.1 Disposal Capacity

The estimated disposal capacity (including municipal solid waste and cover soils) of the SR85 LF Cell 1 is approximately 11.25 million metric tons and Cell 2 will be approximately 11.8 million metric tons. Cell 2 may begin operation during this renewal's 5 year permit term. The estimated closure year for the SR85 LF is 2100.

13.2 Operating Schedule

The SR85 LF is an active landfill and land filling and maintenance operations occur 12 hours per day from 5 am to 5 pm, 6 days per week; however, the LFGES operates 24 hours per day, 365 days per year.

14.0 PROCESS AND CONTROL EQUIPMENT DESCRIPTION

The COP presently operates under a Title V Air Quality Operating Permit #V03002 revision that was issued on December 11, 2014. This permit renewal application sets forth operating conditions for the control of emissions (criteria pollutants, NMOC, and HAPs) from area and point sources at the SR85 LF.

Compacted waste at the SR85 LF decomposes over time by various reduction/oxidation chemical and microbial processes. Results of these processes include the generation of methane, carbon dioxide, water vapor (which becomes condensate/leachate when it comes into contact with the waste mass), and numerous NMOC, including VOC and HAPs. To limit the emission of the gaseous compounds through the landfill surface and into the atmosphere, a facility-wide LFGES was installed.

The LFGES consists of vertical wells drilled and emplaced into the waste mass and interconnected to a vacuum source by HDPE and PVC headers. LFG is removed under vacuum from the refuse prism as it is produced. The extracted LFG is then delivered to a high temperature enclosed flare (Flare Station) where it is combusted under controlled conditions into carbon dioxide and water vapor. During this combustion process, various criteria air pollutants (NOx, SOx, and CO) are emitted. Also emitted through the extraction and treatment process and particulate (PM) and particulate matter as condensable salts. Source performance testing is performed at regular intervals to verify the destruction efficiency of the LFGES. There is currently one Flare Station at the SR85 LF containing three flares.

LFG condensate/leachate is collected in sumps located at engineered low points in the header system and then conveyed to a central storage tank at the appropriate flare station. To prevent buildup of desorbed gases in the tank, an exhaust vent system was designed such that any air leaving the tank is passed through granulated activated charcoal canister to remove any organic gases and odors desorbed into the air above the condensate/leachate. This tank is monitored on a regular basis using a PID and/or FID organic gas-analyzing instrument to determine if gas breakthrough has occurred.

The COP complies with an approved Dust Control Plan. Vehicle traffic related to current and future LFGES OM&M activities are an insignificant source of fugitive dust emissions. Control of dust emissions due to wind erosion and other activities is accomplished by some of the following actions, as further identified and required by the approved Dust Control Plan (Appendix E):

- Scraper operation – pre-water to depths of cuts.

- Extensive hydro-seeding was performed, as part of the final cover construction operation, to stabilize the soils and minimize erosion and offsite discharge of soils during adverse weather events.
- Perimeter security fencing and appropriate signage were installed to limit vehicle traffic over landfill surfaces by preventing public access to (and discourage trespassing onto) the SR85 LF.
- Asphalt millings installed on access roads to and around most of the landfill.
- Driving on perimeter roads is as needed for maintenance (< 20 trips/day) and at speeds < 15 mph.
- Two 8000 gallon water pulls are used when performing dust generating activities other than driving on access/perimeter roads for routine monitoring and maintenance.

The process equipment at the SR85 LF includes the following:

Table 14-1: Existing Enclosed Flare Equipment Listing

Equipment Identification	Equipment Location	Equipment Description
FL-1	Flare Station 1	18 MMBtu/hr flare w/ blower, ignition assembly, and condensate injection assembly
FL-2	Flare Station 1	42 MMBtu/hr flare w/ blower, ignition assembly, and condensate injection assembly
FL-3(1)	Flare Station 1	40 MMBtu/hr flare w/ blower, ignition assembly, and condensate injection assembly
***Note**: (1) FL-3 was relocated to the SR85 LF from the Skunk Creek LF site in November 2014.*		

15.0 STACK INFORMATION

Table 15-1 provides existing enclosed flares exhaust stacks data.

Table 15-1: Existing Enclosed Flares Exhaust Stack Data[1]

Flare Identification	Stack ID	Vertical Stack Height (ft.)	Stack Inside Diameter (inches)	Exhaust Gas Temperature (°F)	Exhaust Gas Flow Rate (acfm)
Flare Station 1					
Flare 1 (FL-1)	1	30.75	72	1045	23,682
Flare 2 (FL-2)	2	32.75	114	1475	30,342
Flare 3 (FL-3)[2]	3	32.50	106	1339	56,796

Notes:

(1) *The listed exhaust gas temperatures (°F) and flow rates (acfm) are the average of three (3 exhaust gas temperature and flow readings from the most recent source test reports (e.g., 2012).*

(2) FL-3 was relocated to the SR85 LF from the Skunk Creek LF site in November 2014.

(3) The vertical flare stack heights are based on measurements taken during the most recent source tests that are reflected in the corresponding source test report documents (2012).

16.0 SITE DIAGRAM

A SR85 LF site diagram is provided in Appendix D. The diagram includes the following features:

- Property Boundaries
- Adjacent Streets and Roads
- Directional Arrow
- Elevation
- Closest distance between Equipment and Property Boundary.
- Equipment Layout
- Relative location of emission sources/permits
- Location of Emission Sources, Points and Non-point Emission Areas
- Location of Air Pollution Control Equipment

17.0 AIR POLLUTION CONTROL INFORMATION

Sources at the facility which presently have pollution control devices include the following:

- Gas collection and control system is currently in operation at the SR85 LF. The system incorporates use of enclosed landfill gas flares. The flares are the primary NMOC control devices have been source tested per requirements of Maricopa County, to determine compliance with the permit. The flares are rated at 98% destruction efficiency for VOC and they are rated for 98% destruction efficiency for NMOC. At the flare stations, the condensate/leachate tank vents are controlled by 55 gallon GAC canisters for organic vapor and odor control.
- SR85 LF performs dust control measures included in the facility's current approved dust control plan. A copy of the current Title V Air Quality Operating permit is included in Appendix A and the dust control plan is included in Appendix E.

18.0 PERENNIAL ENERGY, INC LANDFILL GAS FLARES

The existing flares were tested for compliance and met the emission limits in the permit.

19.0 COMPLIANCE PLAN

Table 19-1 demonstrates the current, site operations compliance status with respect to applicable federal requirements, including those regulations found in Regulation III, ARS Section 49-480.03, and ARS Section 49-480.04.

Table 19-1: Compliance Demonstration Summary

Regulatory Citation	Regulatory Title	Applicable Requirements	Compliance Demonstration
40 CFR Part 60, Subpart WWW	Standards of performance for Municipal Solid Waste Landfills	Subpart WWW sets standards for landfills to comply with regards to landfill gas collection and control measures.	1. The SR85 LF demonstrated that the NMOC emission rate is above the standard, as stated in the rule. Therefore a gas collection system was designed and installed. This system meets the requirements. 2. The SR85 LF operates the gas collection system to comply with the standards set in Subpart WWW. 3. NSPS monitoring is conducted to maintain compliance with Subpart WWW. 4. The flare stations contain the necessary recording equipment to maintain records of the operation of the flares. The flare stations have been source tested and have met the required destruction efficiency.
40 CFR Part 63, Subpart AAAA	National Emission Standards for Hazardous Air pollutants: Municipal Solid Waste Landfills	Any time an action taken during a startup, shutdown and malfunction plan is not consistent with the startup, shutdown and malfunction plan, the source shall report actions taken within 2 working days after commencing such actions, followed by a letter 7 days after the event.	SR85 LF will comply with the requirements of Subpart AAAA
40 CFR Part 82, Subpart F (Title VI, Section 608, 11/15/90)	Stratospheric Ozone Protection Program	1. Subpart F pertains to the use and handling of Ozone depleting substances and includes requirements for the proper handling of Chlorofluorocarbons (CFC)'s.	1. SR85 LF will comply with the applicable requirements set forth in Subpart F.
40 CFR Part 98, Subpart HH	Mandatory Greenhouse Gas Reporting for Municipal Solid Waste Landfills	Subpart HH requires that the owner or operator of the MSW landfill submit annual GHG reports to the U.S. EPA	SR85 LF will comply with the requirements of Subpart HH.

Regulatory Citation	Regulatory Title	Applicable Requirements	Compliance Demonstration
Maricopa County Rule 100	General Provisions	1. Prohibits the discharge of regulated air pollutants in excess of the quantities or concentrations specified in the applicable State or County Rules. 2. Requires recordkeeping of emissions testing, monitoring, and malfunctions. 3. Requires submittal of an annual emissions inventory questionnaire.	1. SR85 LF will comply through monitoring of emissions as required by each applicable rule that contains an emission limit (see the Compliance Demonstration for each County Rule containing applicable emission limits in Table 11-1). 2. SR85 LF will comply by maintaining all necessary inventory records of emission testing, monitoring, and malfunctions as required by each applicable rule. 3. SR85 LF will comply by submitting annual emissions inventory reports to Maricopa County within 90 days of receipt of inventory forms.
Maricopa County Rule 140	Excess Emissions	Requires reports of excess emissions.	SR85 LF will comply by submitting any required excess emission reports when applicable.
Maricopa County Rule 200	Permit Requirements	1. Outlines generic air permit requirements for sources within Maricopa County. 2. Requires an earth moving permit prior to any earth moving operation that disturbs a total surface area of 0.10 acre or more.	1. SR85 LF will comply by obtaining a Title V Permit renewal. 2. SR85 LF has complied by obtaining an approved dust control plan and earth moving permit for the landfill (see Attachment D of the Title V permit renewal application).
Maricopa County Rule 210	Title V Permit Provisions	Establishes procedures for obtaining a Title V permit, including application processing procedures, permit contents, permit review, compliance plan, requirements, administrative requirements, and public participation provisions.	SR85 LF will comply by obtaining a Title V permit renewal.
Maricopa County Rule 270	Performance Tests	1. Establishes the requirements for performance tests, testing criteria, testing conditions, notice of testing and testing facilities that must be followed to determine compliance with applicable emissions limits.	1. SR85 LF has an active landfill gas collection and control system. SCLF will comply with this rule by conducting performance tests to ensure compliance with the emission limits: a. SR85 LF has conducted a performance test on the landfill gas collection and control system. b. SR85 LF will furnish Maricopa County with a test protocol and a report of the results of future performance tests.

Regulatory Citation	Regulatory Title	Applicable Requirement	Compliance Demonstration
Maricopa County Rule 280	Fees	Establishes the fees for processing of Title V application and permits and for annual emissions of regulated air pollutants.	SR85 LF will comply through the payment of all applicable fees.
Maricopa County Rule 300	Visible Emissions	Establishes an opacity limit of 20 percent with the exception of exceedences during startup, shutdown, and emergencies.	SR85 LF will continue to comply through the following procedures: a. SR85 LF will conduct visible opacity tests (according to EPA Reference Method 9). b. SR85 LF will retain copies of all records for five years.
Maricopa County Rule 310	Open Fugitive Dust Sources	1. Requires a dust control plan for any source commencing earth moving operations or dust generating operations. 2. Requires compliance with any applicable opacity standards. 3. Requires application of control measures. 4. Requires a dust control plan and operating permit in accordance with Maricopa County Rule 200.	1. SR85 LF complies by having obtained a dust control plan submitted to/approved by Maricopa County. 2. SR85 LF will comply with the 20 percent opacity standard by conducting visual inspections and opacity tests (according to EPA Reference Method 9) as applicable. 3. SR85 LF will comply with implementing dust control measures as presented in the Dust Control Plan. Copies of all records will be retained for at least five years. 4. SR85 LF will comply by having obtained an approved dust control plan and Title V permit from Maricopa County.
Maricopa County Rule 320	Odors and Gaseous Air Contaminants	1. Requires material containment to limit gaseous or odorous air contaminants from equipment, operations or premises thereby preventing air pollution. 2. Requires that CO emissions be effectively controlled by means of secondary combustion.	1. SR85 LF will comply with the containment required through the following: a. SR85 LF has designed and installed a landfill gas collection and control system after the landfill's NMOC emissions exceeded 50 megagrams per year. SR85 LF will also perform all necessary monitoring, recordkeeping, and reporting as required. 2. SR85 LF will control CO emissions through the use of the landfill gas enclosed flares by proper operation and maintenance of equipment as designed.

Regulatory Citation	Regulatory Title	Applicable Requirements	Compliance Demonstration
Maricopa County Rule 321	Municipal Solid Waste Landfills	1. Rule 321 sets forth Maricopa County's EG Program, under which the SCLF is regulated. Sections 100 and 200 contain general provisions and definitions, respectively. Section 301 defines the standards of performance for MSW landfills and adopts 40 CFR 60, Subpart WWW by reference, with revisions.	1. Initial Design Capacity Reports and Non-Methane Organic Compound (NMOC) Emission Rate Reports for the SR85 LF were submitted to Maricopa County within the deadlines specified in the rule. The site exceeded the 50 Mg threshold under the initial NMOC Emission Rate Reports; and therefore, LFG collection and control system (GCCS) was installed. The City of Phoenix met this requirement.
Maricopa County Rule 360	Standards of Performance for Municipal Solid Waste Landfills	Rule 360 incorporates 40 CFR 60 Subpart WWW. Subpart WWW sets standards for landfills to comply with regards to landfill gas collection and control measures.	1. The SR85 LF demonstrated that the NMOC emission rate is above the standard, as stated in the rule. Therefore a gas collection system was designed and installed. This system meets the requirements. 2. The SR85 LF operates the gas collection system to comply with the standards set in Subpart WWW. 3. NSPS monitoring is conducted to maintain compliance with Subpart WWW. 4. The landfill gas flare stations contain necessary recording equipment to maintain records of the operation. The flares have been source tested and have met emission standards.
Maricopa County Rule 370	National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills	Rule 370 incorporates 40 CFR Part 63, Subpart AAAA	The provisions of this rule apply to the owner or operator of any stationary source for which a standard is prescribed under this rule, and for which federal delegation of the implementation and enforcement of the standards to the Maricopa County Air Quality Department (department) has been Accomplished. Any such stationary source must also comply with other Maricopa County Air Pollution Control Regulations. The City of Phoenix continues to meet these requirements.

19.1 Compliance Schedule

1. Based on information and belief formed after reasonable inquiry, the source identified in this application will continue to comply in a timely manner with the requirement(s) with which the source is currently in compliance as identified in Table 19-1.
2. Based on information and belief formed after reasonable inquiry, the source identified in this application will comply in a timely manner with any additional applicable requirements that become effective during the permit time.
3. The source currently operates in compliance with applicable requirements. Therefore, a schedule of compliance for sources not in compliance is not applicable for this site.

19.2 Progress Reports

There is no violation to remedy, this is not applicable.

19.3 Acid Rain

The facility is not subject to the acid rain provisions, this is not applicable.

20.0 COMPLIANCE CERTIFICATION

The signature of a responsible company official on page number (i) of the Standard Permit Application Form shall constitute a certification of compliance with all applicable requirements as required by regulations, and as outlined in Section 16 (Compliance Plan). In addition the signature on "page *i*" that follows the permit renewal application cover page shall certify the truth, accuracy, and completeness of the following:

1. Applicable requirements identified in Table 19-1.
2. The methods for determining compliance and requirements specifically applicable to the facility identified in Table 19-1.
3. Compliance certification shall be submitted annually along with any required annual fees.
4. Since there are no enhanced monitoring or compliance certification requirements applicable to the source at this time, this section is not applicable, and the source is exempt from such requirements.
5. The signature of a responsible company official on the Standard Permit Application Form shall constitute certification of compliance with the above described regulations and provisions.

Since the sources are not subject to the acid rain provisions, this item is not applicable.

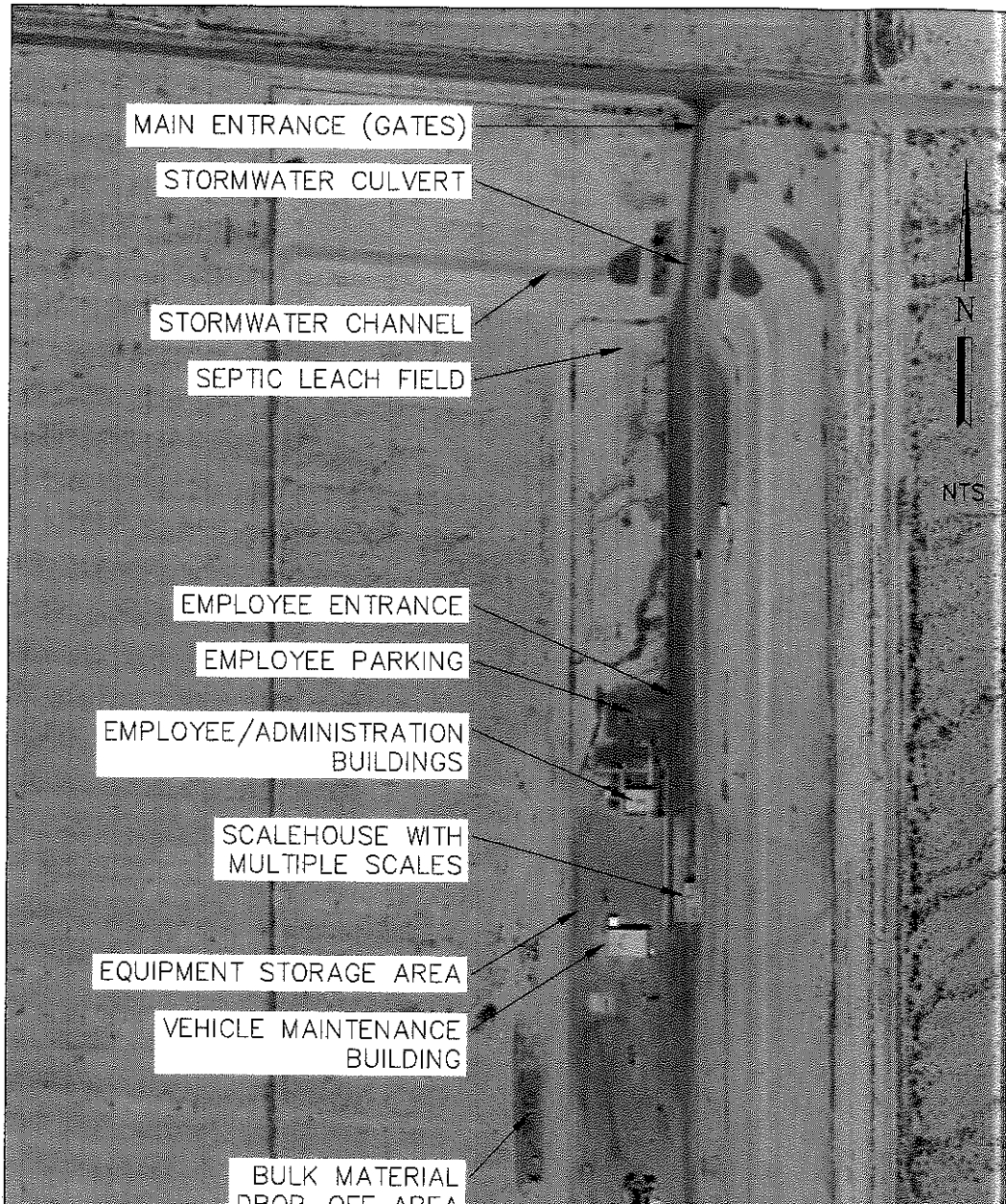
21.0 REQUIREMENTS FOR NEW MAJOR SOURCES

This item is not applicable since the facility is not a new major source and is not proposing a new major modification.

22.0 METHODOLOGY FOR EMISSION CALCULATIONS

Appendix B contains the assumptions, methodologies, conversions, and calculations, on which the Title V permit application is based. All emissions are "worst-case", maximum PTE over the five-year term of the Title V Operating Permit (i.e., until the year 2021). Although municipal solid waste (MSW) landfills are sources of ammonia (NH_3) emissions, according to a U.S. EPA funded report, *Development and Selection of Ammonia Emissions Factors*[2], they are "very uncertain and not very important sources" and are 'minor and insignificant influences" when compared to other possible sources. Therefore, emission rates of ammonia are considered insignificant for purposes of this Title V Operating Permit Renewal Application.

[2] R. Battye, W. Battye, C. Overcash, and S. Fudge. Development and Selection of Ammonia Emission Factors Final Report. Prepared for the U.S. Environmental Protection Agency, August 1994.


MAIN ENTRANCE (GATES)
STORMWATER CULVERT
STORMWATER CHANNEL
SEPTIC LEACH FIELD
EMPLOYEE ENTRANCE
EMPLOYEE PARKING
EMPLOYEE/ADMINISTRATION BUILDINGS
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EQUIPMENT STORAGE AREA
VEHICLE MAINTENANCE BUILDING
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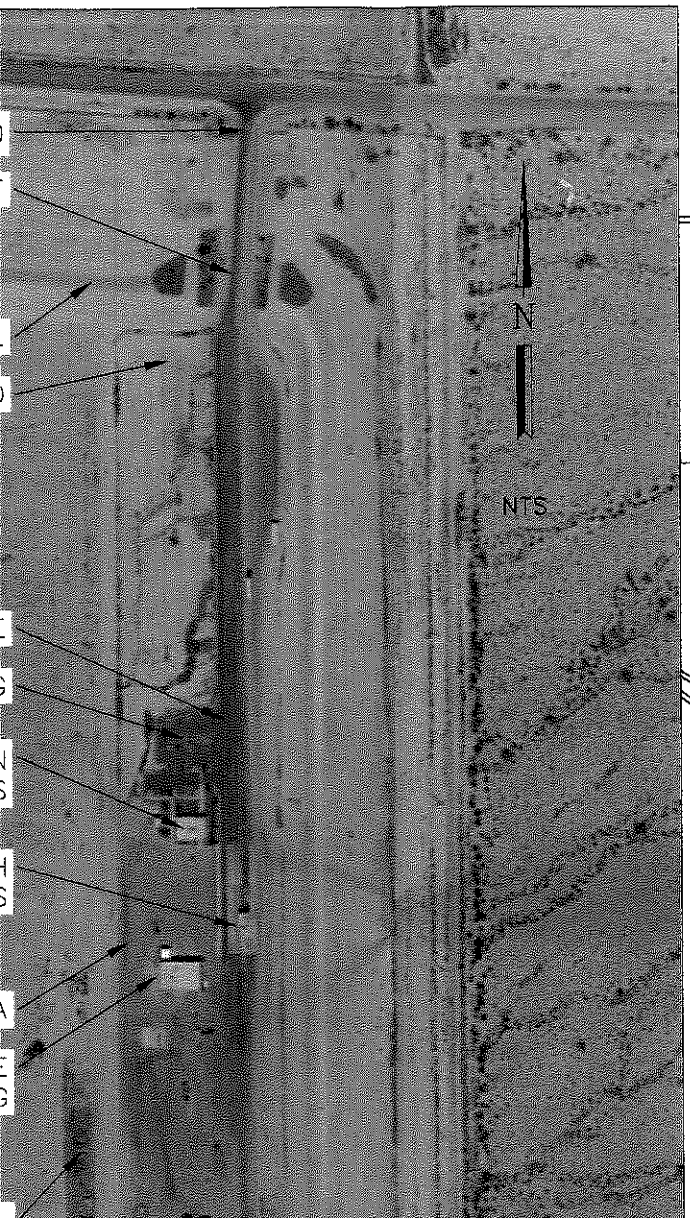
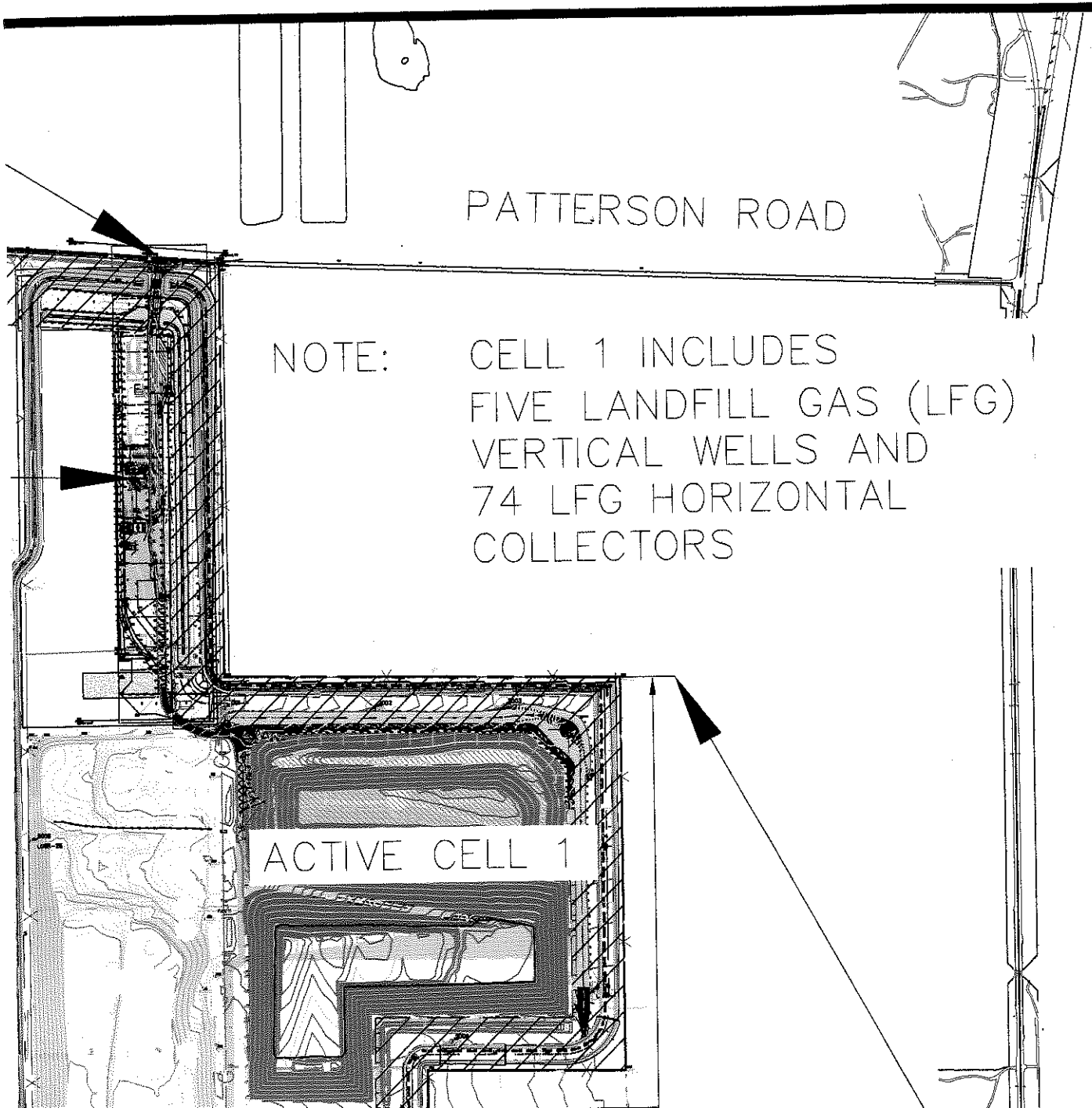


LANDFILL ENTRANCE

ENTRANCE FACILITIES

350' PERIMETER
BUFFER AREA



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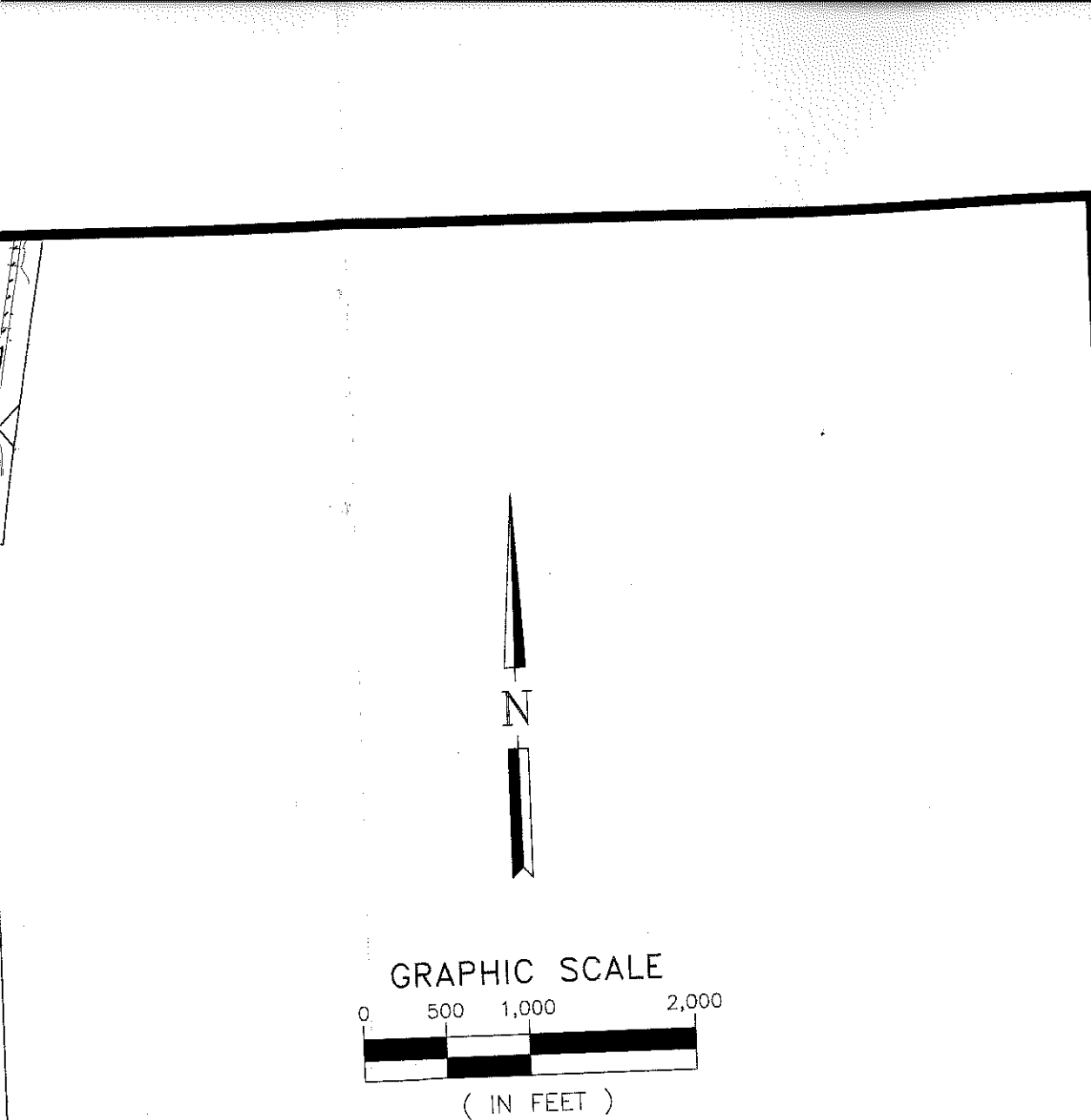

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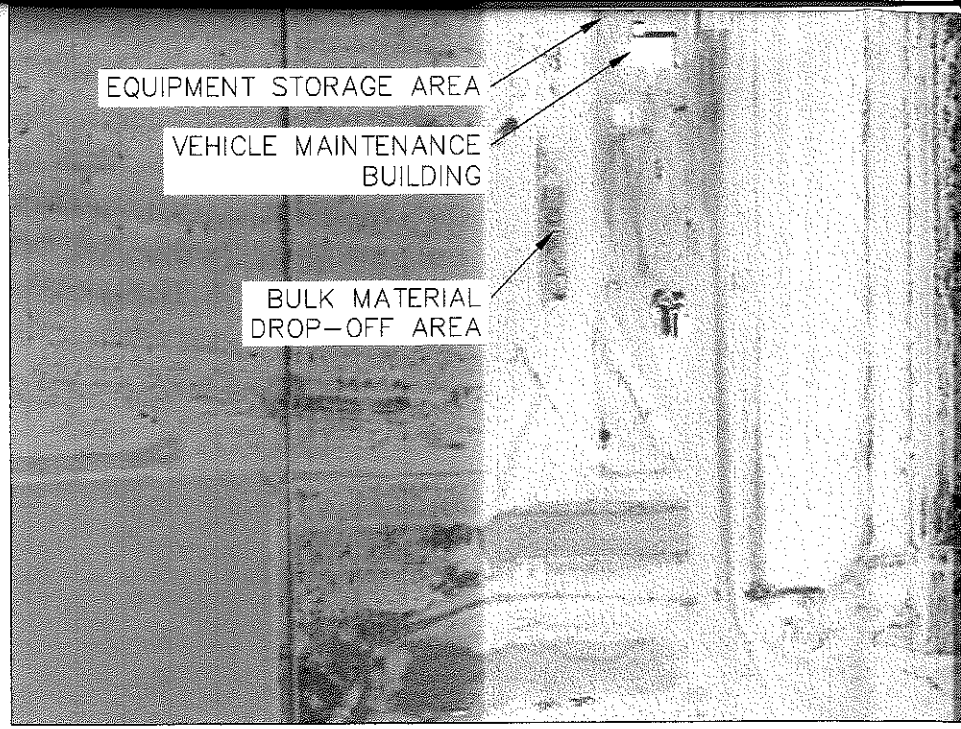
Checked By: T. SHEBER

DESIGN DIVISION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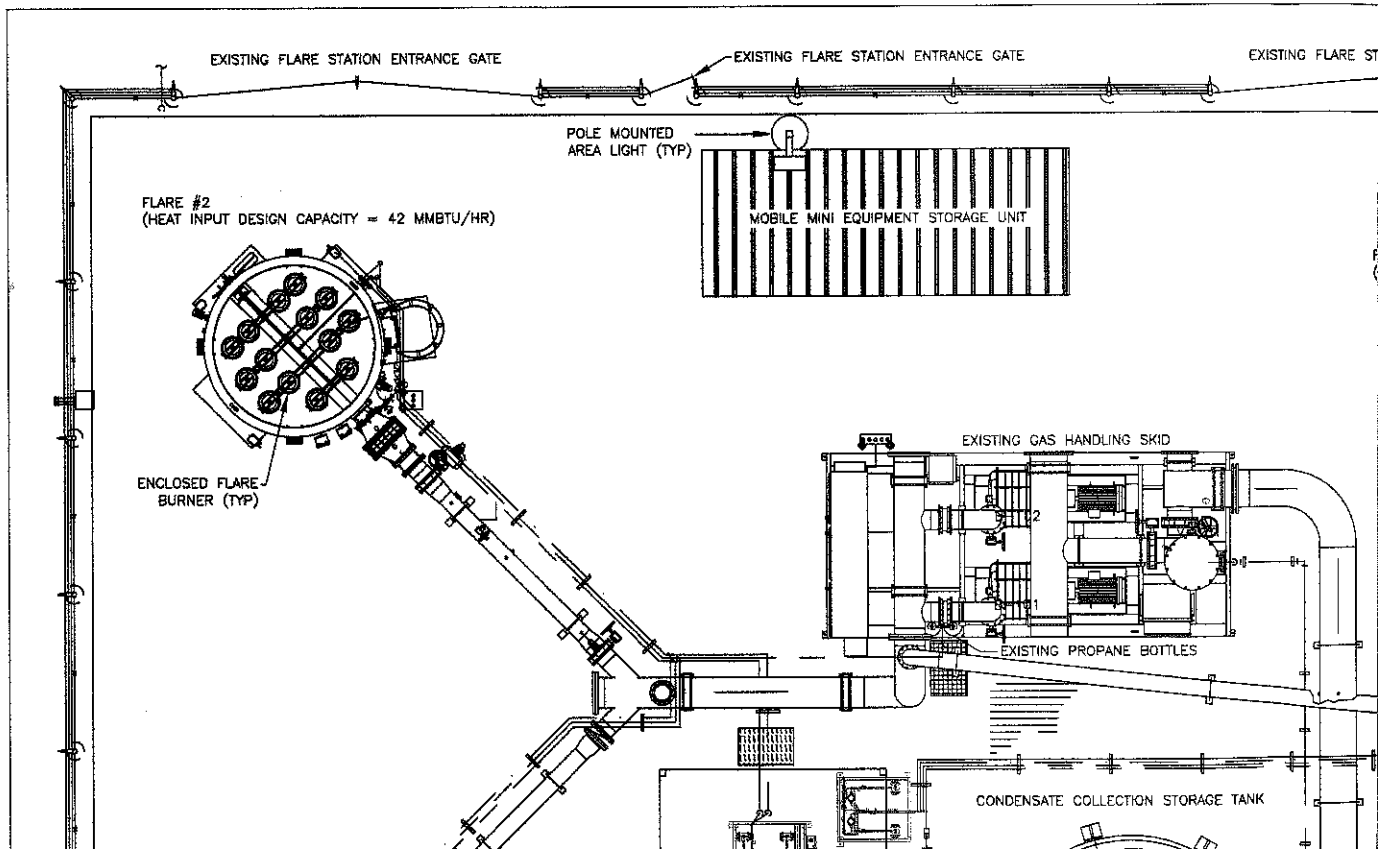
VEHICLE MAINTENANCE BUILDING
BULK MATERIAL DROP–OFF AREA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POLE MOUNTED AREA LIGHT (TYP)
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FLARE #2
(HEAT INPUT DESIGN CAPACITY = 42 MMBTU/HR)
ENCLOSED FLARE BURNER (TYP)
EXISTING GAS HANDLING SKID
EXISTING PROPANE BOTTLES
CONDENSATE COLLECTION STORAGE TANK

FLARE
STATION

CONSTRUCTION
WATER POND

N ENTRANCE GATE

EXISTING FLARE STATION ENTRANCE GATE

POLE MOUNTED
AREA LIGHT (TYP)

ENT STORAGE UNIT

FLARE #1
(HEAT INPUT DESIGN CAPACITY = 18 MMBTU/HR)

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(IN FEET)

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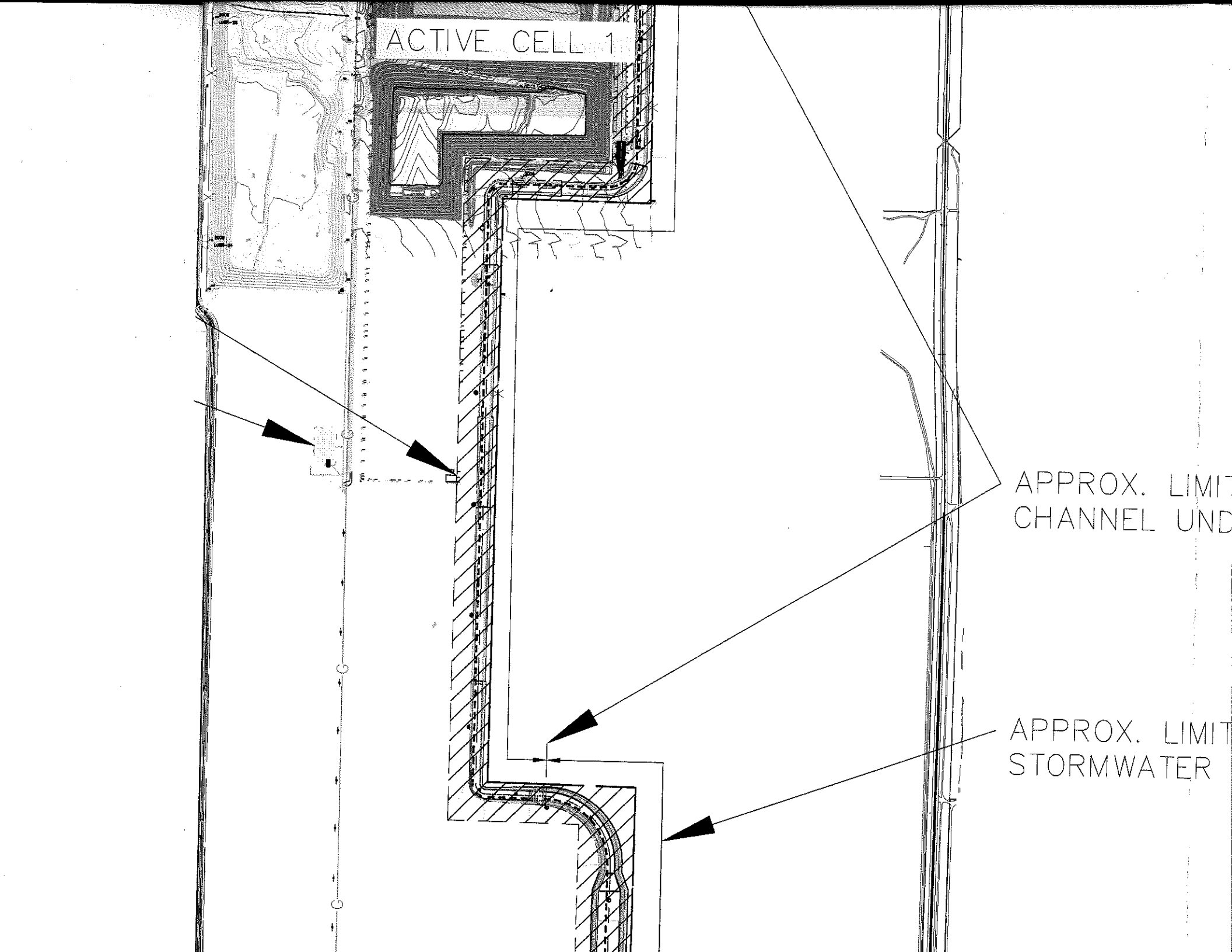
EXISTING PROPANE BOTTLES

CONDENSATE COLLECTION STORAGE TANK


ACTIVE CELL 1
APPROX. LIMIT
CHANNEL UND
APPROX. LIMIT
STORMWATER

(IN FEET)

APPROX. LIMIT OF STORMWATER
CHANNEL UNDER CONSTRUCTION

APPROX. LIMIT OF FUTURE
STORMWATER CHANNEL

Designed By:
T. LIVERMORE

Drawn By:
T. LIVERMORE

Checked By:
T. SHEBER

Date:
JAN 2015

ATING PERMIT RENEWAL APPLICATION

133, PHASE #1014

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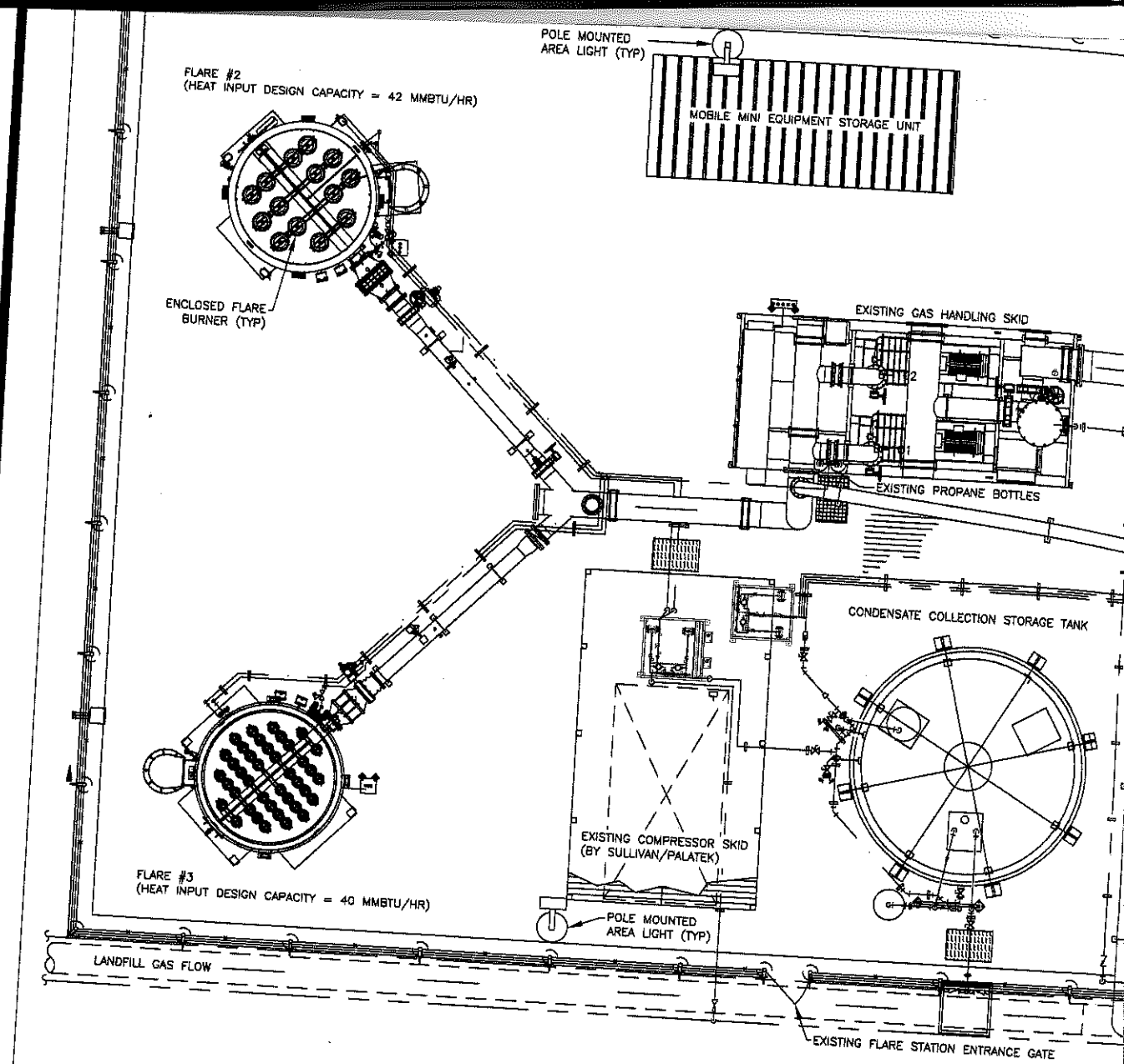
ENGINEERING DEPARTMENT



SR85 FLARE STATION SITE PLAN

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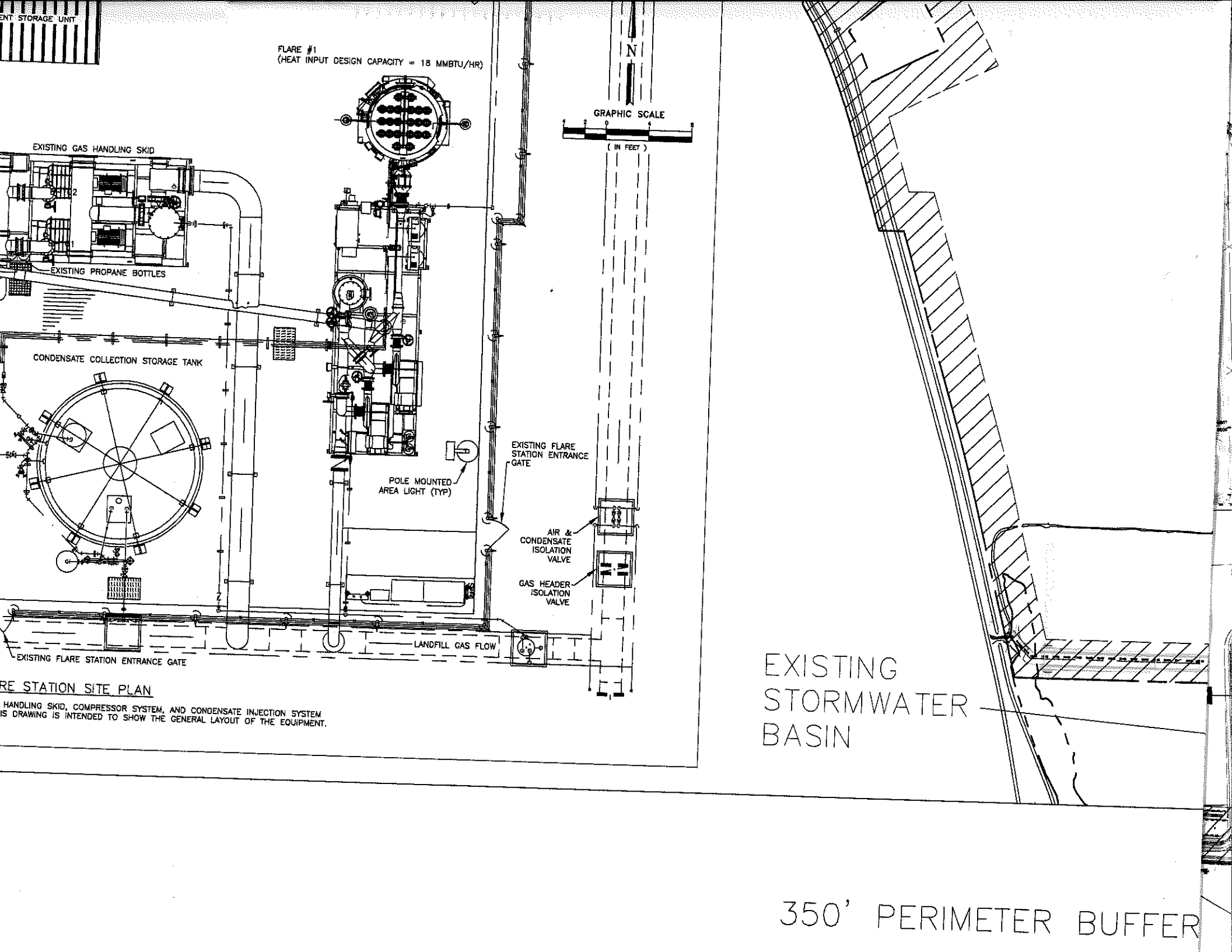
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GRAPHIC SCALE
(IN FEET)
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EXISTING PROPANE BOTTLES
CONDENSATE COLLECTION STORAGE TANK
EXISTING FLARE STATION ENTRANCE GATE
POLE MOUNTED AREA LIGHT (TYP)
AIR & CONDENSATE ISOLATION VALVE
GAS HEADER ISOLATION VALVE
LANDFILL GAS FLOW
EXISTING FLARE STATION ENTRANCE GATE
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HANDLING SKID, COMPRESSOR SYSTEM, AND CONDENSATE INJECTION SYSTEM
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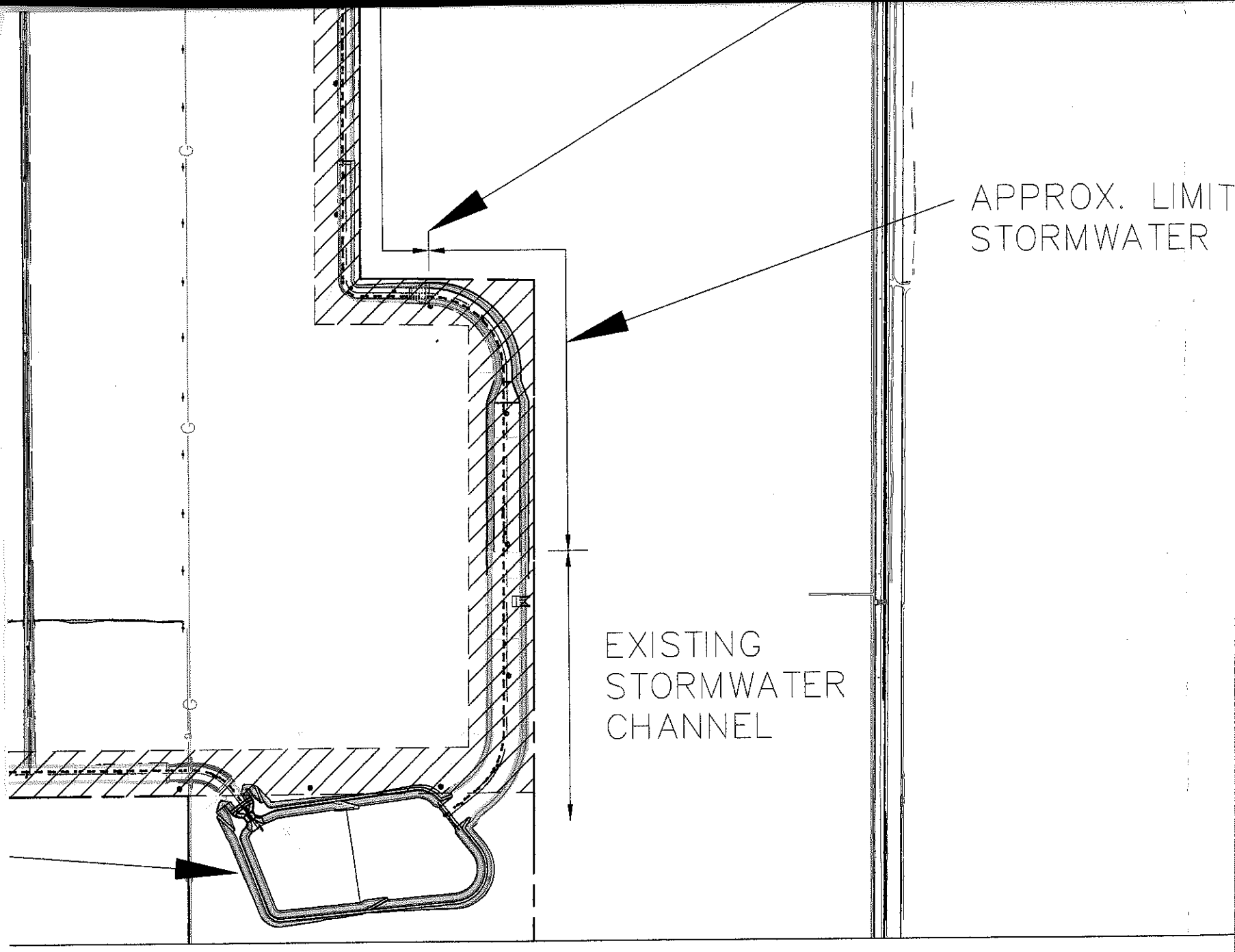
EXISTING STORMWATER BASIN
350' PERIMETER BUFFER



AREA

APPROX. LIMIT OF FUTURE
STORMWATER CHANNEL

Title

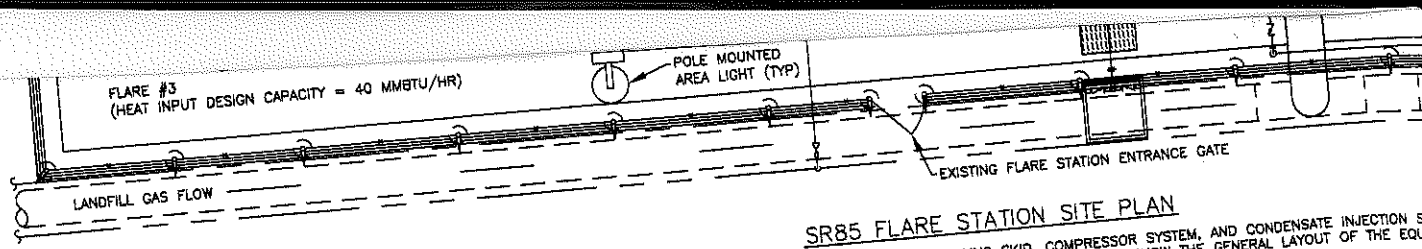
STATE ROUTE 85 LANDFILL
TITLE V AIR QUALITY OPERATING PERMIT RENEWAL APPLICATIO
SITE PLAN
PROJECT NUMBER: 2013-0133, PHASE #1014

OF PHOENIX • ENGINEERIN

Phoenix\SR 85 Landfill\02- SR85 Title V Permit Renewal\21- SR85 Title V Renewal Site Plan\SR85-Title-V-Renewal-2015_Site-Plan

811
Know what's below.
Call before you dig.

CALL TWO WORKING DAYS



SR85 FLARE STATION SITE PLAN

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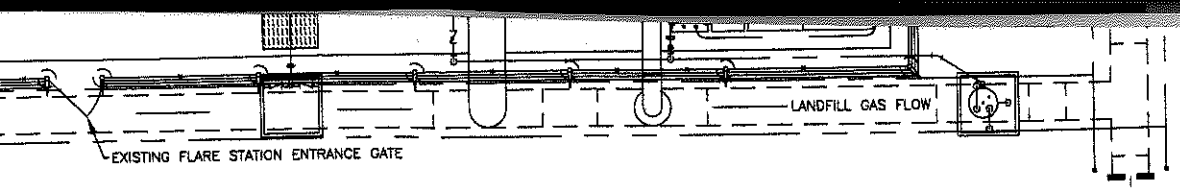

85 FLARE STATION SITE PLAN

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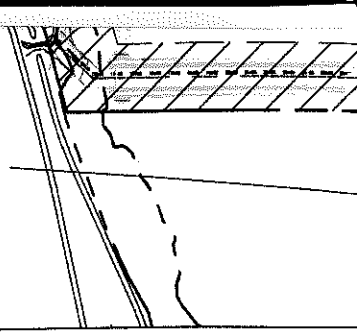
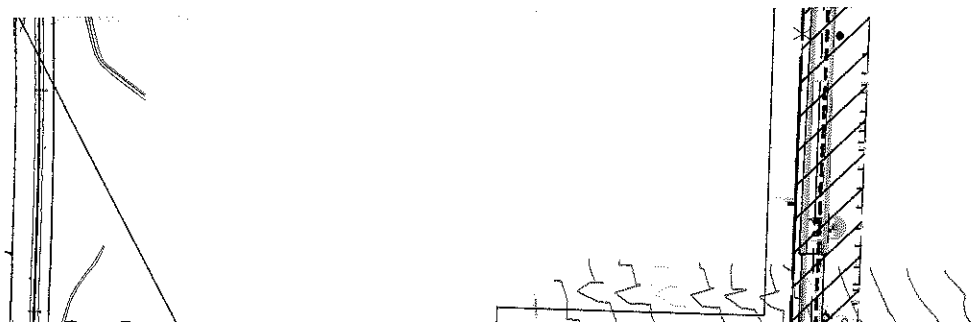
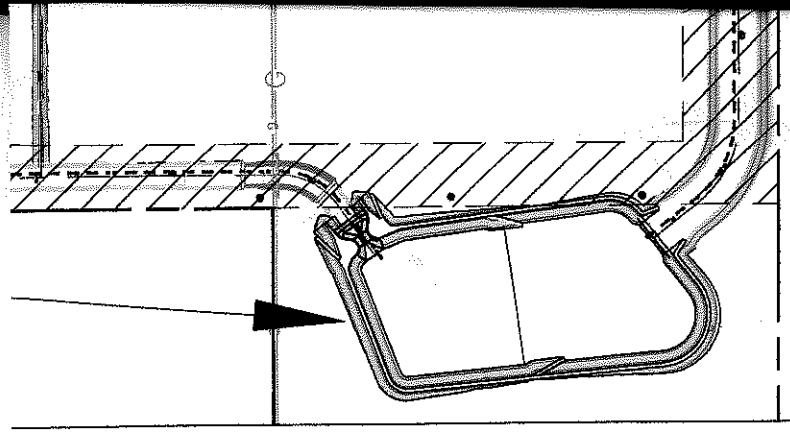
EXISTING
STORMWATER
BASIN



350' PERIMETER BUFFE





STORMWATER
CHANNEL

AREA

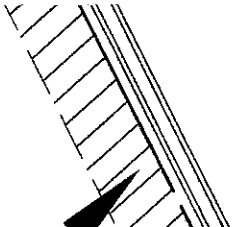
BENCHMARK

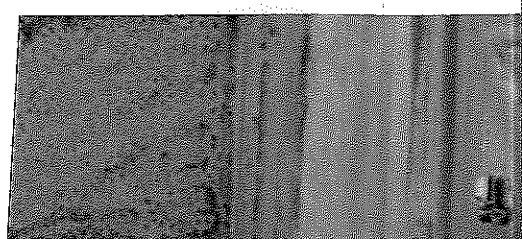
DESCRIPTION:

USGLO BRASS CAP IN POTH
PATTERSON ROAD (NE COR

ELEVATION: 838.04

FLARE





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Title

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SITE PLAN
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Know what's below. Call before you dig.

CALL TWO WORKING DAYS BEFORE YOU DIG
602-263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

BENCHMARK
DESCRIPTION:
USGLO BRASS CAP IN POTHOLE PATTERSON ROAD (NE COR SEC 9)
ELEVATION: 838.04

TETRA TECH BAS (602) 267-0336
complex world CLEAR SOLUTIONS
TETRA TECH BAS, INC.
CIVIL AND ENVIRONMENTAL ENGINEERS
3822 E. UNIVERSITY DRIVE, SUITE 2
PHOENIX, AZ 85034

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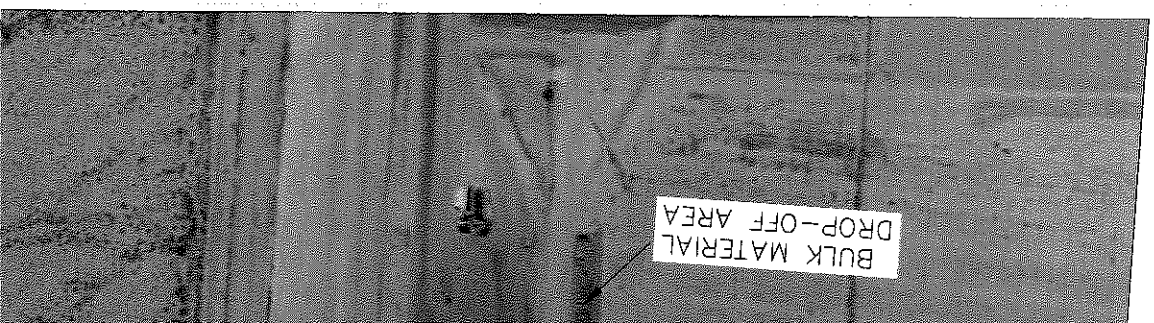


APPENDIX B

PTE SUMMARY AND PTE CALCULATION DETAILS

Emission Unit I.D.	Emission Unit Description	FACILITY-WIDE POTENTIAL-TO-EMIT (PTE) TOTALS, tpy									
		GHG	NMOC	VOC	HAPs	CO	NO_x	SO_2	PM	PM_{10}	$PM_{2.5}$
Landfill Site Point Source Emissions:[1,2]											
FL-1	Flare 1 (rated at 18 MMBtu/hr)	13,168	4.204	1.640	0.215	8.672	2.996	1.883	3.351	3.351	3.351
FL-2	Flare 2 (rated at 42 MMBtu/hr)	26,912	5.476	2.136	0.301	14.533	7.174	2.978	4.691	4.691	4.691
FL-3	Flare 3 (rated at 40 MMBtu/hr)	25,631	2.155	0.840	0.287	5.957	6.482	3.035	4.468	4.468	4.468
	Non-Fugitive PTE Totals[3] =	65,711	11.83	4.62	0.80	29.16	16.65	7.90	12.51	12.51	12.51
Landfill Surface Fugitive Emissions:											
	Solid Waste Handling Particulate Emissions =	-	-	-	-	-	-	-	0.153	0.072	0.011
	Storage Pile Particulate Emissions =	-	-	-	-	-	-	-	13.136	13.136	1.970
	Scraper Particulate Emissions =	-	-	-	-	-	-	-	3.235	3.235	0.485
	Paved Roadway Particulate Emissions =	-	-	-	-	-	-	-	1.136	1.136	0.170
	Light Duty Vehicles on Unpaved Roadways =	-	-	-	-	-	-	-	1.900	1.900	0.285
	Heavy Duty Vehicle on Unpaved Roadways =	-	-	-	-	-	-	-	15.302	15.302	2.295
	Landfill Site Scarification Operations =	-	-	-	-	-	-	-	0.082	0.082	0.012
	Landfill Compaction Operations =	-	-	-	-	-	-	-	0.021	0.021	0.003
	Fueling Storage Emissions =	-	-	0.0105	-	-	-	-	-	-	-
	Architectual Coatings Fugitive Emissions =	-	-	1.644	-	-	-	-	-	-	-
	Landfill Gas Fugitive Emissions[4,5,6,7] =	46,414	46.104	17.981	0.832	0.908	-	-	-	-	-
		46,414	46.10	19.63	0.83	0.91	0.00	0.00	34.97	34.99	5.23

Notes:

1 Flare 3 from Skunk Creek Landfill, Flare Station 1, was relocated to the City of Phoenix State Route 85 Solid Waste Municipal Landfill Site on November 14, 2014 and relisted as SR85 Flare 3 (FL-3). It was approved to source test it with the other two flares by February 24, 2017. Until then, it will be run for commissioning, calibration, and verification of operation.

2 Greenhouse gas (GHG) emissions from enclosed landfill gas flares include CO_2 emissions plus equivalent CO_2 emissions (CO2e) for N_20 and methane.

3 Used for Source Classification (e.g., Non-Categorical Source whereby fugitive emissions are not to be included in the source classification emissions total).

4 Landfill fugitive GHG emissions shown are conservative and include the maximum modeled methane generation rate over the Title V Permit Renewal period (e.g., 2021) as predicted by LandGEM multiplied by 10%, representing a 90% LFG collection efficiency, then the resultant value is multiplied by the Global Warming Potential index (GWPi) for methane of 25. LandGEM generally overpredicts landfill gas generation.

5 This is representing CO that may potentially be in LFG and is included because it is a factor included in AP42. The fugitive emission value reported for carbon monoxide(CO) is conservative and it is based on 10% of the LandGEM modeling result that uses the landfill gas CO default concentration of 141 ppmv and molecular weight of 28.01 per AP42, Chapter 2.4.4, Table 2.4-1. That is, the value reported assumes 90% of the CO from the landfill is captured and sent to the enclosed flare (e.g., non-fugitive - point source emissions).

6 The reported VOCs are 39% of NMOC per AP 42, Chapter 2.4, Table 2.4.2.

7 The reported HAPs are based on Toluene - No or Unknown Co-disposal - HAP/VOC which is the largest HAP per the LandGEM modeling inputs. In LandGEM, concentrations of HAPs were inputs and they reflect listed landfill gas contituents as shown in AP42, Chapter 2.4.4, Table 2.4-1.

8 The $PM_{2.5}/PM_{10}$ ratio of 0.15 taken from the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook, dated September 7, 2006 is used for fugitive dust emissions for fugitive emission sources where an AP42 source-specific particle size multiplier is not provided. The ratios of $PM_{2.5}$ to PM_{10} for fugitive dust sources published in Section 13 of AP-42 typically range from 0.10 to 0.20.

9 Emissions from non-road diesel engine equipment (i.e., emergency generator and other sources that are not stationary such as tipper engines are not included in the facility-wide PTE table.

Flare 1 Potential-to-Emit (PTE)

Parameter	Value	Units	Source
Flare Rated Capacity (FL-1)	1,500	scfm	*Perennial Energy Blower Skid Rating*
Annual LFG to Flare, maximum	788	MMscf/yr	***Calculation:*** *(1500 scfm x 60 min/hr x 8760 hrs/yr) ÷ (10^6)*
Flare Rated Capacity (FL-1)	18	MMBtu/hr	*Maximum Rated Flare Heat Input Capacity (Perennial Energy)*
CH_4 Combusted in Flare	750	scfm	*Assumes 50% CH_4 in LFG for PTE*
HHV of LFG	502.50	Btu/scf	*LandGEM default concentration and U.S. EPA Stationary Combustion Source Guidance, EPA430-K-08-003, May 2008*
Emission Factor, CO	0.11	lbs/MMBtu Heat Input	*Flare Source Test conducted 04/26/12*
Emission Factor, NO_X (as NO_2)	0.038	lbs/MMBtu Heat Input	*Flare Source Test conducted 04/26/12*
Emission Factor, PM	17	lbs/MMscf (methane)	*AP42, Chapter 2, Nov. 1998, Table 2.4-5*
Exhaust Emission Rate, SO_2	0.43	lbs/hr	*Flare Source Test conducted 04/26/12*
Inlet Emission Factor, NMOC	14,367	ppmv (as methane)	*Flare Source Test conducted 04/26/12*
Inlet Emission Factor, NMOC	2,395	ppmv (as hexane)	***Calculation:*** *NMOC (as methane) ÷ 6 = NMOC (as hexane)*
Inlet Total Reduced Sulfur (TRS) Compounds Concentration	89.13	ppmv	*Flare Source Test conducted 04/26/12*
Destruction Efficiency	98%	percent control	*Minimum Required Destruction Efficiency used for PTE*
VOC Concentration	39	% of NMOC	*AP-42, Chapter 2, Nov. 1998, Table 2.4-2, footnote "c"*

Pollutant	Emission Factor		Potential-to-Emit (PTE)	
	Value	Units	lb/hr	tpy[11]
NOx *(See Note 1)*	0.038	lbs/MMBtu Heat Input	0.684	2.996
CO *(See Note 1)*	0.11	lbs/MMBtu Heat Input	1.980	8.672
$PM=PM_{10}=PM_{2.5}$ *(See Note 2)*	17	lb/MMscf (methane)	0.765	3.351
SO_2 *(See Note 3)*	0.43	lbs/hr	0.430	1.883
NMOC *(See Note 4)*	533.225	lb/MMscf (LFG)	0.960	4.204
VOC	39% of NMOC	ppmv	0.374	1.640
Total HAPs *(See Note 5)*	2.73E-05	lb HAPs/scf (LFG)	0.049	0.215
Largest HAP *(See Note 6)*	39	ppmv	0.017	0.073
CO_2 *(See Note 7)*	114.795	lbs/MMBtu Heat Input	2,066	9,050
Methane *(See Note 8)*	98%	percent control	37.30	163
N_2O *(See Note 9)*	0.00139	lb/MMBtu	0.025	0.110
		GHG (as CO_2e)[10] =	3,006	13,168

Notes:

1 Potential Emissions, lb/hr = (Emission factor, lb/MMBtu Heat Input) x (Maximum Flare Heat Input Capacity, MMBTU/hr)

2 Particulate potential emissions, lb/hr = (Emission factor, lb/MMscf of CH_4) x (Methane combusted in flare, MMscf/hr). Methane combusted in flare, MMscf/hr = (CH_4 Combusted in Flare, scfm) x (60 min/hr) ÷ (1,000,000) = (750 scfm) x (60 min/hr) ÷ (1,000,000) = 0.047 MMscf/hr. So, the potential emissions, lb/hr = (0.047 MMscf/hr) x (17 lb/MMscf CH_4) = 0.765 lb/hr

3 SO_2 emissions are based on source test measured exhaust emission rate - SO_X exhaust, lb/hr (as SO_2).

4 NMOC emissions based on site-specific value for the concentration of NMOC (as hexane), minimum destruction efficiency of 98%, and where the inlet NMOC emissions factor (EF) = (2,395 ppmv x 86.18 lb/lb-mol) ÷ 387 scf/lb-mol = 533.225 lb/MMscf of LFG. So, potential emissions, lb/hr = 533.225 lb/MMscf x [((1500 scf/min) x (60 min/hr)) ÷ (1,000,000)] x (1 - 98% control) = 0.959 lb/hr *[**Note:** 387 scf/lb-mol which corresponds to a gas at 70°F and 14.7 psi]*

5 The HAP Emission factor per LandGEM (See Appendix B, Page B-8). LandGEM results are before control. The calculation for total HAPs assumes 98% control of all HAPs by flare. Potential Emissions, lb/hr = (Emission Factor, lb HAP/scf LFG) x (1-98% control) x (LFG Flow Rate scfm) x (60 min/hr) = (2.73E-05 lb/scf) x (1 - 98%) x (1,200 scfm) x (60 min/hr) = 0.039265 lb/hr. *[**Note:** See Appendix B, Page B-8 for LandGEM-based HAP emission factor of 2.73E-05 lb/scf]*

6 The largest HAP modeled by LandGEM is toluene per AP-42 Table 2.4-2 and LandGEM default inputs (See Appendix B, Page B-8). Potential Emissions, lb/hr = (39 ppmv/1,000,000) x (1-98% control) x (92.13 lb/lbmol toluene) ÷ (387 scf/lbmol) x (LFG Flow Rate scfm) x (60 min/hr) = ((39 ÷ 10^6) x (1 - 98%)) x (92.13 lb/lbmol ÷ 387 scf/lbmol) x (1,200 scfm x 60 min/hr) = 0.013369 lb/hr *[**Note:** 387 scf/lb-mol which corresponds to a gas at 70°F and 14.7 psi]*

7 The CO_2 emission factor of 52.07 kg/MMBtu per 40 CFR, Part 98, Table C-1 is used. A conversion factor of 2.20462 lb/kg is used to convert the CO_2 EF from kg/MMBtu to lb/MMBtu. [52.07 kg/MMBtu x 2.20462 lb/kg = 114.795 lb/MMBtu] So, potential emissions, lb/hr = 114.795 lb/MMBtu x 18 MMBtu/hr = 2,066 lb/hr.

8 Potential Methane Emissions, lb/hr = (CH_4 Flow Rate, scfm) x (60 min/hr) x (16.04 lb/lbmol CH_4) ÷ (387 scf/lbmol) x (1-98% control) = (600 scfm) x (60 min/hr) x (16.04 lb/lbmol ÷ 387 scf/lbmol) x (1 - 98%) = 29.84186 lb/hr *[**Note:** 387 scf/lb-mol which corresponds to a gas at 70°F and 14.7 psi]*

9 N_2O emission factor per 40 CFR Part 98, Table C-2 (e.g., biogas N_2O emission factor = 6.30E-04 kg N_2O)/MMBtu), convert to lb/MMBtu by use of 2.20462 lb/kg gives 0.001389 lb/MMBtu. So, potential emissions, lb/hr = 0.001389 lb/MMBtu x 18 MMBtu/hr = 0.0250 lb/hr.

10 Potential GHG (as CO_2e = (Potential Methane) x (Methane GWP, 25) + (Potential N_2O) x (N_2O GWP, 298) + Potential CO_2

11 Potential Annual Emissions, tpy = (Potential Emissions, lb/hr) x (8,760 hr/year) ÷ (2,000 lbs/ton).

Flare 2 Potential-to-Emit (PTE)

Parameter	Value	Units	Source
Flare Rated Capacity (FL-2)	2,100	scfm	*Perennial Energy Flare Specifications*
Annual LFG to Flare, maximum	1,104	MMscf/yr	***Calculation:*** *(2100 scfm x 60 min/hr x 8760 hrs/yr) ÷ (10^6)*
Flare Rated Capacity (FL-2)	42	MMBtu/hr	*Maximum Rated Flare Heat Input Capacity (Perennial Energy)*
CH_4 Combusted in Flare	1,050	scfm	*Assumes 50% CH_4 in LFG for PTE*
HHV of LFG	502.50	Btu/scf	*LandGEM default concentration and U.S. EPA Stationary Combustion Source Guidance, EPA430-K-08-003, May 2008*
Emission Factor, CO	0.079	lbs/MMBtu Heat Input	*Flare Source Test conducted 04/25/12*
Emission Factor, NO_x (as NO_2)	0.039	lbs/MMBtu Heat Input	*Flare Source Test conducted 04/25/12*
Emission Factor, PM	17	lbs/MMscf (methane)	*AP42, Chapter 2, Nov. 1998, Table 2.4-5*
Exhaust Emission Rate, SO_2	0.68	lbs/hr	*Flare Source Test conducted 04/25/12*
Inlet Emission Factor, NMOC	13,367	ppmv (as methane)	*Flare Source Test conducted 04/25/12*
Inlet Emission Factor, NMOC	2,228	ppmv (as hexane)	***Calculation:*** *NMOC (as methane) ÷ 6 = NMOC (as hexane)*
Inlet Total Reduced Sulfur (TRS) Compounds Concentration	89.13	ppmv	*Flare Source Test conducted 04/25/12*
Destruction Efficiency	98%	percent control	*Minimum Required Destruction Efficiency used for PTE*
VOC Concentration	39	% of NMOC	*AP-42, Chapter 2, Nov. 1998, Table 2.4-2, footnote "c"*

Pollutant		Emission Factor		Potential-to-Emit (PTE)	
		Value	Units	lb/hr	tpy [11]
NOx	*(See Note 1)*	0.039	lbs/MMBtu Heat Input	1.638	7.174
CO	*(See Note 1)*	0.079	lbs/MMBtu Heat Input	3.318	14.533
$PM=PM_{10}=PM_{2.5}$	*(See Note 2)*	17	lb/MMscf (methane)	1.071	4.691
SO_2	*(See Note 3)*	0.68	lbs/hr	0.680	2.978
NMOC	*(See Note 4)*	496.110	lb/MMscf (LFG)	1.250	5.476
VOC		39% of NMOC	ppmv	0.488	2.136
Total HAPs	*(See Note 5)*	2.73E-05	lb HAPs/scf (LFG)	0.069	0.301
Largest HAP	*(See Note 6)*	39	ppmv	0.023	0.102
CO_2	*(See Note 7)*	114.795	lbs/MMBtu Heat Input	4,821	21,118
Methane	*(See Note 8)*	98%	percent control	52.22	229
N_2O	*(See Note 9)*	0.00139	lb/MMBtu	0.058	0.256
			GHG (as CO_2e) [10] =	6,144	26,912

Notes:

1 Potential Emissions, lb/hr = (Emission factor, lb/MMBtu Heat Input) x (Maximum Flare Heat Input Capacity, MMBTU/hr)

2 Particulate potential emissions, lb/hr = (Emission factor, lb/MMscf of CH_4) x (Methane combusted in flare, MMscf/hr). Methane combusted in flare, MMscf/hr = (CH_4 Combusted in Flare, scfm) x (60 min/hr) ÷ (1,000,000) = (1,050 scfm) x (60 min/hr)÷ (1,000,000) = 0.063 MMscf/hr. So, the potential emissions, lb/hr = (0.063 MMscf/hr) x (17 lb/MMscf CH_4) = 1.071 lb/hr

3 SO_2 emissions are based on source test measured exhaust emission rate - SO_x exhaust, lb/hr (as SO_2)

4 NMOC emissions based on site-specific value for the concentration of NMOC (as hexane), minimum destruction efficiency of 98%, and where the inlet NMOC emissions factor (EF) = (2228 ppmv x 86.18 lb/lb-mol) ÷ 387 scf/lb-mol = 496.110 lb/MMscf of LFG. So, potential emissions, lb/hr = 496.110 lb/MMscf x [((2,100 scf/min) x (60 min/hr)) ÷ (1,000,000)] x (1 - 98% control) = 1.250198 lb/hr *[**Note:** 387 scf/lb-mol which corresponds to a gas at 70°F and 14.7 psi]*

5 The HAP Emission factor per LandGEM (See Appendix B, Page B-8). LandGEM results are before control. The calculation for total HAPs assumes 98% control of all HAPs by flare. Potential Emissions, lb/hr = (Emission Factor, lb HAP/scf LFG) x (1-98% control) x (LFG Flow Rate scfm) x (60 min/hr) = (2.73E-05 lb/scf) x (1 - 98%) x (2,100 scfm) x (60 min/hr) = 0.068713 lb/hr *[**Note:** See Appendix B, Page B-8 for LandGEM-based HAP emission factor of 2.73E-05 lb/scf]*

6 The largest HAP modeled by LandGEM is toluene per AP-42 Table 2.4-2 and LandGEM default inputs (See Appendix B, Page B-8). Potential Emissions, lb/hr = (39 ppmv/1,000,000) x (1-98% control) x (92.13 lb/lbmol toluene)÷ (387 scf/lbmol) x (LFG Flow Rate scfm) x (60 min/hr) = ((39÷ 10^6) x (1 - 98%)) x (92.13 lb/lbmol ÷ 387 scf/lbmol) x (2,100 scfm x 60 min/hr) = 0.023397 lb/hr *[**Note:** 387 scf/lb-mol which corresponds to a gas at 70°F and 14.7 psi]*

7 The CO_2 emission factor of 52.07 kg/MMBtu per 40 CFR, Part 98, Table C-1 is used. A conversion factor of 2.20462 lb/kg is used to convert the CO_2 EF from kg/MMBtu to lb/MMBtu. [52.07 kg/MMBtu x 2.20462 lb/kg = 114.795 lb/MMBtu] So, potential emissions, lb/hr = 114.795 lb/MMBtu x 42 MMBtu/hr = 4,821 lb/hr.

8 Potential Methane Emissions, lb/hr = (CH_4 Flow Rate, scfm) x (60 min/hr) x (16.04 lb/lbmol CH_4) ÷ (387 scf/lbmol) x (1-98% control) = (1,050 scfm) x (60 min/hr) x (16.04 lb/lbmol ÷ 387 scf/lbmol) x (1 - 98%) = 52.223256 lb/hr *[**Note:** 387 scf/lb-mol which corresponds to a gas at 70°F and 14.7 psi]*

9 N_2O emission factor per 40 CFR Part 98, Table C-2 (e.g., biogas N_2O emission factor = 6.30E-04 kg N_2O)/MMBtu), convert to lb/MMBtu by use of 2.20462 lb/kg gives 0.001389 lb/MMBtu. So, potential emissions, lb/hr = 0.001389 lb/MMBtu x 42 MMBtu/hr = 0.05834 lb/hr

10 Potential GHG (as CO_2e = (Potential Methane) x (Methane GWP, 25) + (Potential N_2O) x (N_2O GWP, 298) + Potential CO_2

11 Potential Annual Emissions, tpy = (Potential Emissions, lb/hr) x (8,760 hr/year) ÷ (2,000 lbs/ton)

Flare 3 Potential-to-Emit (PTE) [Relocation from Skunk Creek Landfill Flare Station on November 14, 2014]

Parameter	Value	Units	Source
Flare Rated Capacity (FL-3)	2,000	scfm	*Perennial Energy Flare Specifications*
Annual LFG to Flare, maximum	1,051	MMscf/yr	***Calculation:*** *(2000 scfm x 60 min/hr x 8760 hrs/yr) ÷ (10^6)*
Flare Rated Capacity (FL-3)	40	MMBtu/hr	*Maximum Rated Flare Heat Input Capacity (Perennial Energy)*
CH_4 Combusted in Flare	1,000	scfm	*Assumes 50% CH_4 in LFG for PTE calculations*
HHV of LFG	502.50	Btu/scf	*LandGEM default concentration and U.S. EPA Stationary Combustion Source Guidance, EPA430-K-08-003, May 2008*
Emission Factor, CO	0.034	lbs/MMBtu Heat Input	*Flare Source Test conducted 04/17/12*
Emission Factor, NO_X (as NO_2)	0.037	lbs/MMBtu Heat Input	*Flare Source Test conducted 04/17/12*
Emission Factor, PM	17	lbs/MMscf (methane)	*AP42, Chapter 2, Nov. 1998, Table 2.4-5*
Exhaust Emission Rate, SO_2	0.693	lbs/hr	*Flare Source Test conducted 04/17/12*
Inlet Emission Factor, NMOC	5,523	ppmv (as methane)	*Flare Source Test conducted 04/17/12*
Inlet Emission Factor, NMOC	920.5	ppmv (as hexane)	***Calculation:*** *NMOC (as methane) ÷ 6 = NMOC (as hexane)*
Inlet Total Reduced Sulfur (TRS) Compounds Concentration	48.97	ppmv	*Flare Source Test conducted 04/17/12*
Destruction Efficiency	98%	percent control	*Minimum Required Destruction Efficiency used for PTE*
VOC Concentration	39	% of NMOC	*AP-42, Chapter 2, Nov. 1998, Table 2.4-2, footnote "c"*

	Emission Factor		Potential-to-Emit (PTE)	
Pollutant	Value	Units	lb/hr	tpy [11]
NOx *(See Note 1)*	0.037	lbs/MMBtu Heat Input	1.480	6.482
CO *(See Note 1)*	0.034	lbs/MMBtu Heat Input	1.360	5.957
$PM=PM_{10}=PM_{2.5}$ *(See Note 2)*	17	lb/MMscf (methane)	1.020	4.468
SO_2 *(See Note 3)*	0.693	lbs/hr	0.693	3.035
NMOC *(See Note 4)*	204.984	lb/MMscf (LFG)	0.492	2.155
VOC	39% of NMOC	ppmv	0.192	0.840
Total HAPs *(See Note 5)*	2.73E-05	lb HAPs/scf (LFG)	0.065	0.287
Largest HAP *(See Note 6)*	39	ppmv	0.022	0.098
CO_2 *(See Note 7)*	114.795	lbs/MMBtu Heat Input	4,592	20,112
Methane *(See Note 8)*	98%	percent control	49.74	218
N_2O *(See Note 9)*	0.00139	lb/MMBtu	0.056	0.243
		GHG (as CO_2e) [10] =	5,852	25,631

Notes:

1 Potential Emissions, lb/hr = (Emission factor, lb/MMBtu Heat Input) x (Maximum Flare Heat Input Capacity, MMBTU/hr)

2 Particulate potential emissions, lb/hr = (Emission factor, lb/MMscf of CH_4) x (Methane combusted in flare, MMscf/hr). Methane combusted in flare, MMscf/hr = (CH_4 Combusted in Flare, scfm) x (60 min/hr) ÷ (1,000,000) = (1,000 scfm) x (60 min/hr)÷ (1,000,000) = 0.060 MMscf/hr. So, the potential emissions, lb/hr = (0.060 MMscf/hr) x (17 lb/MMscf CH_4) = 1.020 lb/hr

3 SO_2 emissions are based on source test measured exhaust emission rate - SO_X exhaust, lb/hr (as SO_2)

4 NMOC emissions based on site-specific value for the concentration of NMOC (as hexane), minimum destruction efficiency of 98%, and where the inlet NMOC emissions factor (EF) = (920.5 ppmv x 86.18 lb/lb-mol)÷ 387 scf/lb-mol = 204.984 lb/MMscf of LFG. So, potential emissions, lb/hr = 204.984 lb/MMscf x [((2,000 scf/min) x (60 min/hr)) ÷ (1,000,000)] x (1 - 98% control) = 0.491961 lb/hr *[**Note:** 387 scf/lb-mol which corresponds to a gas at 70°F and 14.7 psi]*

5 The HAP Emission factor per LandGEM (See Appendix B, Page B-8). The calculation for total HAPs assumes 98% control of all HAPs by flare. Potential Emissions, lb/hr = (Emission Factor, lb HAP/scf LFG) x (1-98% control) x (LFG Flow Rate scfm) x (60 min/hr) = (2.73E-05 lb/scf) x (1 - 98%) x (2,100 scfm) x (60 min/hr) = 0.065441 lb/hr *[**Note:** See Appendix B, Page B-8 for LandGEM-based HAP emission factor of 2.73E-05 lb/scf]*

6 The largest HAP modeled by LandGEM is toluene per AP-42 Table 2.4-2 and LandGEM default inputs (See Appendix B, Page B-8). Potential Emissions, lb/hr = (39 ppmv/1,000,000) x (1-98% control) x (92.13 lb/lbmol S)÷ (387 scf/lbmol) x (LFG Flow Rate scfm) x (60 min/hr) = ((39÷ 10^6) x (1 - 98%)) x (92.13 lb/lbmol ÷ 387 scf/lbmol) x (2,100 scfm x 60 min/hr) = 0.022283 lb/hr *[**Notes:** (1) 387 scf/lb-mol which corresponds to a gas at 70°F and 14.7 psi, (2) See Appendix B, Page B-8 for LandGEM-based worst case HAP generation rates]*

7 The CO_2 emission factor of 52.07 kg/MMBtu per 40 CFR, Part 98, Table C-1 is used. A conversion factor of 2.20462 lb/kg is used to convert the CO_2 EF from kg/MMBtu to lb/MMBtu. [52.07 kg/MMBtu x 2.20462 lb/kg = 114.795 lb/MMBtu] So, potential emissions, lb/hr = 114.795 lb/MMBtu x 40 MMBtu/hr = 4,592 lb/hr

8 Potential Methane Emissions, lb/hr = (CH_4 Flow Rate, scfm) x (60 min/hr) x (16.04 lb/lbmol CH_4) ÷ (387 scf/lbmol) x (1-98% control) = (1,000 scfm) x (60 min/hr) x (16.04 lb/lbmol ÷ 387 scf/lbmol) x (1 - 98%) = 49.736434 lb/hr *[**Note:** 387 scf/lb-mol which corresponds to a gas at 70°F and 14.7 psi]*

9 N_2O emission factor per 40 CFR Part 98, Table C-2 (e.g., biogas N_2O emission factor = 6.30E-04 kg N_2O)/MMBtu), convert to lb/MMBtu by use of 2.20462 lb/kg gives 0.001389 lb/MMBtu. So, potential emissions, lb/hr = 0.001389 lb/MMBtu x 40 MMBtu/hr = 0.056 lb/hr

10 Potential GHG (as CO_2e = (Potential Methane) x (Methane GWP, 25) + (Potential N_2O) x (N_2O GWP, 298) + Potential CO_2

11 Potential Annual Emissions, tpy = (Potential Emissions, lb/hr) x (8,760 hr/year) ÷ (2,000 lbs/ton)

Potential Controlled Landfill Gas Emissions

Year	Landfill Gas (LFG) Generation[1] (scf/yr)	Regarding Compliance with Major NSR Applicability[2]						Regarding Compliance with Part 63[3]	
		Methane (tpy)	NMOC 2311 ppmvd as hexane[4] (tpy)	Total Reduced Sulfur (tpy)	VOC (NMOC as hexane)[5] (tpy)	GHG[6] (tpy CO_2e)	CO (tpy)	Largest HAP (Toluene) (tpy)	Combined HAP (tpy)
2016	1,786,819,342	334	8.299	5.954	3.237	8,354	8.170	0.98	2.9
2017	1,912,123,292	358	8.881	6.372	3.463	8,940	8.743	1.05	3.1
2018	2,034,946,059	381	9.451	6.781	3.686	9,515	9.304	1.12	3.3
2019	2,155,336,771	403	10.010	7.182	3.904	10,078	9.855	1.18	3.5
2020	2,273,343,588	425	10.558	7.575	4.118	10,629	10.394	1.25	3.7
2021	**2,389,013,713**	**447**	**11.096**	**7.961**	**4.327**	**11,170**	**10.923**	**1.31**	**3.8**
2022	2,502,393,416	468	11.622	8.339	4.533	11,700	11.442	1.37	4.0
2023	2,613,528,050	489	12.138	8.709	4.734	12,220	11.950	1.44	4.2
2024	2,722,462,072	509	12.644	9.072	4.931	12,729	12.448	1.50	4.4
2025	2,829,239,055	529	13.140	9.428	5.125	13,228	12.936	1.55	4.6
2026	2,933,901,712	549	13.626	9.776	5.314	13,718	13.415	1.61	4.7
2027	3,036,491,910	568	14.103	10.118	5.500	14,197	13.884	1.67	4.9
2028	3,137,050,686	587	14.570	10.453	5.682	14,668	14.344	1.72	5.0
2029	3,235,618,264	605	15.028	10.782	5.861	15,128	14.794	1.78	5.2
2030	3,332,234,074	623	15.476	11.104	6.036	15,580	15.236	1.83	5.4
2031	3,426,936,763	641	15.916	11.419	6.207	16,023	15.669	1.88	5.5
2032	3,519,764,212	658	16.347	11.729	6.375	16,457	16.093	1.93	5.7
2033	3,610,753,555	675	16.770	12.032	6.540	16,882	16.509	1.98	5.8
2034	3,699,941,189	692	17.184	12.329	6.702	17,299	16.917	2.03	6.0
2035	3,787,362,789	708	17.590	12.620	6.860	17,708	17.317	2.08	6.1
2036	3,873,053,325	724	17.988	12.906	7.015	18,109	17.709	2.13	6.2
2037	3,957,047,075	740	18.378	13.186	7.167	18,502	18.093	2.17	6.4
2038	4,039,377,637	755	18.761	13.460	7.317	18,887	18.469	2.22	6.5
2039	4,120,077,945	771	19.135	13.729	7.463	19,264	18.838	2.26	6.6
2040	4,199,180,280	785	19.503	13.993	7.606	19,634	19.200	2.31	6.8
2041	4,276,716,283	800	19.863	14.251	7.747	19,996	19.554	2.35	6.9
2042	4,352,716,971	814	20.216	14.504	7.884	20,352	19.902	2.39	7.0
2043	4,427,212,744	828	20.562	14.753	8.019	20,700	20.243	2.43	7.1
2044	4,404,067,460	824	20.454	14.675	7.977	20,592	20.137	2.42	7.1
2045	4,316,861,081	807	20.049	14.385	7.819	20,184	19.738	2.37	6.9
2046	4,231,381,505	791	19.652	14.100	7.664	19,784	19.347	2.32	6.8
2047	4,147,594,537	776	19.263	13.821	7.513	19,393	18.964	2.28	6.7
2048	4,065,466,663	760	18.882	13.547	7.364	19,009	18.589	2.23	6.5
2049	3,984,965,029	745	18.508	13.279	7.218	18,632	18.220	2.19	6.4
2050	3,906,057,435	731	18.141	13.016	7.075	18,263	17.860	2.15	6.3
2051	3,828,712,316	716	17.782	12.758	6.935	17,902	17.506	2.10	6.2
2052	3,752,898,732	702	17.430	12.506	6.798	17,547	17.159	2.06	6.0
2053	3,678,586,358	688	17.085	12.258	6.663	17,200	16.820	2.02	5.9
2054	3,605,745,468	674	16.747	12.015	6.531	16,859	16.487	1.98	5.8

Legend:

	Designates the term of the Title V Operating Permit Renewal (April 15, 2016 to April 14, 2021).
	Maximum values over the duration of the Title V Operating Permit Renewal (after control).

Notes:

1 See Attachment B, Page B-9 for LandGEM Modeling Output Values (i.e., Landfill Gas Generation, scf/yr).

2 Calculations based on 90% capture rate, 98% control efficiency (except no control efficiency for TRS and CO). No fugitive emissions included in totals.

3 Calculations based upon a capture rate of 90% and 98% control, plus 10% uncontrolled fugitive emissions.

4 Site-specific NMOC Emission Factor based on Flare Source Test data compiled on 04/26/12 were used as input to the LandGEM model.

5 VOC generation is assumed to be 39% of NMOC generation based on AP-42, Section 2.4, Table 2.4-2

6 GHG emissions shown = Methane Generation * Global Warming Potential index (GWPi) for methane of 25

LandGEM-Predicted Potential Landfill Gas Generation (Before Control)

	EPA LandGEM Outputs							Calculated From LandGEM Output		
Year	Landfill Gas (LFG) Generation[1] (scf/yr)	Landfill Gas (LFG) Generation[1] (scfm)	Methane (tpy)	NMOC[2] (tpy)	Largest HAP (Toluene) (tpy)	Total Reduced Sulfur[3] (tpy)	CO (tpy)	VOC[4] (NMOC as hexane) (tpy)	Combined HAP[5] (tpy)	GHG[6] (tpy CO_2e)
2016	1,786,819,342	3,400	18,565	461.0	8.3	6.62	9.08	179.8	24.36	464,137
2017	1,912,123,292	3,638	19,867	493.4	8.9	7.08	9.71	192.4	26.07	496,686
2018	2,034,946,059	3,872	21,144	525.1	9.5	7.53	10.34	204.8	27.74	528,590
2019	2,155,336,771	4,101	22,394	556.1	10.0	7.98	10.95	216.9	29.38	559,862
2020	2,273,343,588	4,325	23,621	586.6	10.6	8.42	11.55	228.8	30.99	590,515
2021	**2,389,013,713**	**4,545**	**24,822**	**616.4**	**11.1**	**8.85**	**12.14**	**240.4**	**32.57**	**620,561**
2022	2,502,393,416	4,761	26,000	645.7	11.6	9.27	12.71	251.8	34.12	650,012
2023	2,613,528,050	4,972	27,155	674.3	12.2	9.68	13.28	263.0	35.63	678,880
2024	2,722,462,072	5,180	28,287	702.5	12.7	10.08	13.83	274.0	37.12	707,176
2025	2,829,239,055	5,383	29,396	730.0	13.2	10.48	14.37	284.7	38.57	734,912
2026	2,933,901,712	5,582	30,484	757.0	13.7	10.86	14.91	295.2	40.00	762,099
2027	3,036,491,910	5,777	31,550	783.5	14.1	11.24	15.43	305.6	41.40	788,748
2028	3,137,050,686	5,969	32,595	809.4	14.6	11.61	15.94	315.7	42.77	814,868
2029	3,235,618,264	6,156	33,619	834.9	15.1	11.98	16.44	325.6	44.11	840,472
2030	3,332,234,074	6,340	34,623	859.8	15.5	12.34	16.93	335.3	45.43	865,568
2031	3,426,936,763	6,520	35,607	884.2	16.0	12.69	17.41	344.8	46.72	890,168
2032	3,519,764,212	6,697	36,571	908.2	16.4	13.03	17.88	354.2	47.99	914,281
2033	3,610,753,555	6,870	37,517	931.7	16.8	13.37	18.34	363.3	49.23	937,916
2034	3,699,941,189	7,039	38,443	954.7	17.2	13.70	18.80	372.3	50.44	961,083
2035	3,787,362,789	7,206	39,352	977.2	17.6	14.02	19.24	381.1	51.64	983,791
2036	3,873,053,325	7,369	40,242	999.3	18.0	14.34	19.68	389.7	52.80	1,006,050
2037	3,957,047,075	7,529	41,115	1,021.0	18.4	14.65	20.10	398.2	53.95	1,027,868
2038	4,039,377,637	7,685	41,970	1,042.3	18.8	14.96	20.52	406.5	55.07	1,049,253
2039	4,120,077,945	7,839	42,809	1,063.1	19.2	15.25	20.93	414.6	56.17	1,070,216
2040	4,199,180,280	7,989	43,631	1,083.5	19.5	15.55	21.33	422.6	57.25	1,090,763
2041	4,276,716,283	8,137	44,436	1,103.5	19.9	15.83	21.73	430.4	58.31	1,110,904
2042	4,352,716,971	8,281	45,226	1,123.1	20.3	16.12	22.11	438.0	59.34	1,130,645
2043	4,427,212,744	8,423	46,000	1,142.3	20.6	16.39	22.49	445.5	60.36	1,149,996
2044	4,404,067,460	8,379	45,759	1,136.3	20.5	16.31	22.37	443.2	60.04	1,143,984
2045	4,316,861,081	8,213	44,853	1,113.8	20.1	15.98	21.93	434.4	58.85	1,121,331
2046	4,231,381,505	8,051	43,965	1,091.8	19.7	15.67	21.50	425.8	57.69	1,099,128
2047	4,147,594,537	7,891	43,095	1,070.2	19.3	15.36	21.07	417.4	56.55	1,077,363
2048	4,065,466,663	7,735	42,241	1,049.0	18.9	15.05	20.65	409.1	55.43	1,056,030
2049	3,984,965,029	7,582	41,405	1,028.2	18.5	14.75	20.24	401.0	54.33	1,035,119
2050	3,906,057,435	7,432	40,585	1,007.9	18.2	14.46	19.84	393.1	53.25	1,014,623
2051	3,828,712,316	7,284	39,781	987.9	17.8	14.18	19.45	385.3	52.20	994,532
2052	3,752,898,732	7,140	38,994	968.3	17.5	13.90	19.07	377.6	51.17	974,839
2053	3,678,586,358	6,999	38,221	949.2	17.1	13.62	18.69	370.2	50.15	955,536
2054	3,605,745,468	6,860	37,465	930.4	16.8	13.35	18.32	362.8	49.16	936,615

Legend:

Designates the term of the Title V Operating Permit Renewal (April 15, 2016 to April 14, 2021).

Maximum values over the duration of the Title V Operating Permit Renewal, (before control).

Notes:

(1) LandGEM modeling landfill gas generation based on landfill waste tonnage records and the following input parameters: k = 0.020 yr-1; Lo = 170 m^3/Mg

(2) Assumes NMOC concentration of 2311 ppmv (as hexane) which is based on Flare Source Testing of inlet landfill gas - testing conducted on April 2012.

(3) Custom pollutant entered into LandGEM. Sulfur atomic weight = 32, Average Measured Concentration = 89.13 ppm (total reduced sulfur) was used as input to LandGEM, LFG flare test (April 2012).

(4) VOC generation is assumed to be 39% of NMOC generation based on AP-42, Section 2.4, Table 2.4-2.

(5) Total HAP, tpy = (LFG emissions, scf) x (ratio of HAP to LFG, ton/scf). [Example calculation for 2021: 2,389,013,713 scf LandGEM estimated landfill gas generation x 2.73E-05 lbs HAPs/scf landfill gas HAPS emission factor, see Appendix B Page B-8) ÷ 2000 lbs/ton = 32.57 tpy]

(6) GHG emissions = Methane Generation x GWP (25) [Example calculation for 2021: 24,822 tpy methane x 25 GWPi = 620,561 tpy GHG in 2021]

LandGEM Input Values

Year	Waste Acceptance Rate[1] (short tons/year)
2006	1,098,360
2007	1,079,168
2008	1,001,221
2009	929,183
2010	962,275
2011	976,554
2012	818,303
2013	742,681

Methane Generation Constant, k ($year^{-1}$)	0.02
Potential Methane Generation Capacity, L_o (m^3/Mg)	170
NMOC Concentration[2] (*ppmv as hexane*)	2311
Total Reduced Sulfur Compounds[2] (ppm)	89.13
Methane Content[1] (*% by volume*)	50
AP42 Default Carbon Monoxide Concentration, ppmv[3]	141

Notes:

1 LandGEM default value.
2 Based upon Flare Source Testing of inlet landfill gas - testing conducted on April 26, 2012.
3 AP42, Table 2.4-1, Default Concentrations for Landfill Gas Constituents.

Combined HAP Emission Factor Calculation

Hazardous Air Pollutant	2021 Generation[1] (tons)
1,1,1-Trichloroethane (methyl chloroform) - HAP	0.19820
1,1,2,2-Tetrachloroethane - HAP/VOC	0.57146
1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	0.73517
1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.06001
1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.12558
1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.06295
Acrylonitrile - HAP/VOC	1.03461
Benzene - No or Unknown Co-disposal - HAP/VOC	0.45934
Carbon disulfide - HAP/VOC	0.13666
Carbon tetrachloride - HAP/VOC	0.00190
Carbonyl sulfide - HAP/VOC	0.09110
Chlorobenzene - HAP/VOC	0.08710
Chloroethane (ethyl chloride) - HAP/VOC	0.25960
Chloroform - HAP/VOC	0.01109
Dichlorobenzene - (HAP for para isomer/VOC)	0.09554
Dichloromethane (methylene chloride) - HAP	3.68053
Ethylbenzene - HAP/VOC	1.51143
Ethylene dibromide - HAP/VOC	0.00058
Hexane - HAP/VOC	1.76044
Mercury (total) - HAP	0.00018
Methyl ethyl ketone - HAP/VOC	1.58462
Methyl isobutyl ketone - HAP/VOC	0.58900
Perchloroethylene (tetrachloroethylene) - HAP	1.89904
Toluene - No or Unknown Co-disposal - HAP/VOC	11.12080
Trichloroethylene (trichloroethene) - HAP/VOC	1.13874
Vinyl chloride - HAP/VOC	1.41212
Xylenes - HAP/VOC	3.94287
Total HAP Generation in 2021 (tons) =	**32.57**

Total HAP Generation in 2021 (tons)	Total LFG Generation in 2021 (scf)	HAP EF [3] (lb HAP/scf LFG)
32.57	2.39E+09	2.73E-05

Notes:

(1) HAPs from LandGEM output for calendar year 2021 (worst case). The LandGEM modeling results provided in this appendix includes the modeled landfill generation rates for HAPs that were then used in the table above for calculation of the emissions factor for HAPs.

(2) HAPs from LandGEM shown are "generation" prior to collection and control.

(3) HAPs emissions factor 2.73E-05 is used in Potential-to-Emit calculatiopn sheets for Flares 1 through 3.

SR85 Landfill - LandGEM Modeling Output Values

Year	scfm	scf/hr	scf/yr	Methane (tpy)	TRS (tpy)	NMOC (tpy)	CO (tpy)	Toluene (tpy)
2016	3,399.58	203,974.81	1,786,819,342	18,565	6.62	461.0	9.08	8.3
2017	3,637.98	218,278.91	1,912,123,292	19,867	7.08	493.4	9.71	8.9
2018	3,871.66	232,299.78	2,034,946,059	21,144	7.53	525.1	10.34	9.5
2019	4,100.72	246,043.01	2,155,336,771	22,394	7.98	556.1	10.95	10.0
2020	4,325.24	259,514.11	2,273,343,588	23,621	8.42	586.6	11.55	10.6
2021	4,545.31	272,718.46	2,389,013,713	24,822	8.85	616.4	12.14	11.1
2022	4,761.02	285,661.35	2,502,393,416	26,000	9.27	645.7	12.71	11.6
2023	4,972.47	298,347.95	2,613,528,050	27,155	9.68	674.3	13.28	12.2
2024	5,179.72	310,783.34	2,722,462,072	28,287	10.08	702.5	13.83	12.7
2025	5,382.87	322,972.49	2,829,239,055	29,396	10.48	730.0	14.37	13.2
2026	5,582.00	334,920.29	2,933,901,712	30,484	10.86	757.0	14.91	13.7
2027	5,777.19	346,631.50	3,036,491,910	31,550	11.24	783.5	15.43	14.1
2028	5,968.51	358,110.81	3,137,050,686	32,595	11.61	809.4	15.94	14.6
2029	6,156.05	369,362.82	3,235,618,264	33,619	11.98	834.9	16.44	15.1
2030	6,339.87	380,392.02	3,332,234,074	34,623	12.34	859.8	16.93	15.5
2031	6,520.05	391,202.83	3,426,936,763	35,607	12.69	884.2	17.41	16.0
2032	6,696.66	401,799.57	3,519,764,212	36,571	13.03	908.2	17.88	16.4
2033	6,869.77	412,186.48	3,610,753,555	37,517	13.37	931.7	18.34	16.8
2034	7,039.46	422,367.72	3,699,941,189	38,443	13.70	954.7	18.80	17.2
2035	7,205.79	432,347.35	3,787,362,789	39,352	14.02	977.2	19.24	17.6
2036	7,368.82	442,129.37	3,873,053,325	40,242	14.34	999.3	19.68	18.0
2037	7,528.63	451,717.70	3,957,047,075	41,115	14.65	1021.0	20.10	18.4
2038	7,685.27	461,116.17	4,039,377,637	41,970	14.96	1042.3	20.52	18.8
2039	7,838.81	470,328.53	4,120,077,945	42,809	15.25	1063.1	20.93	19.2
2040	7,989.31	479,358.48	4,199,180,280	43,631	15.55	1083.5	21.33	19.5
2041	8,136.83	488,209.62	4,276,716,283	44,436	15.83	1103.5	21.73	19.9
2042	8,281.42	496,885.50	4,352,716,971	45,226	16.12	1123.1	22.11	20.3
2043	8,423.16	505,389.58	4,427,212,744	46,000	16.39	1142.3	22.49	20.6
2044	8,379.12	502,747.43	4,404,067,460	45,759	16.31	1136.3	22.37	20.5
2045	8,213.21	492,792.36	4,316,861,081	44,853	15.98	1113.8	21.93	20.1
2046	8,050.57	483,034.42	4,231,381,505	43,965	15.67	1091.8	21.50	19.7
2047	7,891.16	473,469.70	4,147,594,537	43,095	15.36	1070.2	21.07	19.3
2048	7,734.91	464,094.37	4,065,466,663	42,241	15.05	1049.0	20.65	18.9
2049	7,581.74	454,904.68	3,984,965,029	41,405	14.75	1028.2	20.24	18.5
2050	7,431.62	445,896.97	3,906,057,435	40,585	14.46	1007.9	19.84	18.2
2051	7,284.46	437,067.62	3,828,712,316	39,781	14.18	987.9	19.45	17.8
2052	7,140.22	428,413.10	3,752,898,732	38,994	13.90	968.3	19.07	17.5
2053	6,998.83	419,929.95	3,678,586,358	38,221	13.62	949.2	18.69	17.1
2054	6,860.25	411,614.78	3,605,745,468	37,465	13.35	930.4	18.32	16.8

SR85 LANDFILL DOZER SCARIFICATION AND COMPACTOR PARTICULATE EMISSIONS

Notes:

1 Scarification of lifts, prior to compaction, is performed by using one of two (2) dozers that usually operate each day that provide shallow ripping of cover soil to ensure adhesion between lifts and is only one (1) to two (2) inches deep.

2 Compaction is performed using one or two of three compactors to reduce void space in landfilled waste so as to optimize municipal solid waste landfill capacity.

3 Scarification and compaction particulate emissions (PM10) were estimated by methods cited in the San Diego Air Pollution Control District (SDAPCD) Engineering Evaluation of the Gregory Canyon Landfill (Application No. APCD2007-APP-985364), dated August 5, 2013.

4 For compactor operations an equation, shown below, for agricultural rolling (Wood et al. 2010) is used which is an agricultural tilling operation deemed representative of compacting operations.

5 For scarification operations an equation, shown below, for agricultural ripping (Wood et al. 2010) is used which involves shallow ripping deemed representative of scarcification of landfill lifts.

6 The area associated with daily scarification and compaction operations at the SR85 Landfill is estimated to be 1.32 acres (e.g., 1,659 m^2).

7 Dozer scarification and compaction is performed throughout each day and the landfill operates six (6) days per week for 52 weeks per year, so, grader scarcification and compaction is performed 312 days per year.

8 The $PM_{2.5}/PM_{10}$ ratio of 0.15 is taken from the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook, dated September 7, 2006. The ratios of PM2.5 to PM10 for fugitive dust sources published in Section 13 of AP-42 typically range from 0.10 to 0.20.

The following equation, as cited above, is used for scarification operations by use of dozers:

$$E(PM_{10})_{scar} = 3.15 \times \left(\frac{s}{100}\right)^{0.6} \times \left[-86.5 \times \ln\left(\frac{M}{100}\right) - 95.159\right]$$

Where: s = silt content (%) = 20.7 [per Table IV-25, Gregory Canyon Landfill Engineering Evaluation]

M = moisture content (%) = 8.5 [per Table IV-25, Gregory Canyon Landfill Engineering Evaluation]

$E(PM_{10})_{scar}$ = PM_{10} emissions from dozer scarcification operations (mg/m^2)

$$E(PM_{10})_{scar} = 3.15 \times \left(\frac{20.7}{100}\right)^{0.6} \times \left[-86.5 \times \ln\left(\frac{8.5}{100}\right) - 95.159\right]$$

$E(PM_{10})_{scar}$ =	144.558	mg/m^2	=	3.19E-04	lbs/m^2	*[Note: 453,592.4 mg per lb]*
$E(PM_{10})_{scar}$ =	0.000318696	lbs/m^2 X 1,659 m^2	=	0.53	lbs	
$E(PM_{10})_{scar}$ =	0.53	lbs x 312 days/yr =		165	*lbs PM_{10} (PTE - Dozer operations)*	
		PM_{10} *Landfill Site Scarcification Operations*	=	0.08	*tpy (PTE - Dozer operations)*	
		PM = PM_{10}	=	0.08	*tpy (PTE - Dozer operations)*	
		$PM_{2.5}$	=	0.01	*tpy [See note 8]*	

The following equation is used for compactor operations, as cited above:

$$E(PM_{10})_{com} = 0.813 \times \left(\frac{s}{100}\right)^{0.6} \times \left[-86.5 \times \ln\left(\frac{M}{100}\right) - 95.159\right]$$

Where: s and M = same as above

$E(PM_{10})_{com}$ = PM_{10} emissions from compactor operations (mg/m^2)

$$E(PM_{10})_{com} = 0.813 \times \left(\frac{20.7}{100}\right)^{0.6} \times \left[-86.5 \times \ln\left(\frac{8.5}{100}\right) - 95.159\right]$$

$E(PM_{10})_{com}$ =	37.3097	mg/m^2	=	8.23E-05	lbs/m^2	*[Note: 453,592.4 mg per lb]*
$E(PM_{10})_{com}$ =	8.22538E-05	lbs/m^2 X 1,659 m^2	=	0.14	lbs	
$E(PM_{10})_{com}$ =	0.14	lbs x 312 days/yr =		43	*lbs PM_{10} (PTE - Compactor operations)*	
		Compactor PM_{10} Emissions	=	0.021	*tpy (PTE - Compactor operations)*	
		PM = PM_{10}	=	0.021	*tpy*	
		$PM_{2.5}$	=	0.003	*tpy [See note 8]*	

SR85 LANDFILL HEAVY DUTY VEHICLES PARTICULATE EMISSIONS

Notes:

1 Heavy duty vehicles travel 0.5 miles on unpaved roadway per LF site visit or 1.0 miles round trip.

2 These heavy duty vehicles traveled on unpaved roadways at the SR85 LF Site at 10 miles per hour (mph).

3 Uncontrolled emission factor of 2.13 lb/VMT from Maricopa County Air Quality Department, Emissions Inventory Unit used to estimate PM_{10} emissions.

4 A control efficiency of 70% is used in the emission calculations to account for dust supression mitigation measures in place.

5 The $PM_{2.5}/PM_{10}$ ratio of 0.15 is taken from the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook, dated September 7, 2006. The ratios of $PM_{2.5}$ to PM_{10} for fugitive dust sources published in Section 13 of AP-42 typically range from 0.10 to 0.20.

Heavy Duty Vehicles (Waste Loads) VMT = 31,093 x 0.5 Miles/Vehicle x 2 (i.e., round trip)

Heavy Duty Vehicles (Waste Loads) VMT = 31,093

Two (2) Water Pull Trucks (VMT) = 16,800

Total Heavy Duty Vehicle VMT = 47,893

PM_{10} Emissions = Total VMT x 2.13 lbs/VMT x [1 - 70%)]

PM_{10} Emissions = 47,893 VMT x 2.13 lbs/VMT x 0.3

PM_{10} Emissions = 30,604 Lbs/yr

PM_{10} Emissions = 15 tpy

PM Emissions = 15 tpy

[PM assumed equal to PM10]

$PM_{2.5}$ Emissions = 2.295 tpy

[$PM_{2.5}/PM_{10}$ ratio = 0.15 (see note 5]

Estimated Annual SR85 Tonnage and Loads Received

Waste Load Source	# of Loads	Tonnage
Maricopa County SWM	129	1,170.76
Special Ops	243	2,078.59
Water - Deer Valley Maintenance	506	12,372.90
Water - Union Hills	119	2,681.66
Water - 24th Street	536	12,986.77
Wastewater - 91st Avenue Operations	455	6,012.03
Gila Bend 85	11	40.53
Mr. Bult Incorporated	29,083	724,738.39
Town of Buckeye 85	11	28.43
Totals =	**31,093**	**762,110**

SR85 LANDFILL LIGHT DUTY VEHICLES PARTICULATE EMISSIONS

Notes:

1. Assumes three (3) City of Phoenix light duty trucks and three (3) contractor light duty trucks that each travel about 20 miles per day on unpaved roadways at SR85.
2. The landfill includes a light duty sweeper vehicle that travels approximately 20 miles per day.
3. The sweeper and light duty trucks travel at 10 miles per hour (mph).
4. Uncontrolled emission factor of 0.29 lb/VMT from Maricopa County Air Quality Department, Emissions Inventory Unit used to estimate PM_{10} emissions.
5. A control efficiency of 70% is used in the emission calculations to account for dust supression mitigation measures in place.
6. The $PM_{2.5}/PM_{10}$ ratio of 0.15 is taken from the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook, dated September 7, 2006. The ratios of PM2.5 to PM10 for fugitive dust sources published in Section 13 of AP-42 typically range from 0.10 to 0.20.

PM_{10} Emission Factor = 0.29 lb/VMT

Vehicle Miles Traveled, Lt Trucks (VMT) = (6 trucks) x (20 miles/day) x (6 days/wk) x (52 wks/yr) = 37,440

Vehicle Miles Traveled, Sweeper Vehicle (VMT) = (1 vehicle) x (20 miles/day) x (6 days/wk) x (52 wks/yr) = 6,240

Total Light Duty Vehicle VMT = 37,440 + 6,240

Total Light Duty Vehicle VMT = 43,680

PM_{10} Emissions = VMT x 0.29 lbs/VMT x [1 - 70%]

PM_{10} Emissions = 3,800 lbs/Yr

PM_{10} Emissions = 1.9 tons/Yr (tpy)

PM = PM_{10} = 1.9 tpy

$PM_{2.5}$ = 0.3 tpy (see note 6)

SR85 LANDFILL PAVED ROADWAY VEHICLE PARTICULATE EMISSIONS

SR85 VEHICLE TRAFFIC				
	MBI Trucks (Hvy)	City Dept Trucks (Lt)	US Waste Trucks (Hvy)	Pass Cars Other Lt Trucks
Avg Weight per Vehicle (tons) =	27.5	2.0	27.5	1.5

Per AP42, Section 13.2.1.3 (Predictive Emission Factor Equations), the quantity of particulate emissions from resuspension of loose material on the road surface due to vehicle travel on a dry paved road may be estimated using the following empirical expression:

$$E = k\ x\ (sL)^{0.91}\ x\ (W)^{1.02}$$ *Equation 1*

Where:

E = particulate emission factor (having units matching the units of k),

k = particulate size multiplier for particulate size range and units of interest, k = 0.0022 (for PM_{10} lbs/VMT)

sL = Road surface silt loading (grams per square meter) (g/m^2) - estimate sL = 0.35 g/m^2 , and

W = average weight (tons) of vehicles traveling the road = 25.3 tons (estimate).

The particle size multiplier in the equation, k, varies with aerodynamic particle size range, as follows:

$$E = (0.0022)\ x\ (0.35)^{0.91}\ x\ (25.3)^{1.02}$$

E = 0.023 (pound [lb]/VMT)

Vehicles travel 1.6 miles on paved roadway at the SR85 LF site.

Estimated Heavy Duty vehicles = 31,093 Heavy Duty Vehicles on Paved Roadway

VMT = 1.6 miles x 2 (round trip) x 40,855 Heavy Duty vehicle trips

VMT = 99,498

Estimated PM_{10} Emissions:

PM_{10} (uncontrolled) = 0.023 X 130,736 =	2,273	lbs (uncontrolled)
PM_{10} (uncontrolled) =	1.14	tpy
PM = PM_{10} =	1.14	tpy
$PM_{2.5}$ =	0.17	tpy (See note below)

Note: The $PM_{2.5}/PM_{10}$ ratio of 0.15 is taken from the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook, dated September 7, 2006. The ratios of $PM_{2.5}$ to PM_{10} for fugitive dust sources published in Section 13 of AP-42 typically range from 0.10 to 0.20.

SR85 LANDFILL SCRAPER PARTICULATE EMISSIONS

Notes:

1 SR85 LF uses two(2) Catapiler 637 Auger Scrapers with a vehicle weight of 122,745 lbs or 61.4 tons each.

2 Scraper PM_{10} emission factor calculated per AP42-13.2.2, Equation (1a).

3 Each of the 2 scrapers averages 10 miles per hour of unpaved roadway scraper travel.

4 City of Phoenix landfill personnel indicate the 2 scrapers, in combination, typically operate 70 hours per month.

5 The % silt used below was estimated by using the vehicle weight ratio to % silt listed in AP42 Table 13.2.2-3

6 Dust control efficiency of 70% is used to account for dust mitigation measures in practice.

7 The $PM_{2.5}/PM_{10}$ ratio of 0.15 is taken from the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook, dated September 7, 2006. The ratios of $PM_{2.5}$ to PM_{10} for fugitive dust sources published in Section 13 of AP-42 typically range from 0.10 to 0.20.

$E = (k) \times ((s/12)^a) \times (W/3)^b$

where,

E = size-specific emission factor (LB/VMT)

s = surface material silt (%)	=	4.82	% (See note #5 above)
W = mean vehicle weight (tons)	=	61.4	tons
k = size-specific constant	=	1.5	Per AP42 Table 13.2.2-2 for PM-10
a = size-specific factor (1)	=	0.9	Per AP42 Table 13.2.2-2 for PM-10
b = size-specific factor (2)	=	0.45	Per AP42 Table 13.2.2-2 for PM-10

$E = (1.5) \times ((4.82/12)^{0.9}) \times (61.4/3)^{0.45}$

E = 2.57 LB/VMT (LF Scraper) w/o control

Miles per month (VMT) = 70 hours/mo x 10 miles/hr

Miles per month (VMT) = 700 VMT/mo

Miles per yr (VMT) = 8,400 VMT/yr *[e.g., 700 miles per month x 12 months/yr]*

Uncontrolled PM_{10} Emissions = E x (Miles per yr)

Uncontrolled PM_{10} Emissions = 2.57 lbs/VMT x 8,400 VMT

Uncontrolled PM_{10} Emissions = 21,569 lbs/yr (PM_{10})

Uncontrolled PM_{10} Emissions = 10.8 tons/yr (PM_{10})

PM_{10} Controlled Emissions = [Uncontrolled PM_{10} Emissions] x [100% Capture Efficiency] x [1 - 70%]

PM_{10} Controlled Emissions = 21,569 lbs/yr x 100% x [1 - 70%]

PM_{10} Controlled Emissions = 6,471 lbs/yr (PM_{10})

PM_{10} Controlled Emissions = 3.24 tons/yr (PM_{10})

PM = PM_{10} = 3.24 tpy

PM2.5 Controlled Emissions = 0.49 tpy

STATE ROUTE 85 LANDFILL STORAGE PILE FUGITIVE PARTICULATE EMISSIONS

Notes: 1

1 State Route 85 is an open landfill that includes an approximate 139 acre soil stockpile area.

2 Uncontrolled emission factor for PM_{10} emissions of 630 lb/acreE-yr from Maricopa County Air Quality Department, Emissions Inventory Unit used to estimate landfill surface fugitive particulate emissions.

3 A control efficiency of 70% is used in the emission calculations to account for use of water for dust mitigation.

4 The $PM_{2.5}/PM_{10}$ ratio of 0.15 is taken from the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook, dated September 7, 2006. The ratios of $PM_{2.5}$ to PM_{10} for fugitive dust sources published in Section 13 of AP-42 typically range from 0.10 to 0.20.

Landfill Surface Area =	*139*	*acres*	
PM_{10} Capture Efficiency =	*100*	*%*	
PM_{10} Control Efficiency =	*70*	*%*	
PM_{10} Emission Factor (EF) =	*630*	*lbs/acre-yr*	

$$PM_{10}\ Emissions = 139\ acres\ x\ 630 \frac{lbs}{acre} - yr\ \ |100\%\ x\ (1\ -\ 70\%)|$$

PM_{10} Emissions =	26,271	*lbs*	
PM_{10} Emissions =	13.14	*tpy*	
$PM = PM_{10}$ =	13.14	*tpy*	
$PM_{2.5}$ Emissions =	1.97	*tpy*	*[See note 4]*

STATE ROUTE 85 LANDFILL WASTE HANDLING FUGITIVE PARTICULATE EMISSIONS

Per AP42, Section 13.2.4 (Aggregate Handling And Storage Piles), the quantity of particulate emissions generated per ton of material transfered by adding aggregate material to a storage pile or truck dumping on the pile or loading out from the pile to a truck with a front-end loader, may be estimated using the following empirical expression:

$$E = k\ x\ (0.0032)\ x \quad \frac{(U/5)^{1.3}}{(M/2)^{1.4}} \quad \textit{(lbs per ton)}$$

Where:

E = emission factor (pound [lb]/ton)

k = particulate size multiplier (dimensionless) = 0.35 (for PM_{10})

U = mean wind speed, miles per hour [mph] = 6.2 mph (National Climatic Data Center, NOAA - 2001)

M = material moisture content (%) = 12% (AP42, Table 13.2.4-1)

The particle size multiplier in the equation, k, varies with aerodynamic particle size range, as follows:

Aerodynamic Particle Size Multiplier (k) For Equation 1				
< 30 µm	**< 15 µm**	**< 10 µm**	**< 5 µm**	**< 2.5 µm**
0.74	**0.48**	**0.35**	**0.2**	**0.053**

Emission Factor $_{PM10}$ = 0.35 x 0.0032 x [(6.2/5)$^{1.3}$ ÷ (12/2)$^{1.4}$]

Emission Factor$_{PM10}$ = 0.000121 lbs/ton

Emission Factor $_{PM}$ = 0.74 x 0.0032 x [(6.2/5)$^{1.3}$ ÷ (12/2)$^{1.4}$]

Emission Factor$_{PM}$ = 0.000255 lbs/ton

Emission Factor $_{PM2.5}$ = 0.053 x 0.0032 x [(6.2/5)$^{1.3}$ ÷ (12/2)$^{1.4}$]

Emission Factor$_{PM2.5}$ = 0.000018 lbs/ton

Estimated Annual Municipal Solid Waste Received = 1,200,000 tons [for PTE purposes]

PM_{10} Emissions = 1,200,000 (tons) x 0.000121 (lbs/ton)

PM_{10} Emissions = 145 lbs

PM_{10} Emissions = 0.07 tons

$PM_{2.5}$ Emissions = 1,200,000 (tons) x 0.000018 (lbs/ton)

$PM_{2.5}$ Emissions = 22 lbs

$PM_{2.5}$ Emissions = 0.01 tons

PM Emissions = 1,200,000 (tons) x 0.000121 (lbs/ton)

PM Emissions = 306 lbs

PM Emissions = 0.15 tons

STATE ROUTE 85 LANDFILL ARCHITECTUAL COATINGS - VOC EMISSIONS

Notes:

1 SR85 Landfill used various architectual coatings that typically include two (2) types of traffic coatings.
2 The traffic coatings typically used include 1300 Clear Concrete Curing Compound and PASS R (Asphalt Rejuvenator, as shown below.
3 Annual usage of curing compound is estimated at 225 gallons and the annual usage of asphalt rejuvenator is estimated at 18,000 gallons.

Material Type	Annual Usage	Usage Units	VOC Content (lbs/gallon)	VOC Emissions, lbs (= Usage x VOC content)
1300 Clear, Concrete Curing Compound	225	gallons	0.21	47
PASS R (Asphalt Rejuvenator)	18,000	gallons	0.18	3,240

Note: *Typical coating material listed is from 2013 Emission Inventory and used to approximate annual usage*

Key: Amount Used (gallon) x VOC Content (lb/gallon) = VOC Emissions

Example Calcs: If the MSDS doesn't have VOC in lb/gal, perform the following two calculations to get that value:

Density of Coating * (VOC content in % by weight / 100) = VOC Content (lb/gal)

(Note: The VOC content in % by volume is not the same as % by weight.)

Example: Density = 12 lb/gal and VOC Content = 65% by wt; VOC Conten: = 12 lb/gal x 65%/100 = 7.8 lb VOC/gal

If the MSDS doesn't have the Density of the Coating then: Specific Gravity * 8.34 lb/gal = Density of Coating (lb/gal)

Example 1: SG = 0.84 from MSDS, so, Density = 0.84 x 8.34 lb/gal = 7.00 lb/gal

Example 2: SG = 1.05 from MSDS, so, Density = 1.10 x 8.34 lb/gal = 8.76 lb/gal

If the MSDS only shows Solids Content in % by weight :then: VOC content in % weight = {1 - (% solids/100)}x100

Example: Solids Content = 35% by wt, so, the VOC Content is calculated as follows:

$$VOC\ Content = \{1 - (\frac{35}{100})\ X\ 100 = 65\%\ by\ weight$$

If the MSDS shows VOC Content in grams per liter (g/L) then: the VOC content in lbs/gallon is calculated as follows:

Example: MSDS lists VOC content as 25 g/L, so, the VOC content in lbs/gallon is calculated as follows:

$$VOC\ Content = (\frac{25\ g}{Liter})\ X\ (\frac{1\ lb}{453.59\ g})\ X\ (\frac{1\ Liter}{0.264172\ gallons}) = 0.2086\ lbs/gallon,\ so,\ use\ 0.21\ lbs/gallon$$

MSDS DATA AND VOC TABULATION[1]

Coatings	Material Name or ID #	Specific Gravity (ratio)	Density (lb/gal)	VOC Content (% by wt.)	VOC Content (lb/gal)	Amount Used (gallons)	VOC Emissions (lbs)
Coating #1	1300 CLEAR Concrete Curing Compound	*Not provided on MSDS*	8.30	*Not provided on MSDS*	0.21	225	47
Coating #2	PASS R, Asphalt Rejuvenator	1.05	8.76	2.00	0.18	18,000	3,240
						VOC Total, lbs =	**3,287**
						VOC Total, tons =	**1.644**

Note: (1) Data listed above taken from manufacturer material safety data sheets (MSDS) or calculated from mfg MSDS data.

STATE ROUTE 85 LANDFILL FUEL STORAGE - VOC EMISSIONS

Notes:

1 The SR85 Landfill facility includes underground gasoline fuel storage with Stage I and Stage II Vapor Recovery and underground storage of B20 (e.g., 20% Biodiesel and 80% Diesel).

2 The estimated annual unleaded gasoline usage for the SR85 Landfill facility is 5,500 gallons.

3 The estimated annual B20 (e.g., 20% Biodiesel and 80% Diesel) usage for the SR85 Landfill facility is 160,000 gallons.

4 Underground tank with both Stage I and Stage II vapor recovery = 0.003 lb of VOC per gallon of gas (MCAQD Guidance, dated 11/25/11).

5 The City of Phoenix proposes an emission factor for estimating VOCs from the underground B20 fuel storage tank of 0.000028 lb per gallon (reference: South Coast Air Quality Management District, Supplemental Instructions for Liquid Organic Storage Tanks, Annual Emissions Reporting Program, 2011). This VOC emissions factor is for underground storage of diesel fuel which is used as an approximation for the VOC emissions from the underground storage of the B20 fuel.

Estimated Annual Gasoline Usage =	5,500	gallons
VOC Emission Factor =	0.003	lbs/gallon

$$Estimated\ VOC\ Emissions = (0.003\ lbs/gallon)\ x\ 5{,}500\ gallons$$

Gasoline VOC Emissions =	17	lbs
Estimated Annual B20 Fuel Usage =	160,000	gallons
VOC Emission Factor =	0.000028	lbs/gallon

$$Estimated\ VOC\ Emissions = (0.000028\ lbs/gallon)\ x\ 160{,}000\ gallons$$

Biodiesel VOC Emissions =	4	lbs
Total Estimated Fuel Storage VOC Emissions =	21	lbs
Total Estimated Fuel Storage VOC Emissions =	**0.01049**	tons

APPENDIX C

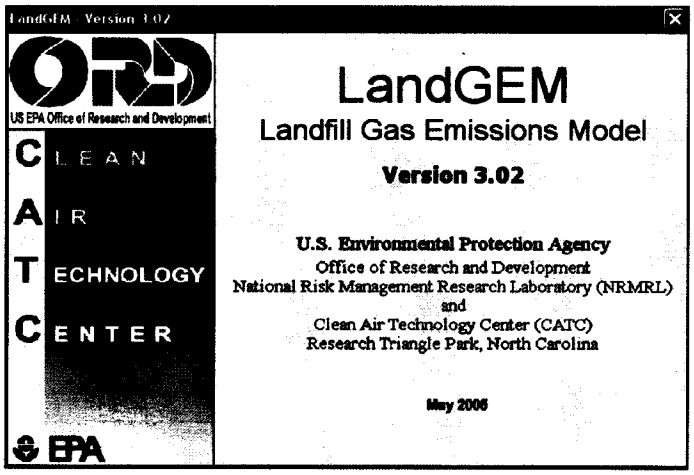
U.S. EPA LANDGEM MODELING RESULTS

MODELING RUN #1:

TOTAL LANDFILL GAS, METHANE, CARBON MONOXIDE, AND TOLUENE

MODELING RUN #2:

TOTAL LANDFILL GAS, METHANE, TOTAL REDUCED SULFUR COMPOUNDS, AND NMOC



Summary Report

Landfill Name or Identifier: State Route 85 Solid Waste Municipal Landfill

Date: Wednesday, March 25, 2015

Description/Comments:
State Route 85 Solid Waste Municipal Landfill Gas Modeling for 2014 Title V Permit Renewal Application. This model uses specified NMOC concentration and the concentrsation of total reduced sulfur compounds per inlet landfill gas analysis for Flare Source Testing conducted April 26, 2012.

About LandGEM:

First-Order Decomposition Rate Equation: $$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} k L_o \left(\frac{M_i}{10} \right) e^{-kt_{ij}}$$

Where,
Q_{CH4} = annual methane generation in the year of the calculation ($m^3/year$)
i = 1-year time increment
n = (year of the calculation) - (initial year of waste acceptance)
j = 0.1-year time increment
k = methane generation rate ($year^{-1}$)
L_o = potential methane generation capacity (m^3/Mg)
M_i = mass of waste accepted in the i^{th} year (Mg)
t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year	**2006**	
Landfill Closure Year (with 80-year limit)	**2043**	
Actual Closure Year (without limit)	***2043***	
Have Model Calculate Closure Year?	**Yes**	
Waste Design Capacity	**26,767,000**	*megagrams*

MODEL PARAMETERS

Methane Generation Rate, k	**0.020**	$year^{-1}$
Potential Methane Generation Capacity, L_o	**170**	m^3/Mg
NMOC Concentration	**2,311**	*ppmv as hexane*
Methane Content	**50**	*% by volume*

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**Total landfill gas**
Gas / Pollutant #2:	**Methane**
Gas / Pollutant #3:	**Carbon monoxide**
Gas / Pollutant #4:	**Toluene - No or Unknown Co-disposal - HAP/VOC**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
2006	998,509	1,098,360	0	0
2007	981,062	1,079,168	998,509	1,098,360
2008	910,201	1,001,221	1,979,571	2,177,528
2009	844,712	929,183	2,889,772	3,178,749
2010	874,795	962,275	3,734,484	4,107,932
2011	887,776	976,554	4,609,279	5,070,207
2012	743,912	818,303	5,497,055	6,046,761
2013	675,165	742,681	6,240,967	6,865,064
2014	675,165	742,681	6,916,132	7,607,745
2015	675,165	742,681	7,591,296	8,350,426
2016	675,165	742,681	8,266,461	9,093,107
2017	675,165	742,681	8,941,625	9,835,788
2018	675,165	742,681	9,616,790	10,578,469
2019	675,165	742,681	10,291,955	11,321,150
2020	675,165	742,681	10,967,119	12,063,831
2021	675,165	742,681	11,642,284	12,806,512
2022	675,165	742,681	12,317,448	13,549,193
2023	675,165	742,681	12,992,613	14,291,874
2024	675,165	742,681	13,667,777	15,034,555
2025	675,165	742,681	14,342,942	15,777,236
2026	675,165	742,681	15,018,106	16,519,917
2027	675,165	742,681	15,693,271	17,262,598
2028	675,165	742,681	16,368,435	18,005,279
2029	675,165	742,681	17,043,600	18,747,960
2030	675,165	742,681	17,718,765	19,490,641
2031	675,165	742,681	18,393,929	20,233,322
2032	675,165	742,681	19,069,094	20,976,003
2033	675,165	742,681	19,744,258	21,718,684
2034	675,165	742,681	20,419,423	22,461,365
2035	675,165	742,681	21,094,587	23,204,046
2036	675,165	742,681	21,769,752	23,946,727
2037	675,165	742,681	22,444,916	24,689,408
2038	675,165	742,681	23,120,081	25,432,089
2039	675,165	742,681	23,795,245	26,174,770
2040	675,165	742,681	24,470,410	26,917,451
2041	675,165	742,681	25,145,575	27,660,132
2042	675,165	742,681	25,820,739	28,402,813
2043	271,096	298,206	26,495,904	29,145,494
2044	0	0	26,767,000	29,443,700
2045	0	0	26,767,000	29,443,700

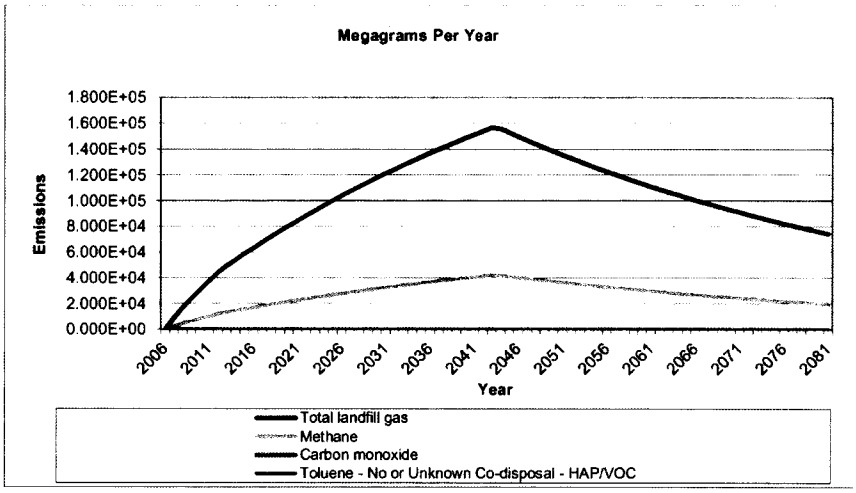
Pollutant Parameters

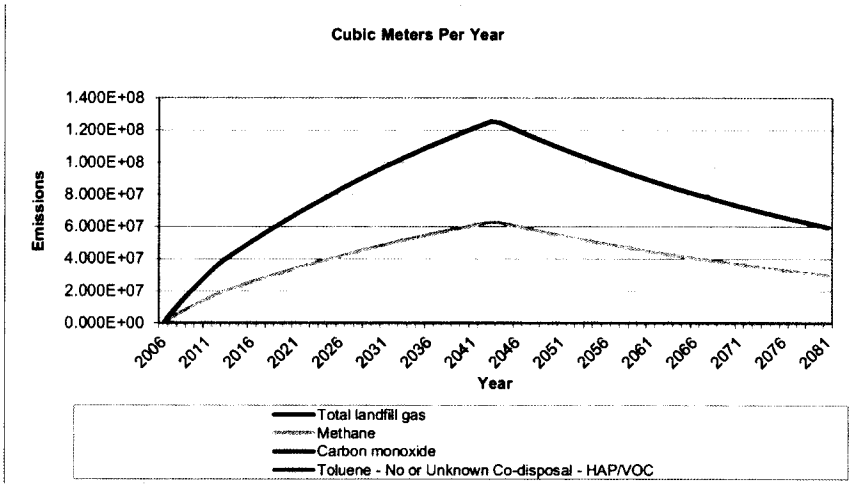
		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

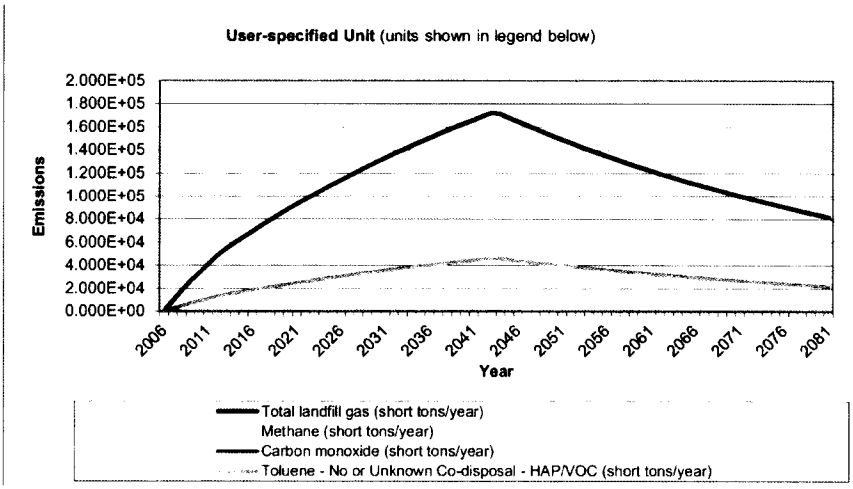
Pollutant Parameters (Continued)

		Gas / Pollutant Default Parameters:		User-specified Pollutant Parameters:	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		
	Total Reduced Sulfur Compounds			89.13	32.06

Graphs


Megagrams Per Year
Emissions
1.800E+05
1.600E+05
1.400E+05
1.200E+05
1.000E+05
8.000E+04
6.000E+04
4.000E+04
2.000E+04
0.000E+00
2006
2011
2016
2021
2026
2031
2036
2041
2046
2051
2056
2061
2066
2071
2076
2081
Year
Total landfill gas
Methane
Carbon monoxide
Toluene - No or Unknown Co-disposal - HAP/VOC


Cubic Meters Per Year
Emissions
1.400E+08
1.200E+08
1.000E+08
8.000E+07
6.000E+07
4.000E+07
2.000E+07
0.000E+00
2006
2011
2016
2021
2026
2031
2036
2041
2046
2051
2056
2061
2066
2071
2076
2081
Year
Total landfill gas
Methane
Carbon monoxide
Toluene - No or Unknown Co-disposal - HAP/VOC


User-specified Unit (units shown in legend below)
Emissions
2.000E+05
1.800E+05
1.600E+05
1.400E+05
1.200E+05
1.000E+05
8.000E+04
6.000E+04
4.000E+04
2.000E+04
0.000E+00
2006
2011
2016
2021
2026
2031
2036
2041
2046
2051
2056
2061
2066
2071
2076
2081
Year
Total landfill gas (short tons/year)
Methane (short tons/year)
Carbon monoxide (short tons/year)
Toluene - No or Unknown Co-disposal - HAP/VOC (short tons/year)

INVENTORY **Landfill Name or Identifier:** State Route 85 Solid Waste Municipal Landfill

Enter year of emissions inventory: 2021

Gas / Pollutant	Emission Rate				
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(ft^3/year)*	*(short tons/year)*
Total landfill gas	8.448E+04	6.765E+07	4.545E+03	2.389E+09	9.293E+04
Methane	2.257E+04	3.382E+07	2.273E+03	1.195E+09	2.482E+04
Carbon dioxide	6.192E+04	3.382E+07	2.273E+03	1.195E+09	6.811E+04
NMOC	5.604E+02	1.563E+05	1.050E+01	5.521E+06	6.164E+02
1,1,1-Trichloroethane (methyl chloroform) - HAP	1.802E-01	3.247E+01	2.182E-03	1.147E+03	1.982E-01
1,1,2,2-Tetrachloroethane - HAP/VOC	5.195E-01	7.441E+01	5.000E-03	2.628E+03	5.715E-01
1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	6.683E-01	1.624E+02	1.091E-02	5.734E+03	7.352E-01
1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	5.455E-02	1.353E+01	9.091E-04	4.778E+02	6.001E-02
1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	1.142E-01	2.774E+01	1.864E-03	9.795E+02	1.256E-01
1,2-Dichloropropane (propylene dichloride) - HAP/VOC	5.723E-02	1.218E+01	8.182E-04	4.300E+02	6.295E-02
2-Propanol (isopropyl alcohol) - VOC	8.457E+00	3.382E+03	2.273E-01	1.195E+05	9.302E+00
Acetone	1.144E+00	4.735E+02	3.182E-02	1.672E+04	1.258E+00
Acrylonitrile - HAP/VOC	9.406E-01	4.262E+02	2.864E-02	1.505E+04	1.035E+00
Benzene - No or Unknown Co-disposal - HAP/VOC	4.176E-01	1.285E+02	8.636E-03	4.539E+03	4.593E-01
~~Benzene - Co-disposal - HAP/VOC~~	~~2.418E+00~~	~~7.441E+02~~	~~5.000E-02~~	~~2.628E+04~~	~~2.659E+00~~
Bromodichloromethane - VOC	1.429E+00	2.097E+02	1.409E-02	7.406E+03	1.572E+00
Butane - VOC	8.177E-01	3.382E+02	2.273E-02	1.195E+04	8.994E-01
Carbon disulfide - HAP/VOC	1.242E-01	3.924E+01	2.636E-03	1.386E+03	1.367E-01
Carbon monoxide	1.103E+01	9.471E+03	6.363E-01	3.345E+05	1.214E+01
Carbon tetrachloride - HAP/VOC	1.731E-03	2.706E-01	1.818E-05	9.556E+00	1.905E-03
Carbonyl sulfide - HAP/VOC	8.282E-02	3.315E+01	2.227E-03	1.171E+03	9.110E-02
Chlorobenzene - HAP/VOC	7.918E-02	1.691E+01	1.136E-03	5.973E+02	8.710E-02
Chlorodifluoromethane	3.163E-01	8.794E+01	5.909E-03	3.106E+03	3.479E-01
Chloroethane (ethyl chloride) - HAP/VOC	2.360E-01	8.794E+01	5.909E-03	3.106E+03	2.596E-01
Chloroform - HAP/VOC	1.008E-02	2.029E+00	1.364E-04	7.167E+01	1.109E-02
Chloromethane - VOC	1.705E-01	8.118E+01	5.454E-03	2.867E+03	1.875E-01
Dichlorobenzene - (HAP for para isomer/VOC)	8.686E-02	1.421E+01	9.545E-04	5.017E+02	9.554E-02
Dichlorodifluoromethane	5.443E+00	1.082E+03	7.272E-02	3.822E+04	5.988E+00
Dichlorofluoromethane - VOC	7.529E-01	1.759E+02	1.182E-02	6.211E+03	8.282E-01
Dichloromethane (methylene chloride) - HAP	3.346E+00	9.471E+02	6.363E-02	3.345E+04	3.681E+00
Dimethyl sulfide (methyl sulfide) - VOC	1.364E+00	5.277E+02	3.545E-02	1.863E+04	1.500E+00
Ethane	7.530E+01	6.021E+04	4.045E+00	2.126E+06	8.283E+01
Ethanol - VOC	3.501E+00	1.827E+03	1.227E-01	6.450E+04	3.851E+00
Ethyl mercaptan (ethanethiol) - VOC	4.021E-01	1.556E+02	1.045E-02	5.495E+03	4.423E-01
Ethylbenzene - HAP/VOC	1.374E+00	3.112E+02	2.091E-02	1.099E+04	1.511E+00
Ethylene dibromide - HAP/VOC	5.286E-04	6.765E-02	4.545E-06	2.389E+00	5.815E-04
Fluorotrichloromethane - VOC	2.938E-01	5.141E+01	3.454E-03	1.816E+03	3.232E-01
Hexane - HAP/VOC	1.600E+00	4.465E+02	3.000E-02	1.577E+04	1.760E+00
Hydrogen sulfide	3.452E+00	2.435E+03	1.636E-01	8.600E+04	3.797E+00
Mercury (total) - HAP	1.637E-04	1.962E-02	1.318E-06	6.928E-01	1.801E-04
Methyl ethyl ketone - HAP/VOC	1.441E+00	4.803E+02	3.227E-02	1.696E+04	1.585E+00
Methyl isobutyl ketone - HAP/VOC	5.355E-01	1.285E+02	8.636E-03	4.539E+03	5.890E-01
Methyl mercaptan - VOC	3.384E-01	1.691E+02	1.136E-02	5.973E+03	3.723E-01
Pentane - VOC	6.699E-01	2.232E+02	1.500E-02	7.884E+03	7.369E-01
Perchloroethylene (tetrachloroethylene) - HAP	1.726E+00	2.503E+02	1.682E-02	8.839E+03	1.899E+00
Propane - VOC	1.365E+00	7.441E+02	5.000E-02	2.628E+04	1.501E+00
t-1,2-Dichloroethene - VOC	7.637E-01	1.894E+02	1.273E-02	6.689E+03	8.401E-01
Toluene - No or Unknown Co-disposal - HAP/VOC	1.011E+01	2.638E+03	1.773E-01	9.317E+04	1.112E+01
~~Toluene - Co-disposal - HAP/VOC~~	~~4.407E+01~~	~~1.150E+04~~	~~7.727E-01~~	~~4.061E+05~~	~~4.848E+01~~
Trichloroethylene (trichloroethene) - HAP/VOC	1.035E+00	1.894E+02	1.273E-02	6.689E+03	1.139E+00
Vinyl chloride - HAP/VOC	1.284E+00	4.938E+02	3.318E-02	1.744E+04	1.412E+00
Xylenes - HAP/VOC	3.584E+00	8.118E+02	5.454E-02	2.867E+04	3.943E+00
Total Reduced Sulfur Compounds	8.041E+00	6.030E+03	4.051E-01	2.129E+05	8.845E+00

Note: Benzene and toluene Co-disposal is not applicable for the SR85 Landfill site.

Results

Year	Total landfill gas			Methane		
	(Mg/year)	(m^3/year)	(short tons/year)	(Mg/year)	(m^3/year)	(short tons/year)
2006	0	0	0	0	0	0
2007	8.404E+03	6.729E+06	9.244E+03	2.245E+03	3.365E+06	2.469E+03
2008	1.649E+04	1.321E+07	1.814E+04	4.406E+03	6.604E+06	4.846E+03
2009	2.383E+04	1.908E+07	2.621E+04	6.365E+03	9.540E+06	7.001E+03
2010	3.046E+04	2.439E+07	3.351E+04	8.137E+03	1.220E+07	8.951E+03
2011	3.722E+04	2.981E+07	4.095E+04	9.943E+03	1.490E+07	1.094E+04
2012	4.396E+04	3.520E+07	4.835E+04	1.174E+04	1.760E+07	1.292E+04
2013	4.935E+04	3.952E+07	5.428E+04	1.318E+04	1.976E+07	1.450E+04
2014	5.405E+04	4.328E+07	5.946E+04	1.444E+04	2.164E+07	1.588E+04
2015	5.867E+04	4.698E+07	6.453E+04	1.567E+04	2.349E+07	1.724E+04
2016	6.319E+04	5.060E+07	6.950E+04	1.688E+04	2.530E+07	1.857E+04
2017	6.762E+04	5.414E+07	7.438E+04	1.806E+04	2.707E+07	1.987E+04
2018	7.196E+04	5.762E+07	7.916E+04	1.922E+04	2.881E+07	2.114E+04
2019	7.622E+04	6.103E+07	8.384E+04	2.036E+04	3.052E+07	2.239E+04
2020	8.039E+04	6.437E+07	8.843E+04	2.147E+04	3.219E+07	2.362E+04
2021	8.448E+04	6.765E+07	9.293E+04	2.257E+04	3.382E+07	2.482E+04
2022	8.849E+04	7.086E+07	9.734E+04	2.364E+04	3.543E+07	2.600E+04
2023	9.242E+04	7.401E+07	1.017E+05	2.469E+04	3.700E+07	2.716E+04
2024	9.627E+04	7.709E+07	1.059E+05	2.572E+04	3.855E+07	2.829E+04
2025	1.000E+05	8.011E+07	1.101E+05	2.672E+04	4.006E+07	2.940E+04
2026	1.037E+05	8.308E+07	1.141E+05	2.771E+04	4.154E+07	3.048E+04
2027	1.074E+05	8.598E+07	1.181E+05	2.868E+04	4.299E+07	3.155E+04
2028	1.109E+05	8.883E+07	1.220E+05	2.963E+04	4.442E+07	3.259E+04
2029	1.144E+05	9.162E+07	1.259E+05	3.056E+04	4.581E+07	3.362E+04
2030	1.178E+05	9.436E+07	1.296E+05	3.148E+04	4.718E+07	3.462E+04
2031	1.212E+05	9.704E+07	1.333E+05	3.237E+04	4.852E+07	3.561E+04
2032	1.245E+05	9.967E+07	1.369E+05	3.325E+04	4.983E+07	3.657E+04
2033	1.277E+05	1.022E+08	1.405E+05	3.411E+04	5.112E+07	3.752E+04
2034	1.308E+05	1.048E+08	1.439E+05	3.495E+04	5.238E+07	3.844E+04
2035	1.339E+05	1.072E+08	1.473E+05	3.577E+04	5.362E+07	3.935E+04
2036	1.370E+05	1.097E+08	1.507E+05	3.658E+04	5.484E+07	4.024E+04
2037	1.399E+05	1.121E+08	1.539E+05	3.738E+04	5.603E+07	4.111E+04
2038	1.428E+05	1.144E+08	1.571E+05	3.815E+04	5.719E+07	4.197E+04
2039	1.457E+05	1.167E+08	1.603E+05	3.892E+04	5.833E+07	4.281E+04
2040	1.485E+05	1.189E+08	1.633E+05	3.966E+04	5.945E+07	4.363E+04
2041	1.512E+05	1.211E+08	1.664E+05	4.040E+04	6.055E+07	4.444E+04
2042	1.539E+05	1.233E+08	1.693E+05	4.111E+04	6.163E+07	4.523E+04
2043	1.566E+05	1.254E+08	1.722E+05	4.182E+04	6.268E+07	4.600E+04
2044	1.557E+05	1.247E+08	1.713E+05	4.160E+04	6.235E+07	4.576E+04
2045	1.527E+05	1.222E+08	1.679E+05	4.078E+04	6.112E+07	4.485E+04
2046	1.496E+05	1.198E+08	1.646E+05	3.997E+04	5.991E+07	4.397E+04
2047	1.467E+05	1.174E+08	1.613E+05	3.918E+04	5.872E+07	4.309E+04
2048	1.438E+05	1.151E+08	1.581E+05	3.840E+04	5.756E+07	4.224E+04
2049	1.409E+05	1.128E+08	1.550E+05	3.764E+04	5.642E+07	4.140E+04
2050	1.381E+05	1.106E+08	1.519E+05	3.690E+04	5.530E+07	4.058E+04
2051	1.354E+05	1.084E+08	1.489E+05	3.616E+04	5.421E+07	3.978E+04
2052	1.327E+05	1.063E+08	1.460E+05	3.545E+04	5.313E+07	3.899E+04
2053	1.301E+05	1.042E+08	1.431E+05	3.475E+04	5.208E+07	3.822E+04
2054	1.275E+05	1.021E+08	1.403E+05	3.406E+04	5.105E+07	3.746E+04
2055	1.250E+05	1.001E+08	1.375E+05	3.338E+04	5.004E+07	3.672E+04

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(short tons/year)*	*(Mg/year)*	*(m^3/year)*	*(short tons/year)*
2056	1.225E+05	9.810E+07	1.348E+05	3.272E+04	4.905E+07	3.600E+04
2057	1.201E+05	9.616E+07	1.321E+05	3.208E+04	4.808E+07	3.528E+04
2058	1.177E+05	9.425E+07	1.295E+05	3.144E+04	4.713E+07	3.458E+04
2059	1.154E+05	9.239E+07	1.269E+05	3.082E+04	4.619E+07	3.390E+04
2060	1.131E+05	9.056E+07	1.244E+05	3.021E+04	4.528E+07	3.323E+04
2061	1.109E+05	8.876E+07	1.219E+05	2.961E+04	4.438E+07	3.257E+04
2062	1.087E+05	8.701E+07	1.195E+05	2.902E+04	4.350E+07	3.193E+04
2063	1.065E+05	8.528E+07	1.172E+05	2.845E+04	4.264E+07	3.129E+04
2064	1.044E+05	8.359E+07	1.148E+05	2.788E+04	4.180E+07	3.067E+04
2065	1.023E+05	8.194E+07	1.126E+05	2.733E+04	4.097E+07	3.007E+04
2066	1.003E+05	8.032E+07	1.103E+05	2.679E+04	4.016E+07	2.947E+04
2067	9.832E+04	7.873E+07	1.081E+05	2.626E+04	3.936E+07	2.889E+04
2068	9.637E+04	7.717E+07	1.060E+05	2.574E+04	3.858E+07	2.832E+04
2069	9.446E+04	7.564E+07	1.039E+05	2.523E+04	3.782E+07	2.775E+04
2070	9.259E+04	7.414E+07	1.018E+05	2.473E+04	3.707E+07	2.720E+04
2071	9.076E+04	7.267E+07	9.983E+04	2.424E+04	3.634E+07	2.667E+04
2072	8.896E+04	7.123E+07	9.786E+04	2.376E+04	3.562E+07	2.614E+04
2073	8.720E+04	6.982E+07	9.592E+04	2.329E+04	3.491E+07	2.562E+04
2074	8.547E+04	6.844E+07	9.402E+04	2.283E+04	3.422E+07	2.511E+04
2075	8.378E+04	6.709E+07	9.216E+04	2.238E+04	3.354E+07	2.462E+04
2076	8.212E+04	6.576E+07	9.033E+04	2.194E+04	3.288E+07	2.413E+04
2077	8.049E+04	6.446E+07	8.854E+04	2.150E+04	3.223E+07	2.365E+04
2078	7.890E+04	6.318E+07	8.679E+04	2.107E+04	3.159E+07	2.318E+04
2079	7.734E+04	6.193E+07	8.507E+04	2.066E+04	3.096E+07	2.272E+04
2080	7.581E+04	6.070E+07	8.339E+04	2.025E+04	3.035E+07	2.227E+04
2081	7.430E+04	5.950E+07	8.174E+04	1.985E+04	2.975E+07	2.183E+04
2082	7.283E+04	5.832E+07	8.012E+04	1.945E+04	2.916E+07	2.140E+04
2083	7.139E+04	5.717E+07	7.853E+04	1.907E+04	2.858E+07	2.098E+04
2084	6.998E+04	5.603E+07	7.698E+04	1.869E+04	2.802E+07	2.056E+04
2085	6.859E+04	5.493E+07	7.545E+04	1.832E+04	2.746E+07	2.015E+04
2086	6.723E+04	5.384E+07	7.396E+04	1.796E+04	2.692E+07	1.975E+04
2087	6.590E+04	5.277E+07	7.249E+04	1.760E+04	2.639E+07	1.936E+04
2088	6.460E+04	5.173E+07	7.106E+04	1.725E+04	2.586E+07	1.898E+04
2089	6.332E+04	5.070E+07	6.965E+04	1.691E+04	2.535E+07	1.860E+04
2090	6.206E+04	4.970E+07	6.827E+04	1.658E+04	2.485E+07	1.824E+04
2091	6.084E+04	4.871E+07	6.692E+04	1.625E+04	2.436E+07	1.787E+04
2092	5.963E+04	4.775E+07	6.559E+04	1.593E+04	2.387E+07	1.752E+04
2093	5.845E+04	4.680E+07	6.430E+04	1.561E+04	2.340E+07	1.717E+04
2094	5.729E+04	4.588E+07	6.302E+04	1.530E+04	2.294E+07	1.683E+04
2095	5.616E+04	4.497E+07	6.177E+04	1.500E+04	2.248E+07	1.650E+04
2096	5.505E+04	4.408E+07	6.055E+04	1.470E+04	2.204E+07	1.617E+04
2097	5.396E+04	4.321E+07	5.935E+04	1.441E+04	2.160E+07	1.585E+04
2098	5.289E+04	4.235E+07	5.818E+04	1.413E+04	2.118E+07	1.554E+04
2099	5.184E+04	4.151E+07	5.702E+04	1.385E+04	2.076E+07	1.523E+04
2100	5.081E+04	4.069E+07	5.590E+04	1.357E+04	2.034E+07	1.493E+04
2101	4.981E+04	3.988E+07	5.479E+04	1.330E+04	1.994E+07	1.463E+04
2102	4.882E+04	3.909E+07	5.370E+04	1.304E+04	1.955E+07	1.434E+04
2103	4.786E+04	3.832E+07	5.264E+04	1.278E+04	1.916E+07	1.406E+04
2104	4.691E+04	3.756E+07	5.160E+04	1.253E+04	1.878E+07	1.378E+04
2105	4.598E+04	3.682E+07	5.058E+04	1.228E+04	1.841E+07	1.351E+04
2106	4.507E+04	3.609E+07	4.958E+04	1.204E+04	1.804E+07	1.324E+04

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(short tons/year)*	*(Mg/year)*	*(m^3/year)*	*(short tons/year)*
2107	4.418E+04	3.537E+07	4.859E+04	1.180E+04	1.769E+07	1.298E+04
2108	4.330E+04	3.467E+07	4.763E+04	1.157E+04	1.734E+07	1.272E+04
2109	4.244E+04	3.399E+07	4.669E+04	1.134E+04	1.699E+07	1.247E+04
2110	4.160E+04	3.331E+07	4.576E+04	1.111E+04	1.666E+07	1.222E+04
2111	4.078E+04	3.265E+07	4.486E+04	1.089E+04	1.633E+07	1.198E+04
2112	3.997E+04	3.201E+07	4.397E+04	1.068E+04	1.600E+07	1.174E+04
2113	3.918E+04	3.137E+07	4.310E+04	1.047E+04	1.569E+07	1.151E+04
2114	3.840E+04	3.075E+07	4.225E+04	1.026E+04	1.538E+07	1.128E+04
2115	3.764E+04	3.014E+07	4.141E+04	1.006E+04	1.507E+07	1.106E+04
2116	3.690E+04	2.955E+07	4.059E+04	9.856E+03	1.477E+07	1.084E+04
2117	3.617E+04	2.896E+07	3.978E+04	9.661E+03	1.448E+07	1.063E+04
2118	3.545E+04	2.839E+07	3.900E+04	9.470E+03	1.419E+07	1.042E+04
2119	3.475E+04	2.783E+07	3.822E+04	9.282E+03	1.391E+07	1.021E+04
2120	3.406E+04	2.728E+07	3.747E+04	9.098E+03	1.364E+07	1.001E+04
2121	3.339E+04	2.674E+07	3.673E+04	8.918E+03	1.337E+07	9.810E+03
2122	3.273E+04	2.621E+07	3.600E+04	8.742E+03	1.310E+07	9.616E+03
2123	3.208E+04	2.569E+07	3.529E+04	8.568E+03	1.284E+07	9.425E+03
2124	3.144E+04	2.518E+07	3.459E+04	8.399E+03	1.259E+07	9.239E+03
2125	3.082E+04	2.468E+07	3.390E+04	8.232E+03	1.234E+07	9.056E+03
2126	3.021E+04	2.419E+07	3.323E+04	8.069E+03	1.210E+07	8.876E+03
2127	2.961E+04	2.371E+07	3.257E+04	7.910E+03	1.186E+07	8.701E+03
2128	2.903E+04	2.324E+07	3.193E+04	7.753E+03	1.162E+07	8.528E+03
2129	2.845E+04	2.278E+07	3.130E+04	7.600E+03	1.139E+07	8.359E+03
2130	2.789E+04	2.233E+07	3.068E+04	7.449E+03	1.117E+07	8.194E+03
2131	2.734E+04	2.189E+07	3.007E+04	7.302E+03	1.094E+07	8.032E+03
2132	2.679E+04	2.146E+07	2.947E+04	7.157E+03	1.073E+07	7.873E+03
2133	2.626E+04	2.103E+07	2.889E+04	7.015E+03	1.052E+07	7.717E+03
2134	2.574E+04	2.061E+07	2.832E+04	6.876E+03	1.031E+07	7.564E+03
2135	2.523E+04	2.021E+07	2.776E+04	6.740E+03	1.010E+07	7.414E+03
2136	2.473E+04	1.981E+07	2.721E+04	6.607E+03	9.903E+06	7.267E+03
2137	2.424E+04	1.941E+07	2.667E+04	6.476E+03	9.707E+06	7.123E+03
2138	2.376E+04	1.903E+07	2.614E+04	6.348E+03	9.515E+06	6.982E+03
2139	2.329E+04	1.865E+07	2.562E+04	6.222E+03	9.326E+06	6.844E+03
2140	2.283E+04	1.828E+07	2.512E+04	6.099E+03	9.142E+06	6.709E+03
2141	2.238E+04	1.792E+07	2.462E+04	5.978E+03	8.961E+06	6.576E+03
2142	2.194E+04	1.757E+07	2.413E+04	5.860E+03	8.783E+06	6.446E+03
2143	2.150E+04	1.722E+07	2.365E+04	5.744E+03	8.609E+06	6.318E+03
2144	2.108E+04	1.688E+07	2.318E+04	5.630E+03	8.439E+06	6.193E+03
2145	2.066E+04	1.654E+07	2.273E+04	5.518E+03	8.272E+06	6.070E+03
2146	2.025E+04	1.622E+07	2.228E+04	5.409E+03	8.108E+06	5.950E+03

Results (Continued)

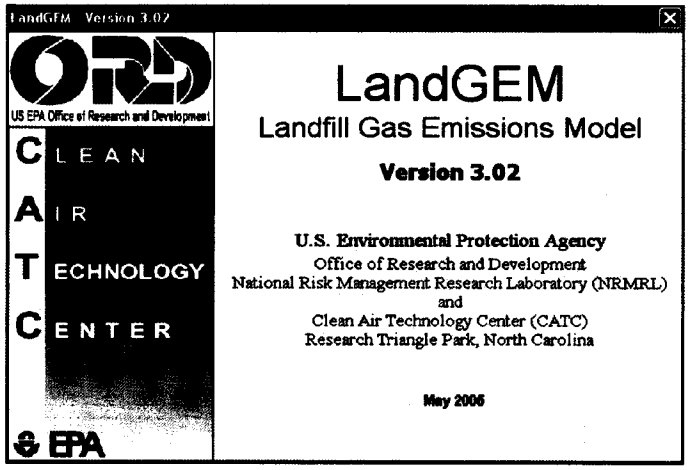
Year	Carbon monoxide			Toluene - No or Unknown Co-disposal - HAP/VOC		
	(Mg/year)	*(m^3/year)*	*(short tons/year)*	*(Mg/year)*	*(m^3/year)*	*(short tons/year)*
2006	0	0	0	0	0	0
2007	1.098E+00	9.421E+02	1.207E+00	1.006E+00	2.624E+02	1.106E+00
2008	2.154E+00	1.849E+03	2.370E+00	1.974E+00	5.151E+02	2.171E+00
2009	3.112E+00	2.671E+03	3.423E+00	2.851E+00	7.441E+02	3.137E+00
2010	3.979E+00	3.415E+03	4.377E+00	3.646E+00	9.514E+02	4.010E+00
2011	4.862E+00	4.173E+03	5.348E+00	4.455E+00	1.162E+03	4.900E+00
2012	5.741E+00	4.928E+03	6.315E+00	5.260E+00	1.373E+03	5.787E+00
2013	6.445E+00	5.532E+03	7.090E+00	5.906E+00	1.541E+03	6.496E+00
2014	7.060E+00	6.060E+03	7.766E+00	6.469E+00	1.688E+03	7.115E+00
2015	7.662E+00	6.577E+03	8.428E+00	7.020E+00	1.832E+03	7.723E+00
2016	8.252E+00	7.084E+03	9.078E+00	7.561E+00	1.973E+03	8.318E+00
2017	8.831E+00	7.580E+03	9.714E+00	8.092E+00	2.112E+03	8.901E+00
2018	9.398E+00	8.067E+03	1.034E+01	8.611E+00	2.247E+03	9.473E+00
2019	9.954E+00	8.544E+03	1.095E+01	9.121E+00	2.380E+03	1.003E+01
2020	1.050E+01	9.012E+03	1.155E+01	9.620E+00	2.511E+03	1.058E+01
2021	1.103E+01	9.471E+03	1.214E+01	1.011E+01	2.638E+03	1.112E+01
2022	1.156E+01	9.920E+03	1.271E+01	1.059E+01	2.764E+03	1.165E+01
2023	1.207E+01	1.036E+04	1.328E+01	1.106E+01	2.886E+03	1.217E+01
2024	1.257E+01	1.079E+04	1.383E+01	1.152E+01	3.007E+03	1.267E+01
2025	1.307E+01	1.122E+04	1.437E+01	1.197E+01	3.124E+03	1.317E+01
2026	1.355E+01	1.163E+04	1.491E+01	1.242E+01	3.240E+03	1.366E+01
2027	1.402E+01	1.204E+04	1.543E+01	1.285E+01	3.353E+03	1.413E+01
2028	1.449E+01	1.244E+04	1.594E+01	1.328E+01	3.464E+03	1.460E+01
2029	1.494E+01	1.283E+04	1.644E+01	1.369E+01	3.573E+03	1.506E+01
2030	1.539E+01	1.321E+04	1.693E+01	1.410E+01	3.680E+03	1.551E+01
2031	1.583E+01	1.359E+04	1.741E+01	1.450E+01	3.785E+03	1.595E+01
2032	1.626E+01	1.395E+04	1.788E+01	1.489E+01	3.887E+03	1.638E+01
2033	1.668E+01	1.431E+04	1.834E+01	1.528E+01	3.988E+03	1.681E+01
2034	1.709E+01	1.467E+04	1.880E+01	1.566E+01	4.086E+03	1.722E+01
2035	1.749E+01	1.501E+04	1.924E+01	1.603E+01	4.183E+03	1.763E+01
2036	1.789E+01	1.535E+04	1.968E+01	1.639E+01	4.277E+03	1.803E+01
2037	1.828E+01	1.569E+04	2.010E+01	1.675E+01	4.370E+03	1.842E+01
2038	1.866E+01	1.601E+04	2.052E+01	1.709E+01	4.461E+03	1.880E+01
2039	1.903E+01	1.633E+04	2.093E+01	1.744E+01	4.550E+03	1.918E+01
2040	1.939E+01	1.665E+04	2.133E+01	1.777E+01	4.637E+03	1.955E+01
2041	1.975E+01	1.695E+04	2.173E+01	1.810E+01	4.723E+03	1.991E+01
2042	2.010E+01	1.726E+04	2.211E+01	1.842E+01	4.807E+03	2.026E+01
2043	2.045E+01	1.755E+04	2.249E+01	1.874E+01	4.889E+03	2.061E+01
2044	2.034E+01	1.746E+04	2.237E+01	1.864E+01	4.864E+03	2.050E+01
2045	1.994E+01	1.711E+04	2.193E+01	1.827E+01	4.767E+03	2.009E+01
2046	1.954E+01	1.677E+04	2.150E+01	1.791E+01	4.673E+03	1.970E+01
2047	1.916E+01	1.644E+04	2.107E+01	1.755E+01	4.580E+03	1.931E+01
2048	1.878E+01	1.612E+04	2.065E+01	1.720E+01	4.490E+03	1.892E+01
2049	1.840E+01	1.580E+04	2.024E+01	1.686E+01	4.401E+03	1.855E+01
2050	1.804E+01	1.548E+04	1.984E+01	1.653E+01	4.314E+03	1.818E+01
2051	1.768E+01	1.518E+04	1.945E+01	1.620E+01	4.228E+03	1.782E+01
2052	1.733E+01	1.488E+04	1.907E+01	1.588E+01	4.145E+03	1.747E+01
2053	1.699E+01	1.458E+04	1.869E+01	1.557E+01	4.062E+03	1.712E+01
2054	1.665E+01	1.429E+04	1.832E+01	1.526E+01	3.982E+03	1.678E+01
2055	1.632E+01	1.401E+04	1.796E+01	1.496E+01	3.903E+03	1.645E+01

Results (Continued)

Year	Carbon monoxide			Toluene - No or Unknown Co-disposal - HAP/VOC		
	(Mg/year)	(m^3/year)	(short tons/year)	(Mg/year)	(m^3/year)	(short tons/year)
2056	1.600E+01	1.373E+04	1.760E+01	1.466E+01	3.826E+03	1.613E+01
2057	1.568E+01	1.346E+04	1.725E+01	1.437E+01	3.750E+03	1.581E+01
2058	1.537E+01	1.320E+04	1.691E+01	1.409E+01	3.676E+03	1.549E+01
2059	1.507E+01	1.293E+04	1.658E+01	1.381E+01	3.603E+03	1.519E+01
2060	1.477E+01	1.268E+04	1.625E+01	1.353E+01	3.532E+03	1.489E+01
2061	1.448E+01	1.243E+04	1.593E+01	1.327E+01	3.462E+03	1.459E+01
2062	1.419E+01	1.218E+04	1.561E+01	1.300E+01	3.393E+03	1.430E+01
2063	1.391E+01	1.194E+04	1.530E+01	1.275E+01	3.326E+03	1.402E+01
2064	1.363E+01	1.170E+04	1.500E+01	1.249E+01	3.260E+03	1.374E+01
2065	1.336E+01	1.147E+04	1.470E+01	1.225E+01	3.196E+03	1.347E+01
2066	1.310E+01	1.124E+04	1.441E+01	1.200E+01	3.132E+03	1.320E+01
2067	1.284E+01	1.102E+04	1.412E+01	1.177E+01	3.070E+03	1.294E+01
2068	1.259E+01	1.080E+04	1.384E+01	1.153E+01	3.010E+03	1.269E+01
2069	1.234E+01	1.059E+04	1.357E+01	1.130E+01	2.950E+03	1.243E+01
2070	1.209E+01	1.038E+04	1.330E+01	1.108E+01	2.892E+03	1.219E+01
2071	1.185E+01	1.017E+04	1.304E+01	1.086E+01	2.834E+03	1.195E+01
2072	1.162E+01	9.973E+03	1.278E+01	1.065E+01	2.778E+03	1.171E+01
2073	1.139E+01	9.775E+03	1.253E+01	1.043E+01	2.723E+03	1.148E+01
2074	1.116E+01	9.582E+03	1.228E+01	1.023E+01	2.669E+03	1.125E+01
2075	1.094E+01	9.392E+03	1.204E+01	1.003E+01	2.616E+03	1.103E+01
2076	1.073E+01	9.206E+03	1.180E+01	9.827E+00	2.565E+03	1.081E+01
2077	1.051E+01	9.024E+03	1.156E+01	9.633E+00	2.514E+03	1.060E+01
2078	1.030E+01	8.845E+03	1.134E+01	9.442E+00	2.464E+03	1.039E+01
2079	1.010E+01	8.670E+03	1.111E+01	9.255E+00	2.415E+03	1.018E+01
2080	9.901E+00	8.498E+03	1.089E+01	9.072E+00	2.367E+03	9.979E+00
2081	9.705E+00	8.330E+03	1.068E+01	8.892E+00	2.320E+03	9.781E+00
2082	9.512E+00	8.165E+03	1.046E+01	8.716E+00	2.275E+03	9.588E+00
2083	9.324E+00	8.003E+03	1.026E+01	8.543E+00	2.230E+03	9.398E+00
2084	9.139E+00	7.845E+03	1.005E+01	8.374E+00	2.185E+03	9.212E+00
2085	8.958E+00	7.690E+03	9.854E+00	8.208E+00	2.142E+03	9.029E+00
2086	8.781E+00	7.537E+03	9.659E+00	8.046E+00	2.100E+03	8.850E+00
2087	8.607E+00	7.388E+03	9.468E+00	7.887E+00	2.058E+03	8.675E+00
2088	8.437E+00	7.242E+03	9.280E+00	7.730E+00	2.017E+03	8.503E+00
2089	8.270E+00	7.098E+03	9.097E+00	7.577E+00	1.977E+03	8.335E+00
2090	8.106E+00	6.958E+03	8.917E+00	7.427E+00	1.938E+03	8.170E+00
2091	7.945E+00	6.820E+03	8.740E+00	7.280E+00	1.900E+03	8.008E+00
2092	7.788E+00	6.685E+03	8.567E+00	7.136E+00	1.862E+03	7.850E+00
2093	7.634E+00	6.553E+03	8.397E+00	6.995E+00	1.825E+03	7.694E+00
2094	7.483E+00	6.423E+03	8.231E+00	6.856E+00	1.789E+03	7.542E+00
2095	7.335E+00	6.296E+03	8.068E+00	6.720E+00	1.754E+03	7.392E+00
2096	7.189E+00	6.171E+03	7.908E+00	6.587E+00	1.719E+03	7.246E+00
2097	7.047E+00	6.049E+03	7.752E+00	6.457E+00	1.685E+03	7.103E+00
2098	6.907E+00	5.929E+03	7.598E+00	6.329E+00	1.652E+03	6.962E+00
2099	6.771E+00	5.812E+03	7.448E+00	6.204E+00	1.619E+03	6.824E+00
2100	6.637E+00	5.697E+03	7.300E+00	6.081E+00	1.587E+03	6.689E+00
2101	6.505E+00	5.584E+03	7.156E+00	5.961E+00	1.555E+03	6.557E+00
2102	6.376E+00	5.473E+03	7.014E+00	5.842E+00	1.525E+03	6.427E+00
2103	6.250E+00	5.365E+03	6.875E+00	5.727E+00	1.494E+03	6.299E+00
2104	6.126E+00	5.259E+03	6.739E+00	5.613E+00	1.465E+03	6.175E+00
2105	6.005E+00	5.154E+03	6.606E+00	5.502E+00	1.436E+03	6.052E+00
2106	5.886E+00	5.052E+03	6.475E+00	5.393E+00	1.407E+03	5.933E+00

Results (Continued)

Year	Carbon monoxide			Toluene - No or Unknown Co-disposal - HAP/VOC		
	(Mg/year)	*(m^3/year)*	*(short tons/year)*	*(Mg/year)*	*(m^3/year)*	*(short tons/year)*
2107	5.770E+00	4.952E+03	6.347E+00	5.286E+00	1.380E+03	5.815E+00
2108	5.655E+00	4.854E+03	6.221E+00	5.182E+00	1.352E+03	5.700E+00
2109	5.543E+00	4.758E+03	6.098E+00	5.079E+00	1.325E+03	5.587E+00
2110	5.434E+00	4.664E+03	5.977E+00	4.979E+00	1.299E+03	5.476E+00
2111	5.326E+00	4.572E+03	5.859E+00	4.880E+00	1.274E+03	5.368E+00
2112	5.221E+00	4.481E+03	5.743E+00	4.783E+00	1.248E+03	5.262E+00
2113	5.117E+00	4.392E+03	5.629E+00	4.689E+00	1.224E+03	5.158E+00
2114	5.016E+00	4.305E+03	5.517E+00	4.596E+00	1.199E+03	5.055E+00
2115	4.916E+00	4.220E+03	5.408E+00	4.505E+00	1.176E+03	4.955E+00
2116	4.819E+00	4.137E+03	5.301E+00	4.416E+00	1.152E+03	4.857E+00
2117	4.724E+00	4.055E+03	5.196E+00	4.328E+00	1.130E+03	4.761E+00
2118	4.630E+00	3.974E+03	5.093E+00	4.243E+00	1.107E+03	4.667E+00
2119	4.538E+00	3.896E+03	4.992E+00	4.159E+00	1.085E+03	4.574E+00
2120	4.449E+00	3.819E+03	4.893E+00	4.076E+00	1.064E+03	4.484E+00
2121	4.361E+00	3.743E+03	4.797E+00	3.995E+00	1.043E+03	4.395E+00
2122	4.274E+00	3.669E+03	4.702E+00	3.916E+00	1.022E+03	4.308E+00
2123	4.190E+00	3.596E+03	4.609E+00	3.839E+00	1.002E+03	4.223E+00
2124	4.107E+00	3.525E+03	4.517E+00	3.763E+00	9.819E+02	4.139E+00
2125	4.025E+00	3.455E+03	4.428E+00	3.688E+00	9.625E+02	4.057E+00
2126	3.946E+00	3.387E+03	4.340E+00	3.615E+00	9.434E+02	3.977E+00
2127	3.867E+00	3.320E+03	4.254E+00	3.544E+00	9.248E+02	3.898E+00
2128	3.791E+00	3.254E+03	4.170E+00	3.473E+00	9.065E+02	3.821E+00
2129	3.716E+00	3.189E+03	4.087E+00	3.405E+00	8.885E+02	3.745E+00
2130	3.642E+00	3.126E+03	4.006E+00	3.337E+00	8.709E+02	3.671E+00
2131	3.570E+00	3.064E+03	3.927E+00	3.271E+00	8.537E+02	3.598E+00
2132	3.499E+00	3.004E+03	3.849E+00	3.206E+00	8.368E+02	3.527E+00
2133	3.430E+00	2.944E+03	3.773E+00	3.143E+00	8.202E+02	3.457E+00
2134	3.362E+00	2.886E+03	3.698E+00	3.081E+00	8.040E+02	3.389E+00
2135	3.296E+00	2.829E+03	3.625E+00	3.020E+00	7.880E+02	3.322E+00
2136	3.230E+00	2.773E+03	3.553E+00	2.960E+00	7.724E+02	3.256E+00
2137	3.166E+00	2.718E+03	3.483E+00	2.901E+00	7.571E+02	3.191E+00
2138	3.104E+00	2.664E+03	3.414E+00	2.844E+00	7.421E+02	3.128E+00
2139	3.042E+00	2.611E+03	3.346E+00	2.788E+00	7.274E+02	3.066E+00
2140	2.982E+00	2.560E+03	3.280E+00	2.732E+00	7.130E+02	3.006E+00
2141	2.923E+00	2.509E+03	3.215E+00	2.678E+00	6.989E+02	2.946E+00
2142	2.865E+00	2.459E+03	3.152E+00	2.625E+00	6.851E+02	2.888E+00
2143	2.808E+00	2.411E+03	3.089E+00	2.573E+00	6.715E+02	2.831E+00
2144	2.753E+00	2.363E+03	3.028E+00	2.522E+00	6.582E+02	2.774E+00
2145	2.698E+00	2.316E+03	2.968E+00	2.472E+00	6.452E+02	2.720E+00
2146	2.645E+00	2.270E+03	2.909E+00	2.423E+00	6.324E+02	2.666E+00



Summary Report

Landfill Name or Identifier: State Route 85 Solid Waste Municipal Landfill

Date: Wednesday, March 25, 2015

Description/Comments:
State Route 85 Solid Waste Municipal Landfill Gas Modeling for 2014 Title V Permit Renewal Application. This model uses specified NMOC concentration and the concentrsation of total reduced sulfur compounds per inlet landfill gas analysis for Flare Source Testing conducted April 26, 2012.

About LandGEM:

First-Order Decomposition Rate Equation: $$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} k L_o \left(\frac{M_i}{10} \right) e^{-kt_{ij}}$$

Where,
Q_{CH4} = annual methane generation in the year of the calculation ($m^3/year$)
i = 1-year time increment
n = (year of the calculation) - (initial year of waste acceptance)
j = 0.1-year time increment
k = methane generation rate ($year^{-1}$)
L_o = potential methane generation capacity (m^3/Mg)
M_i = mass of waste accepted in the i^{th} year (Mg)
t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year	**2006**	
Landfill Closure Year (with 80-year limit)	**2043**	
Actual Closure Year (without limit)	***2043***	
Have Model Calculate Closure Year?	**Yes**	
Waste Design Capacity	**26,767,000**	*megagrams*

MODEL PARAMETERS

Methane Generation Rate, k	**0.020**	$year^{-1}$
Potential Methane Generation Capacity, L_o	**170**	m^3/Mg
NMOC Concentration	**2,311**	*ppmv as hexane*
Methane Content	**50**	*% by volume*

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**Total landfill gas**
Gas / Pollutant #2:	**Methane**
Gas / Pollutant #3:	**Total Reduced Sulfur Compounds**
Gas / Pollutant #4:	**NMOC**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
2006	998,509	1,098,360	0	0
2007	981,062	1,079,168	998,509	1,098,360
2008	910,201	1,001,221	1,979,571	2,177,528
2009	844,712	929,183	2,889,772	3,178,749
2010	874,795	962,275	3,734,484	4,107,932
2011	887,776	976,554	4,609,279	5,070,207
2012	743,912	818,303	5,497,055	6,046,761
2013	675,165	742,681	6,240,967	6,865,064
2014	675,165	742,681	6,916,132	7,607,745
2015	675,165	742,681	7,591,296	8,350,426
2016	675,165	742,681	8,266,461	9,093,107
2017	675,165	742,681	8,941,625	9,835,788
2018	675,165	742,681	9,616,790	10,578,469
2019	675,165	742,681	10,291,955	11,321,150
2020	675,165	742,681	10,967,119	12,063,831
2021	675,165	742,681	11,642,284	12,806,512
2022	675,165	742,681	12,317,448	13,549,193
2023	675,165	742,681	12,992,613	14,291,874
2024	675,165	742,681	13,667,777	15,034,555
2025	675,165	742,681	14,342,942	15,777,236
2026	675,165	742,681	15,018,106	16,519,917
2027	675,165	742,681	15,693,271	17,262,598
2028	675,165	742,681	16,368,435	18,005,279
2029	675,165	742,681	17,043,600	18,747,960
2030	675,165	742,681	17,718,765	19,490,641
2031	675,165	742,681	18,393,929	20,233,322
2032	675,165	742,681	19,069,094	20,976,003
2033	675,165	742,681	19,744,258	21,718,684
2034	675,165	742,681	20,419,423	22,461,365
2035	675,165	742,681	21,094,587	23,204,046
2036	675,165	742,681	21,769,752	23,946,727
2037	675,165	742,681	22,444,916	24,689,408
2038	675,165	742,681	23,120,081	25,432,089
2039	675,165	742,681	23,795,245	26,174,770
2040	675,165	742,681	24,470,410	26,917,451
2041	675,165	742,681	25,145,575	27,660,132
2042	675,165	742,681	25,820,739	28,402,813
2043	271,096	298,206	26,495,904	29,145,494
2044	0	0	26,767,000	29,443,700
2045	0	0	26,767,000	29,443,700

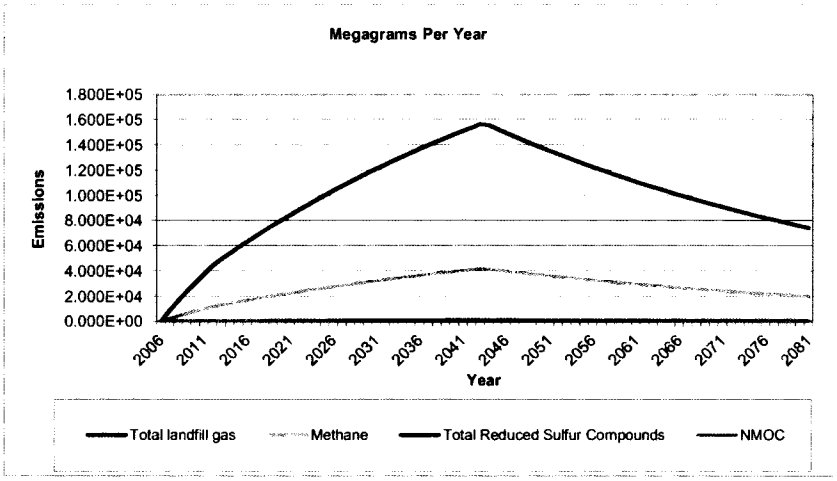
Pollutant Parameters

		Gas / Pollutant Default Parameters:		User-specified Pollutant Parameters:	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

Pollutant Parameters (Continued)

		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		
	Total Reduced Sulfur Compounds			89.13	32.06

Graphs


Megagrams Per Year
Emissions
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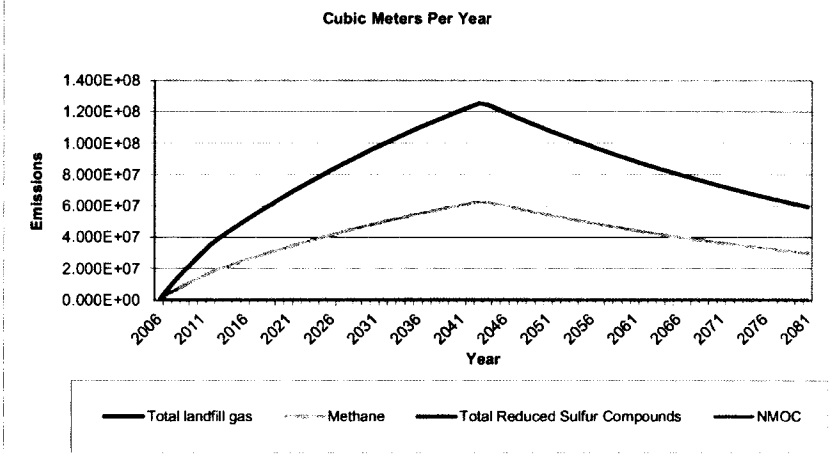
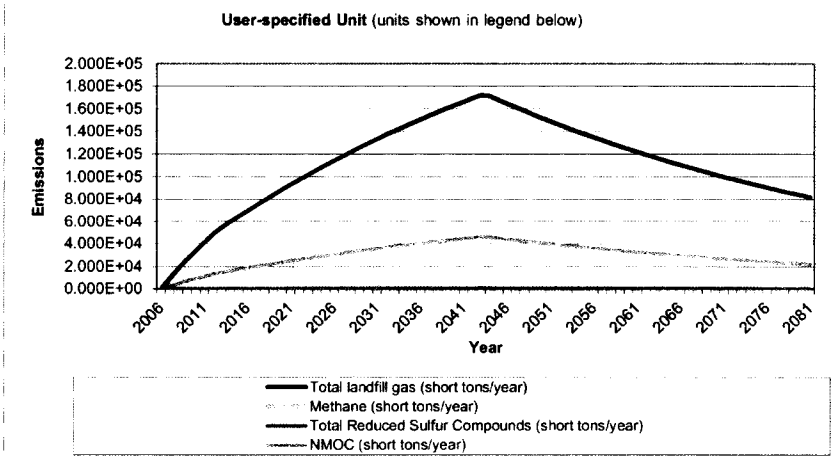
1.600E+05
1.400E+05
1.200E+05
1.000E+05
8.000E+04
6.000E+04
4.000E+04
2.000E+04
0.000E+00
2006 2011 2016 2021 2026 2031 2036 2041 2046 2051 2056 2061 2066 2071 2076 2081
Year
Total landfill gas
Methane
Total Reduced Sulfur Compounds
NMOC


Cubic Meters Per Year
Emissions
1.400E+08
1.200E+08
1.000E+08
8.000E+07
6.000E+07
4.000E+07
2.000E+07
0.000E+00
2006 2011 2016 2021 2026 2031 2036 2041 2046 2051 2056 2061 2066 2071 2076 2081
Year
Total landfill gas
Methane
Total Reduced Sulfur Compounds
NMOC


User-specified Unit (units shown in legend below)
Emissions
2.000E+05
1.800E+05
1.600E+05
1.400E+05
1.200E+05
1.000E+05
8.000E+04
6.000E+04
4.000E+04
2.000E+04
0.000E+00
2006 2011 2016 2021 2026 2031 2036 2041 2046 2051 2056 2061 2066 2071 2076 2081
Year
Total landfill gas (short tons/year)
Methane (short tons/year)
Total Reduced Sulfur Compounds (short tons/year)
NMOC (short tons/year)

INVENTORY

Landfill Name or Identifier: State Route 85 Solid Waste Municipal Landfill

Enter year of emissions inventory: 2021

Gas / Pollutant	Emission Rate				
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(ft^3/year)*	*(short tons/year)*
Total landfill gas	8.448E+04	6.765E+07	4.545E+03	2.389E+09	9.293E+04
Methane	2.257E+04	3.382E+07	2.273E+03	1.195E+09	2.482E+04
Carbon dioxide	6.192E+04	3.382E+07	2.273E+03	1.195E+09	6.811E+04
NMOC	5.604E+02	1.563E+05	1.050E+01	5.521E+06	6.164E+02
1,1,1-Trichloroethane (methyl chloroform) - HAP	1.802E-01	3.247E+01	2.182E-03	1.147E+03	1.982E-01
1,1,2,2-Tetrachloroethane - HAP/VOC	5.195E-01	7.441E+01	5.000E-03	2.628E+03	5.715E-01
1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	6.683E-01	1.624E+02	1.091E-02	5.734E+03	7.352E-01
1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	5.455E-02	1.353E+01	9.091E-04	4.778E+02	6.001E-02
1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	1.142E-01	2.774E+01	1.864E-03	9.795E+02	1.256E-01
1,2-Dichloropropane (propylene dichloride) - HAP/VOC	5.723E-02	1.218E+01	8.182E-04	4.300E+02	6.295E-02
2-Propanol (isopropyl alcohol) - VOC	8.457E+00	3.382E+03	2.273E-01	1.195E+05	9.302E+00
Acetone	1.144E+00	4.735E+02	3.182E-02	1.672E+04	1.258E+00
Acrylonitrile - HAP/VOC	9.406E-01	4.262E+02	2.864E-02	1.505E+04	1.035E+00
Benzene - No or Unknown Co-disposal - HAP/VOC	4.176E-01	1.285E+02	8.636E-03	4.539E+03	4.593E-01
~~Benzene - Co-disposal - HAP/VOC~~	~~2.418E+00~~	~~7.441E+02~~	~~5.000E-02~~	~~2.628E+04~~	~~2.669E+00~~
Bromodichloromethane - VOC	1.429E+00	2.097E+02	1.409E-02	7.406E+03	1.572E+00
Butane - VOC	8.177E-01	3.382E+02	2.273E-02	1.195E+04	8.994E-01
Carbon disulfide - HAP/VOC	1.242E-01	3.924E+01	2.636E-03	1.386E+03	1.367E-01
Carbon monoxide	1.103E+01	9.471E+03	6.363E-01	3.345E+05	1.214E+01
Carbon tetrachloride - HAP/VOC	1.731E-03	2.706E-01	1.818E-05	9.556E+00	1.905E-03
Carbonyl sulfide - HAP/VOC	8.282E-02	3.315E+01	2.227E-03	1.171E+03	9.110E-02
Chlorobenzene - HAP/VOC	7.918E-02	1.691E+01	1.136E-03	5.973E+02	8.710E-02
Chlorodifluoromethane	3.163E-01	8.794E+01	5.909E-03	3.106E+03	3.479E-01
Chloroethane (ethyl chloride) - HAP/VOC	2.360E-01	8.794E+01	5.909E-03	3.106E+03	2.596E-01
Chloroform - HAP/VOC	1.008E-02	2.029E+00	1.364E-04	7.167E+01	1.109E-02
Chloromethane - VOC	1.705E-01	8.118E+01	5.454E-03	2.867E+03	1.875E-01
Dichlorobenzene - (HAP for para isomer/VOC)	8.686E-02	1.421E+01	9.545E-04	5.017E+02	9.554E-02
Dichlorodifluoromethane	5.443E+00	1.082E+03	7.272E-02	3.822E+04	5.988E+00
Dichlorofluoromethane - VOC	7.529E-01	1.759E+02	1.182E-02	6.211E+03	8.282E-01
Dichloromethane (methylene chloride) - HAP	3.346E+00	9.471E+02	6.363E-02	3.345E+04	3.681E+00
Dimethyl sulfide (methyl sulfide) - VOC	1.364E+00	5.277E+02	3.545E-02	1.863E+04	1.500E+00
Ethane	7.530E+01	6.021E+04	4.045E+00	2.126E+06	8.283E+01
Ethanol - VOC	3.501E+00	1.827E+03	1.227E-01	6.450E+04	3.851E+00
Ethyl mercaptan (ethanethiol) - VOC	4.021E-01	1.556E+02	1.045E-02	5.495E+03	4.423E-01
Ethylbenzene - HAP/VOC	1.374E+00	3.112E+02	2.091E-02	1.099E+04	1.511E+00
Ethylene dibromide - HAP/VOC	5.286E-04	6.765E-02	4.545E-06	2.389E+00	5.815E-04
Fluorotrichloromethane - VOC	2.938E-01	5.141E+01	3.454E-03	1.816E+03	3.232E-01
Hexane - HAP/VOC	1.600E+00	4.465E+02	3.000E-02	1.577E+04	1.760E+00
Hydrogen sulfide	3.452E+00	2.435E+03	1.636E-01	8.600E+04	3.797E+00
Mercury (total) - HAP	1.637E-04	1.962E-02	1.318E-06	6.928E-01	1.801E-04
Methyl ethyl ketone - HAP/VOC	1.441E+00	4.803E+02	3.227E-02	1.696E+04	1.585E+00
Methyl isobutyl ketone - HAP/VOC	5.355E-01	1.285E+02	8.636E-03	4.539E+03	5.890E-01
Methyl mercaptan - VOC	3.384E-01	1.691E+02	1.136E-02	5.973E+03	3.723E-01
Pentane - VOC	6.699E-01	2.232E+02	1.500E-02	7.884E+03	7.369E-01
Perchloroethylene (tetrachloroethylene) - HAP	1.726E+00	2.503E+02	1.682E-02	8.839E+03	1.899E+00
Propane - VOC	1.365E+00	7.441E+02	5.000E-02	2.628E+04	1.501E+00
t-1,2-Dichloroethene - VOC	7.637E-01	1.894E+02	1.273E-02	6.689E+03	8.401E-01
Toluene - No or Unknown Co-disposal - HAP/VOC	1.011E+01	2.638E+03	1.773E-01	9.317E+04	1.112E+01
~~Toluene - Co-disposal - HAP/VOC~~	~~4.407E+01~~	~~1.150E+04~~	~~7.727E-01~~	~~4.061E+05~~	~~4.848E+01~~
Trichloroethylene (trichloroethene) - HAP/VOC	1.035E+00	1.894E+02	1.273E-02	6.689E+03	1.139E+00
Vinyl chloride - HAP/VOC	1.284E+00	4.938E+02	3.318E-02	1.744E+04	1.412E+00
Xylenes - HAP/VOC	3.584E+00	8.118E+02	5.454E-02	2.867E+04	3.943E+00
Total Reduced Sulfur Compounds	8.041E+00	6.030E+03	4.051E-01	2.129E+05	8.845E+00

Note: Benzene and toluene Co-disposal is not applicable for the SR85 Landfill site.

Results

Year	Total landfill gas			Methane		
	(Mg/year)	(m^3/year)	(short tons/year)	(Mg/year)	(m^3/year)	(short tons/year)
2006	0	0	0	0	0	0
2007	8.404E+03	6.729E+06	9.244E+03	2.245E+03	3.365E+06	2.469E+03
2008	1.649E+04	1.321E+07	1.814E+04	4.406E+03	6.604E+06	4.846E+03
2009	2.383E+04	1.908E+07	2.621E+04	6.365E+03	9.540E+06	7.001E+03
2010	3.046E+04	2.439E+07	3.351E+04	8.137E+03	1.220E+07	8.951E+03
2011	3.722E+04	2.981E+07	4.095E+04	9.943E+03	1.490E+07	1.094E+04
2012	4.396E+04	3.520E+07	4.835E+04	1.174E+04	1.760E+07	1.292E+04
2013	4.935E+04	3.952E+07	5.428E+04	1.318E+04	1.976E+07	1.450E+04
2014	5.405E+04	4.328E+07	5.946E+04	1.444E+04	2.164E+07	1.588E+04
2015	5.867E+04	4.698E+07	6.453E+04	1.567E+04	2.349E+07	1.724E+04
2016	6.319E+04	5.060E+07	6.950E+04	1.688E+04	2.530E+07	1.857E+04
2017	6.762E+04	5.414E+07	7.438E+04	1.806E+04	2.707E+07	1.987E+04
2018	7.196E+04	5.762E+07	7.916E+04	1.922E+04	2.881E+07	2.114E+04
2019	7.622E+04	6.103E+07	8.384E+04	2.036E+04	3.052E+07	2.239E+04
2020	8.039E+04	6.437E+07	8.843E+04	2.147E+04	3.219E+07	2.362E+04
2021	8.448E+04	6.765E+07	9.293E+04	2.257E+04	3.382E+07	2.482E+04
2022	8.849E+04	7.086E+07	9.734E+04	2.364E+04	3.543E+07	2.600E+04
2023	9.242E+04	7.401E+07	1.017E+05	2.469E+04	3.700E+07	2.716E+04
2024	9.627E+04	7.709E+07	1.059E+05	2.572E+04	3.855E+07	2.829E+04
2025	1.000E+05	8.011E+07	1.101E+05	2.672E+04	4.006E+07	2.940E+04
2026	1.037E+05	8.308E+07	1.141E+05	2.771E+04	4.154E+07	3.048E+04
2027	1.074E+05	8.598E+07	1.181E+05	2.868E+04	4.299E+07	3.155E+04
2028	1.109E+05	8.883E+07	1.220E+05	2.963E+04	4.442E+07	3.259E+04
2029	1.144E+05	9.162E+07	1.259E+05	3.056E+04	4.581E+07	3.362E+04
2030	1.178E+05	9.436E+07	1.296E+05	3.148E+04	4.718E+07	3.462E+04
2031	1.212E+05	9.704E+07	1.333E+05	3.237E+04	4.852E+07	3.561E+04
2032	1.245E+05	9.967E+07	1.369E+05	3.325E+04	4.983E+07	3.657E+04
2033	1.277E+05	1.022E+08	1.405E+05	3.411E+04	5.112E+07	3.752E+04
2034	1.308E+05	1.048E+08	1.439E+05	3.495E+04	5.238E+07	3.844E+04
2035	1.339E+05	1.072E+08	1.473E+05	3.577E+04	5.362E+07	3.935E+04
2036	1.370E+05	1.097E+08	1.507E+05	3.658E+04	5.484E+07	4.024E+04
2037	1.399E+05	1.121E+08	1.539E+05	3.738E+04	5.603E+07	4.111E+04
2038	1.428E+05	1.144E+08	1.571E+05	3.815E+04	5.719E+07	4.197E+04
2039	1.457E+05	1.167E+08	1.603E+05	3.892E+04	5.833E+07	4.281E+04
2040	1.485E+05	1.189E+08	1.633E+05	3.966E+04	5.945E+07	4.363E+04
2041	1.512E+05	1.211E+08	1.664E+05	4.040E+04	6.055E+07	4.444E+04
2042	1.539E+05	1.233E+08	1.693E+05	4.111E+04	6.163E+07	4.523E+04
2043	1.566E+05	1.254E+08	1.722E+05	4.182E+04	6.268E+07	4.600E+04
2044	1.557E+05	1.247E+08	1.713E+05	4.160E+04	6.235E+07	4.576E+04
2045	1.527E+05	1.222E+08	1.679E+05	4.078E+04	6.112E+07	4.485E+04
2046	1.496E+05	1.198E+08	1.646E+05	3.997E+04	5.991E+07	4.397E+04
2047	1.467E+05	1.174E+08	1.613E+05	3.918E+04	5.872E+07	4.309E+04
2048	1.438E+05	1.151E+08	1.581E+05	3.840E+04	5.756E+07	4.224E+04
2049	1.409E+05	1.128E+08	1.550E+05	3.764E+04	5.642E+07	4.140E+04
2050	1.381E+05	1.106E+08	1.519E+05	3.690E+04	5.530E+07	4.058E+04
2051	1.354E+05	1.084E+08	1.489E+05	3.616E+04	5.421E+07	3.978E+04
2052	1.327E+05	1.063E+08	1.460E+05	3.545E+04	5.313E+07	3.899E+04
2053	1.301E+05	1.042E+08	1.431E+05	3.475E+04	5.208E+07	3.822E+04
2054	1.275E+05	1.021E+08	1.403E+05	3.406E+04	5.105E+07	3.746E+04
2055	1.250E+05	1.001E+08	1.375E+05	3.338E+04	5.004E+07	3.672E+04

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	(m^3/year)	(short tons/year)	(Mg/year)	(m^3/year)	(short tons/year)
2056	1.225E+05	9.810E+07	1.348E+05	3.272E+04	4.905E+07	3.600E+04
2057	1.201E+05	9.616E+07	1.321E+05	3.208E+04	4.808E+07	3.528E+04
2058	1.177E+05	9.425E+07	1.295E+05	3.144E+04	4.713E+07	3.458E+04
2059	1.154E+05	9.239E+07	1.269E+05	3.082E+04	4.619E+07	3.390E+04
2060	1.131E+05	9.056E+07	1.244E+05	3.021E+04	4.528E+07	3.323E+04
2061	1.109E+05	8.876E+07	1.219E+05	2.961E+04	4.438E+07	3.257E+04
2062	1.087E+05	8.701E+07	1.195E+05	2.902E+04	4.350E+07	3.193E+04
2063	1.065E+05	8.528E+07	1.172E+05	2.845E+04	4.264E+07	3.129E+04
2064	1.044E+05	8.359E+07	1.148E+05	2.788E+04	4.180E+07	3.067E+04
2065	1.023E+05	8.194E+07	1.126E+05	2.733E+04	4.097E+07	3.007E+04
2066	1.003E+05	8.032E+07	1.103E+05	2.679E+04	4.016E+07	2.947E+04
2067	9.832E+04	7.873E+07	1.081E+05	2.626E+04	3.936E+07	2.889E+04
2068	9.637E+04	7.717E+07	1.060E+05	2.574E+04	3.858E+07	2.832E+04
2069	9.446E+04	7.564E+07	1.039E+05	2.523E+04	3.782E+07	2.775E+04
2070	9.259E+04	7.414E+07	1.018E+05	2.473E+04	3.707E+07	2.720E+04
2071	9.076E+04	7.267E+07	9.983E+04	2.424E+04	3.634E+07	2.667E+04
2072	8.896E+04	7.123E+07	9.786E+04	2.376E+04	3.562E+07	2.614E+04
2073	8.720E+04	6.982E+07	9.592E+04	2.329E+04	3.491E+07	2.562E+04
2074	8.547E+04	6.844E+07	9.402E+04	2.283E+04	3.422E+07	2.511E+04
2075	8.378E+04	6.709E+07	9.216E+04	2.238E+04	3.354E+07	2.462E+04
2076	8.212E+04	6.576E+07	9.033E+04	2.194E+04	3.288E+07	2.413E+04
2077	8.049E+04	6.446E+07	8.854E+04	2.150E+04	3.223E+07	2.365E+04
2078	7.890E+04	6.318E+07	8.679E+04	2.107E+04	3.159E+07	2.318E+04
2079	7.734E+04	6.193E+07	8.507E+04	2.066E+04	3.096E+07	2.272E+04
2080	7.581E+04	6.070E+07	8.339E+04	2.025E+04	3.035E+07	2.227E+04
2081	7.430E+04	5.950E+07	8.174E+04	1.985E+04	2.975E+07	2.183E+04
2082	7.283E+04	5.832E+07	8.012E+04	1.945E+04	2.916E+07	2.140E+04
2083	7.139E+04	5.717E+07	7.853E+04	1.907E+04	2.858E+07	2.098E+04
2084	6.998E+04	5.603E+07	7.698E+04	1.869E+04	2.802E+07	2.056E+04
2085	6.859E+04	5.493E+07	7.545E+04	1.832E+04	2.746E+07	2.015E+04
2086	6.723E+04	5.384E+07	7.396E+04	1.796E+04	2.692E+07	1.975E+04
2087	6.590E+04	5.277E+07	7.249E+04	1.760E+04	2.639E+07	1.936E+04
2088	6.460E+04	5.173E+07	7.106E+04	1.725E+04	2.586E+07	1.898E+04
2089	6.332E+04	5.070E+07	6.965E+04	1.691E+04	2.535E+07	1.860E+04
2090	6.206E+04	4.970E+07	6.827E+04	1.658E+04	2.485E+07	1.824E+04
2091	6.084E+04	4.871E+07	6.692E+04	1.625E+04	2.436E+07	1.787E+04
2092	5.963E+04	4.775E+07	6.559E+04	1.593E+04	2.387E+07	1.752E+04
2093	5.845E+04	4.680E+07	6.430E+04	1.561E+04	2.340E+07	1.717E+04
2094	5.729E+04	4.588E+07	6.302E+04	1.530E+04	2.294E+07	1.683E+04
2095	5.616E+04	4.497E+07	6.177E+04	1.500E+04	2.248E+07	1.650E+04
2096	5.505E+04	4.408E+07	6.055E+04	1.470E+04	2.204E+07	1.617E+04
2097	5.396E+04	4.321E+07	5.935E+04	1.441E+04	2.160E+07	1.585E+04
2098	5.289E+04	4.235E+07	5.818E+04	1.413E+04	2.118E+07	1.554E+04
2099	5.184E+04	4.151E+07	5.702E+04	1.385E+04	2.076E+07	1.523E+04
2100	5.081E+04	4.069E+07	5.590E+04	1.357E+04	2.034E+07	1.493E+04
2101	4.981E+04	3.988E+07	5.479E+04	1.330E+04	1.994E+07	1.463E+04
2102	4.882E+04	3.909E+07	5.370E+04	1.304E+04	1.955E+07	1.434E+04
2103	4.786E+04	3.832E+07	5.264E+04	1.278E+04	1.916E+07	1.406E+04
2104	4.691E+04	3.756E+07	5.160E+04	1.253E+04	1.878E+07	1.378E+04
2105	4.598E+04	3.682E+07	5.058E+04	1.228E+04	1.841E+07	1.351E+04
2106	4.507E+04	3.609E+07	4.958E+04	1.204E+04	1.804E+07	1.324E+04

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	(m^3/year)	(short tons/year)	(Mg/year)	(m^3/year)	(short tons/year)
2107	4.418E+04	3.537E+07	4.859E+04	1.180E+04	1.769E+07	1.298E+04
2108	4.330E+04	3.467E+07	4.763E+04	1.157E+04	1.734E+07	1.272E+04
2109	4.244E+04	3.399E+07	4.669E+04	1.134E+04	1.699E+07	1.247E+04
2110	4.160E+04	3.331E+07	4.576E+04	1.111E+04	1.666E+07	1.222E+04
2111	4.078E+04	3.265E+07	4.486E+04	1.089E+04	1.633E+07	1.198E+04
2112	3.997E+04	3.201E+07	4.397E+04	1.068E+04	1.600E+07	1.174E+04
2113	3.918E+04	3.137E+07	4.310E+04	1.047E+04	1.569E+07	1.151E+04
2114	3.840E+04	3.075E+07	4.225E+04	1.026E+04	1.538E+07	1.128E+04
2115	3.764E+04	3.014E+07	4.141E+04	1.006E+04	1.507E+07	1.106E+04
2116	3.690E+04	2.955E+07	4.059E+04	9.856E+03	1.477E+07	1.084E+04
2117	3.617E+04	2.896E+07	3.978E+04	9.661E+03	1.448E+07	1.063E+04
2118	3.545E+04	2.839E+07	3.900E+04	9.470E+03	1.419E+07	1.042E+04
2119	3.475E+04	2.783E+07	3.822E+04	9.282E+03	1.391E+07	1.021E+04
2120	3.406E+04	2.728E+07	3.747E+04	9.098E+03	1.364E+07	1.001E+04
2121	3.339E+04	2.674E+07	3.673E+04	8.918E+03	1.337E+07	9.810E+03
2122	3.273E+04	2.621E+07	3.600E+04	8.742E+03	1.310E+07	9.616E+03
2123	3.208E+04	2.569E+07	3.529E+04	8.568E+03	1.284E+07	9.425E+03
2124	3.144E+04	2.518E+07	3.459E+04	8.399E+03	1.259E+07	9.239E+03
2125	3.082E+04	2.468E+07	3.390E+04	8.232E+03	1.234E+07	9.056E+03
2126	3.021E+04	2.419E+07	3.323E+04	8.069E+03	1.210E+07	8.876E+03
2127	2.961E+04	2.371E+07	3.257E+04	7.910E+03	1.186E+07	8.701E+03
2128	2.903E+04	2.324E+07	3.193E+04	7.753E+03	1.162E+07	8.528E+03
2129	2.845E+04	2.278E+07	3.130E+04	7.600E+03	1.139E+07	8.359E+03
2130	2.789E+04	2.233E+07	3.068E+04	7.449E+03	1.117E+07	8.194E+03
2131	2.734E+04	2.189E+07	3.007E+04	7.302E+03	1.094E+07	8.032E+03
2132	2.679E+04	2.146E+07	2.947E+04	7.157E+03	1.073E+07	7.873E+03
2133	2.626E+04	2.103E+07	2.889E+04	7.015E+03	1.052E+07	7.717E+03
2134	2.574E+04	2.061E+07	2.832E+04	6.876E+03	1.031E+07	7.564E+03
2135	2.523E+04	2.021E+07	2.776E+04	6.740E+03	1.010E+07	7.414E+03
2136	2.473E+04	1.981E+07	2.721E+04	6.607E+03	9.903E+06	7.267E+03
2137	2.424E+04	1.941E+07	2.667E+04	6.476E+03	9.707E+06	7.123E+03
2138	2.376E+04	1.903E+07	2.614E+04	6.348E+03	9.515E+06	6.982E+03
2139	2.329E+04	1.865E+07	2.562E+04	6.222E+03	9.326E+06	6.844E+03
2140	2.283E+04	1.828E+07	2.512E+04	6.099E+03	9.142E+06	6.709E+03
2141	2.238E+04	1.792E+07	2.462E+04	5.978E+03	8.961E+06	6.576E+03
2142	2.194E+04	1.757E+07	2.413E+04	5.860E+03	8.783E+06	6.446E+03
2143	2.150E+04	1.722E+07	2.365E+04	5.744E+03	8.609E+06	6.318E+03
2144	2.108E+04	1.688E+07	2.318E+04	5.630E+03	8.439E+06	6.193E+03
2145	2.066E+04	1.654E+07	2.273E+04	5.518E+03	8.272E+06	6.070E+03
2146	2.025E+04	1.622E+07	2.228E+04	5.409E+03	8.108E+06	5.950E+03

Results (Continued)

Year	Total Reduced Sulfur Compounds			NMOC		
	(Mg/year)	(m^3/year)	(short tons/year)	(Mg/year)	(m^3/year)	(short tons/year)
2006	0	0	0	0	0	0
2007	7.999E-01	5.998E+02	8.799E-01	5.574E+01	1.555E+04	6.132E+01
2008	1.570E+00	1.177E+03	1.727E+00	1.094E+02	3.052E+04	1.203E+02
2009	2.268E+00	1.701E+03	2.495E+00	1.581E+02	4.409E+04	1.739E+02
2010	2.900E+00	2.174E+03	3.190E+00	2.021E+02	5.638E+04	2.223E+02
2011	3.543E+00	2.657E+03	3.897E+00	2.469E+02	6.888E+04	2.716E+02
2012	4.184E+00	3.137E+03	4.602E+00	2.916E+02	8.135E+04	3.207E+02
2013	4.697E+00	3.522E+03	5.167E+00	3.273E+02	9.132E+04	3.601E+02
2014	5.145E+00	3.858E+03	5.659E+00	3.585E+02	1.000E+05	3.944E+02
2015	5.584E+00	4.187E+03	6.142E+00	3.891E+02	1.086E+05	4.281E+02
2016	6.014E+00	4.510E+03	6.616E+00	4.191E+02	1.169E+05	4.610E+02
2017	6.436E+00	4.826E+03	7.080E+00	4.485E+02	1.251E+05	4.934E+02
2018	6.849E+00	5.136E+03	7.534E+00	4.773E+02	1.332E+05	5.251E+02
2019	7.255E+00	5.440E+03	7.980E+00	5.056E+02	1.410E+05	5.561E+02
2020	7.652E+00	5.738E+03	8.417E+00	5.332E+02	1.488E+05	5.866E+02
2021	8.041E+00	6.030E+03	8.845E+00	5.604E+02	1.563E+05	6.164E+02
2022	8.423E+00	6.316E+03	9.265E+00	5.870E+02	1.638E+05	6.457E+02
2023	8.797E+00	6.596E+03	9.677E+00	6.130E+02	1.710E+05	6.743E+02
2024	9.164E+00	6.871E+03	1.008E+01	6.386E+02	1.782E+05	7.025E+02
2025	9.523E+00	7.141E+03	1.048E+01	6.636E+02	1.851E+05	7.300E+02
2026	9.875E+00	7.405E+03	1.086E+01	6.882E+02	1.920E+05	7.570E+02
2027	1.022E+01	7.664E+03	1.124E+01	7.123E+02	1.987E+05	7.835E+02
2028	1.056E+01	7.917E+03	1.161E+01	7.358E+02	2.053E+05	8.094E+02
2029	1.089E+01	8.166E+03	1.198E+01	7.590E+02	2.117E+05	8.349E+02
2030	1.122E+01	8.410E+03	1.234E+01	7.816E+02	2.181E+05	8.598E+02
2031	1.153E+01	8.649E+03	1.269E+01	8.038E+02	2.243E+05	8.842E+02
2032	1.185E+01	8.883E+03	1.303E+01	8.256E+02	2.303E+05	9.082E+02
2033	1.215E+01	9.113E+03	1.337E+01	8.470E+02	2.363E+05	9.317E+02
2034	1.245E+01	9.338E+03	1.370E+01	8.679E+02	2.421E+05	9.547E+02
2035	1.275E+01	9.559E+03	1.402E+01	8.884E+02	2.478E+05	9.772E+02
2036	1.304E+01	9.775E+03	1.434E+01	9.085E+02	2.535E+05	9.993E+02
2037	1.332E+01	9.987E+03	1.465E+01	9.282E+02	2.589E+05	1.021E+03
2038	1.360E+01	1.019E+04	1.496E+01	9.475E+02	2.643E+05	1.042E+03
2039	1.387E+01	1.040E+04	1.525E+01	9.664E+02	2.696E+05	1.063E+03
2040	1.413E+01	1.060E+04	1.555E+01	9.850E+02	2.748E+05	1.083E+03
2041	1.439E+01	1.079E+04	1.583E+01	1.003E+03	2.799E+05	1.103E+03
2042	1.465E+01	1.099E+04	1.612E+01	1.021E+03	2.848E+05	1.123E+03
2043	1.490E+01	1.117E+04	1.639E+01	1.038E+03	2.897E+05	1.142E+03
2044	1.482E+01	1.112E+04	1.631E+01	1.033E+03	2.882E+05	1.136E+03
2045	1.453E+01	1.090E+04	1.598E+01	1.013E+03	2.825E+05	1.114E+03
2046	1.424E+01	1.068E+04	1.567E+01	9.925E+02	2.769E+05	1.092E+03
2047	1.396E+01	1.047E+04	1.536E+01	9.729E+02	2.714E+05	1.070E+03
2048	1.368E+01	1.026E+04	1.505E+01	9.536E+02	2.660E+05	1.049E+03
2049	1.341E+01	1.006E+04	1.475E+01	9.347E+02	2.608E+05	1.028E+03
2050	1.315E+01	9.858E+03	1.446E+01	9.162E+02	2.556E+05	1.008E+03
2051	1.289E+01	9.663E+03	1.418E+01	8.981E+02	2.505E+05	9.879E+02
2052	1.263E+01	9.472E+03	1.390E+01	8.803E+02	2.456E+05	9.683E+02
2053	1.238E+01	9.284E+03	1.362E+01	8.629E+02	2.407E+05	9.492E+02
2054	1.214E+01	9.100E+03	1.335E+01	8.458E+02	2.360E+05	9.304E+02
2055	1.190E+01	8.920E+03	1.309E+01	8.290E+02	2.313E+05	9.119E+02

Results (Continued)

Year	Total Reduced Sulfur Compounds			NMOC		
	(Mg/year)	*(m^3/year)*	*(short tons/year)*	*(Mg/year)*	*(m^3/year)*	*(short tons/year)*
2056	1.166E+01	8.744E+03	1.283E+01	8.126E+02	2.267E+05	8.939E+02
2057	1.143E+01	8.570E+03	1.257E+01	7.965E+02	2.222E+05	8.762E+02
2058	1.120E+01	8.401E+03	1.232E+01	7.808E+02	2.178E+05	8.588E+02
2059	1.098E+01	8.234E+03	1.208E+01	7.653E+02	2.135E+05	8.418E+02
2060	1.076E+01	8.071E+03	1.184E+01	7.501E+02	2.093E+05	8.252E+02
2061	1.055E+01	7.911E+03	1.161E+01	7.353E+02	2.051E+05	8.088E+02
2062	1.034E+01	7.755E+03	1.138E+01	7.207E+02	2.011E+05	7.928E+02
2063	1.014E+01	7.601E+03	1.115E+01	7.065E+02	1.971E+05	7.771E+02
2064	9.937E+00	7.451E+03	1.093E+01	6.925E+02	1.932E+05	7.617E+02
2065	9.740E+00	7.303E+03	1.071E+01	6.788E+02	1.894E+05	7.466E+02
2066	9.547E+00	7.159E+03	1.050E+01	6.653E+02	1.856E+05	7.319E+02
2067	9.358E+00	7.017E+03	1.029E+01	6.521E+02	1.819E+05	7.174E+02
2068	9.173E+00	6.878E+03	1.009E+01	6.392E+02	1.783E+05	7.032E+02
2069	8.991E+00	6.742E+03	9.890E+00	6.266E+02	1.748E+05	6.892E+02
2070	8.813E+00	6.608E+03	9.694E+00	6.142E+02	1.713E+05	6.756E+02
2071	8.638E+00	6.477E+03	9.502E+00	6.020E+02	1.679E+05	6.622E+02
2072	8.467E+00	6.349E+03	9.314E+00	5.901E+02	1.646E+05	6.491E+02
2073	8.300E+00	6.223E+03	9.130E+00	5.784E+02	1.614E+05	6.362E+02
2074	8.135E+00	6.100E+03	8.949E+00	5.669E+02	1.582E+05	6.236E+02
2075	7.974E+00	5.979E+03	8.772E+00	5.557E+02	1.550E+05	6.113E+02
2076	7.816E+00	5.861E+03	8.598E+00	5.447E+02	1.520E+05	5.992E+02
2077	7.662E+00	5.745E+03	8.428E+00	5.339E+02	1.490E+05	5.873E+02
2078	7.510E+00	5.631E+03	8.261E+00	5.234E+02	1.460E+05	5.757E+02
2079	7.361E+00	5.520E+03	8.097E+00	5.130E+02	1.431E+05	5.643E+02
2080	7.215E+00	5.410E+03	7.937E+00	5.028E+02	1.403E+05	5.531E+02
2081	7.073E+00	5.303E+03	7.780E+00	4.929E+02	1.375E+05	5.422E+02
2082	6.933E+00	5.198E+03	7.626E+00	4.831E+02	1.348E+05	5.314E+02
2083	6.795E+00	5.095E+03	7.475E+00	4.736E+02	1.321E+05	5.209E+02
2084	6.661E+00	4.994E+03	7.327E+00	4.642E+02	1.295E+05	5.106E+02
2085	6.529E+00	4.896E+03	7.182E+00	4.550E+02	1.269E+05	5.005E+02
2086	6.400E+00	4.799E+03	7.039E+00	4.460E+02	1.244E+05	4.906E+02
2087	6.273E+00	4.704E+03	6.900E+00	4.371E+02	1.220E+05	4.809E+02
2088	6.149E+00	4.610E+03	6.763E+00	4.285E+02	1.195E+05	4.713E+02
2089	6.027E+00	4.519E+03	6.630E+00	4.200E+02	1.172E+05	4.620E+02
2090	5.907E+00	4.430E+03	6.498E+00	4.117E+02	1.149E+05	4.529E+02
2091	5.791E+00	4.342E+03	6.370E+00	4.035E+02	1.126E+05	4.439E+02
2092	5.676E+00	4.256E+03	6.243E+00	3.955E+02	1.103E+05	4.351E+02
2093	5.563E+00	4.172E+03	6.120E+00	3.877E+02	1.082E+05	4.265E+02
2094	5.453E+00	4.089E+03	5.999E+00	3.800E+02	1.060E+05	4.180E+02
2095	5.345E+00	4.008E+03	5.880E+00	3.725E+02	1.039E+05	4.098E+02
2096	5.239E+00	3.929E+03	5.763E+00	3.651E+02	1.019E+05	4.016E+02
2097	5.136E+00	3.851E+03	5.649E+00	3.579E+02	9.985E+04	3.937E+02
2098	5.034E+00	3.775E+03	5.537E+00	3.508E+02	9.787E+04	3.859E+02
2099	4.934E+00	3.700E+03	5.428E+00	3.439E+02	9.593E+04	3.783E+02
2100	4.837E+00	3.627E+03	5.320E+00	3.371E+02	9.403E+04	3.708E+02
2101	4.741E+00	3.555E+03	5.215E+00	3.304E+02	9.217E+04	3.634E+02
2102	4.647E+00	3.484E+03	5.112E+00	3.238E+02	9.035E+04	3.562E+02
2103	4.555E+00	3.415E+03	5.010E+00	3.174E+02	8.856E+04	3.492E+02
2104	4.465E+00	3.348E+03	4.911E+00	3.111E+02	8.680E+04	3.423E+02
2105	4.376E+00	3.282E+03	4.814E+00	3.050E+02	8.509E+04	3.355E+02
2106	4.290E+00	3.217E+03	4.719E+00	2.989E+02	8.340E+04	3.288E+02

Results (Continued)

Year	Total Reduced Sulfur Compounds			NMOC		
	(Mg/year)	*(m^3/year)*	*(short tons/year)*	*(Mg/year)*	*(m^3/year)*	*(short tons/year)*
2107	4.205E+00	3.153E+03	4.625E+00	2.930E+02	8.175E+04	3.223E+02
2108	4.122E+00	3.090E+03	4.534E+00	2.872E+02	8.013E+04	3.159E+02
2109	4.040E+00	3.029E+03	4.444E+00	2.815E+02	7.854E+04	3.097E+02
2110	3.960E+00	2.969E+03	4.356E+00	2.760E+02	7.699E+04	3.036E+02
2111	3.882E+00	2.910E+03	4.270E+00	2.705E+02	7.546E+04	2.975E+02
2112	3.805E+00	2.853E+03	4.185E+00	2.651E+02	7.397E+04	2.917E+02
2113	3.729E+00	2.796E+03	4.102E+00	2.599E+02	7.251E+04	2.859E+02
2114	3.655E+00	2.741E+03	4.021E+00	2.547E+02	7.107E+04	2.802E+02
2115	3.583E+00	2.687E+03	3.941E+00	2.497E+02	6.966E+04	2.747E+02
2116	3.512E+00	2.634E+03	3.863E+00	2.448E+02	6.828E+04	2.692E+02
2117	3.443E+00	2.581E+03	3.787E+00	2.399E+02	6.693E+04	2.639E+02
2118	3.374E+00	2.530E+03	3.712E+00	2.352E+02	6.561E+04	2.587E+02
2119	3.308E+00	2.480E+03	3.638E+00	2.305E+02	6.431E+04	2.536E+02
2120	3.242E+00	2.431E+03	3.566E+00	2.259E+02	6.303E+04	2.485E+02
2121	3.178E+00	2.383E+03	3.496E+00	2.215E+02	6.178E+04	2.436E+02
2122	3.115E+00	2.336E+03	3.426E+00	2.171E+02	6.056E+04	2.388E+02
2123	3.053E+00	2.289E+03	3.359E+00	2.128E+02	5.936E+04	2.341E+02
2124	2.993E+00	2.244E+03	3.292E+00	2.086E+02	5.819E+04	2.294E+02
2125	2.934E+00	2.200E+03	3.227E+00	2.044E+02	5.703E+04	2.249E+02
2126	2.875E+00	2.156E+03	3.163E+00	2.004E+02	5.591E+04	2.204E+02
2127	2.819E+00	2.113E+03	3.100E+00	1.964E+02	5.480E+04	2.161E+02
2128	2.763E+00	2.072E+03	3.039E+00	1.925E+02	5.371E+04	2.118E+02
2129	2.708E+00	2.031E+03	2.979E+00	1.887E+02	5.265E+04	2.076E+02
2130	2.654E+00	1.990E+03	2.920E+00	1.850E+02	5.161E+04	2.035E+02
2131	2.602E+00	1.951E+03	2.862E+00	1.813E+02	5.059E+04	1.995E+02
2132	2.550E+00	1.912E+03	2.805E+00	1.777E+02	4.958E+04	1.955E+02
2133	2.500E+00	1.874E+03	2.750E+00	1.742E+02	4.860E+04	1.916E+02
2134	2.450E+00	1.837E+03	2.695E+00	1.708E+02	4.764E+04	1.878E+02
2135	2.402E+00	1.801E+03	2.642E+00	1.674E+02	4.670E+04	1.841E+02
2136	2.354E+00	1.765E+03	2.590E+00	1.641E+02	4.577E+04	1.805E+02
2137	2.308E+00	1.730E+03	2.538E+00	1.608E+02	4.486E+04	1.769E+02
2138	2.262E+00	1.696E+03	2.488E+00	1.576E+02	4.398E+04	1.734E+02
2139	2.217E+00	1.662E+03	2.439E+00	1.545E+02	4.311E+04	1.700E+02
2140	2.173E+00	1.630E+03	2.391E+00	1.515E+02	4.225E+04	1.666E+02
2141	2.130E+00	1.597E+03	2.343E+00	1.485E+02	4.142E+04	1.633E+02
2142	2.088E+00	1.566E+03	2.297E+00	1.455E+02	4.060E+04	1.601E+02
2143	2.047E+00	1.535E+03	2.251E+00	1.426E+02	3.979E+04	1.569E+02
2144	2.006E+00	1.504E+03	2.207E+00	1.398E+02	3.900E+04	1.538E+02
2145	1.966E+00	1.474E+03	2.163E+00	1.370E+02	3.823E+04	1.507E+02
2146	1.927E+00	1.445E+03	2.120E+00	1.343E+02	3.747E+04	1.478E+02

APPENDIX D

CITY OF PHOENIX
STATE ROUTE 85 MUNICIPAL SOLID WASTE LANDFILL
SITE DIAGRAM

APPENDIX E

CITY OF PHOENIX STATE ROUTE 85 MUNICIPAL SOLID WASTE LANDFILL

DUST CONTROL PLAN – 2011

DUST CONTROL PLAN CHANGE – 2012

DUST CONTROL PLAN CHANGE – 2013

Attach this Dust Control Plan to the Air Permit Application and return them to: One Stop Shop
501 N. 44th Street, Suite 200
Phoenix, Arizona 85008
Phone (602) 372-1071 Fax (602) 372-1078

Maricopa County
Air Quality Department

DUST CONTROL PLAN

For Office Use Only			
Permit Number		Approved By	
Date Received		Approval Date	
Comments:			

Section 1. Basic Information
Section 2. Project Information
Section 3. Selection of Control Measures
Section 4. Guidance and Instructions

In order to be accepted for review the Dust Control Plan must be complete. This includes answering all questions fully and accurately. You may fill this Dust Control Plan and submit it as your Dust Control Plan or you may write your own Dust Control Plan that conforms to Rule 310, Section 402.

Keep in mind, the Maricopa County Air Quality Department (department) uses the Instructions portion of the Dust Control Plan as criteria when reviewing, evaluating, and approving the Permit Application. The rules identified in the instructions contain legally binding and enforceable requirements. Permits issued by the department under the rules also contain legally binding and enforceable conditions and terms. The Dust Control Plan does not supersede or change any existing federal, state, or county regulations and laws, including requirements of an approved State Implementation Plan (SIP).

Section 1: Basic Information

Facility/Business Information must be fully and accurately completed, including full legal names of entities and individuals (no DBA's or trade names).

1(a). Facility Information:

Type of Facility: Landfill ~~(Closed)~~ (Open)

Type of Permit:
☐ General Permit ☐ Non-Title V ☑ Title V

Permit Number: V03-002

Facility Name: SR85 Landfill

Facility Address: 28361 W. Patterson Road

City: Buckeye | State: AZ | Zip: 85326

Phone: (602) 534-8511 | Fax: (602) 722-2040

E-Mail Address: bill.stout@phoenix.gov

Local Mailing Address (if not the same as above): Same

1(b). Person responsible for submitting the Dust Control Plan:

Name: Joy A. Bell, P.E.

Signature: Joy A. Bell

Title: Project Manager | Company Name: City of Phoenix

On-Site Phone: (602) 256-5605 | Mobile: (602) 374-0503 | Fax: (602) 534-9872

E-mail Address: joy.bell@phoenix.gov

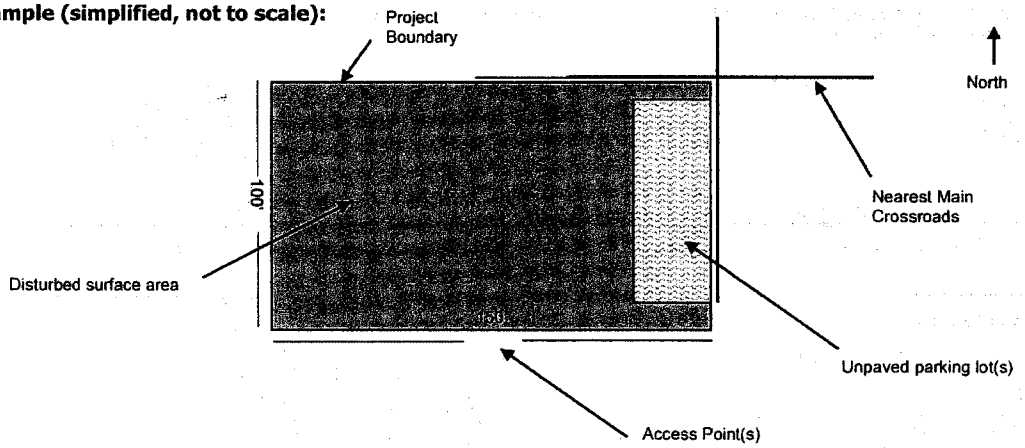
1(c). Name(s) of person(s) responsible for the implementation of the Dust Control Plan:		
Name: Bill Stout		
Title: Solid Waste Superintendent	Company Name: City of Phoenix	
On-Site Phone: (602) 534-8511	Mobile: (602) 722-2040	Fax: (602) 534-1452
E-mail Address: bill.stout@phoenix.gov		

Section 2: Project Information

Attach a separate page (8½" × 11") with a drawing showing all of the following elements:

- **Entire project site boundaries**
- **Area to be disturbed with linear dimensions or certification of square footage (including staging areas, stockpiles, access and haul roads, parking, driveways, and storage)**
- **Nearest main crossroads**
- **North arrow**
- **Access Point(s) – Planned exit locations onto areas accessible to the public**
- **Perimeter of unpaved parking lot(s)**

Example (simplified, not to scale):

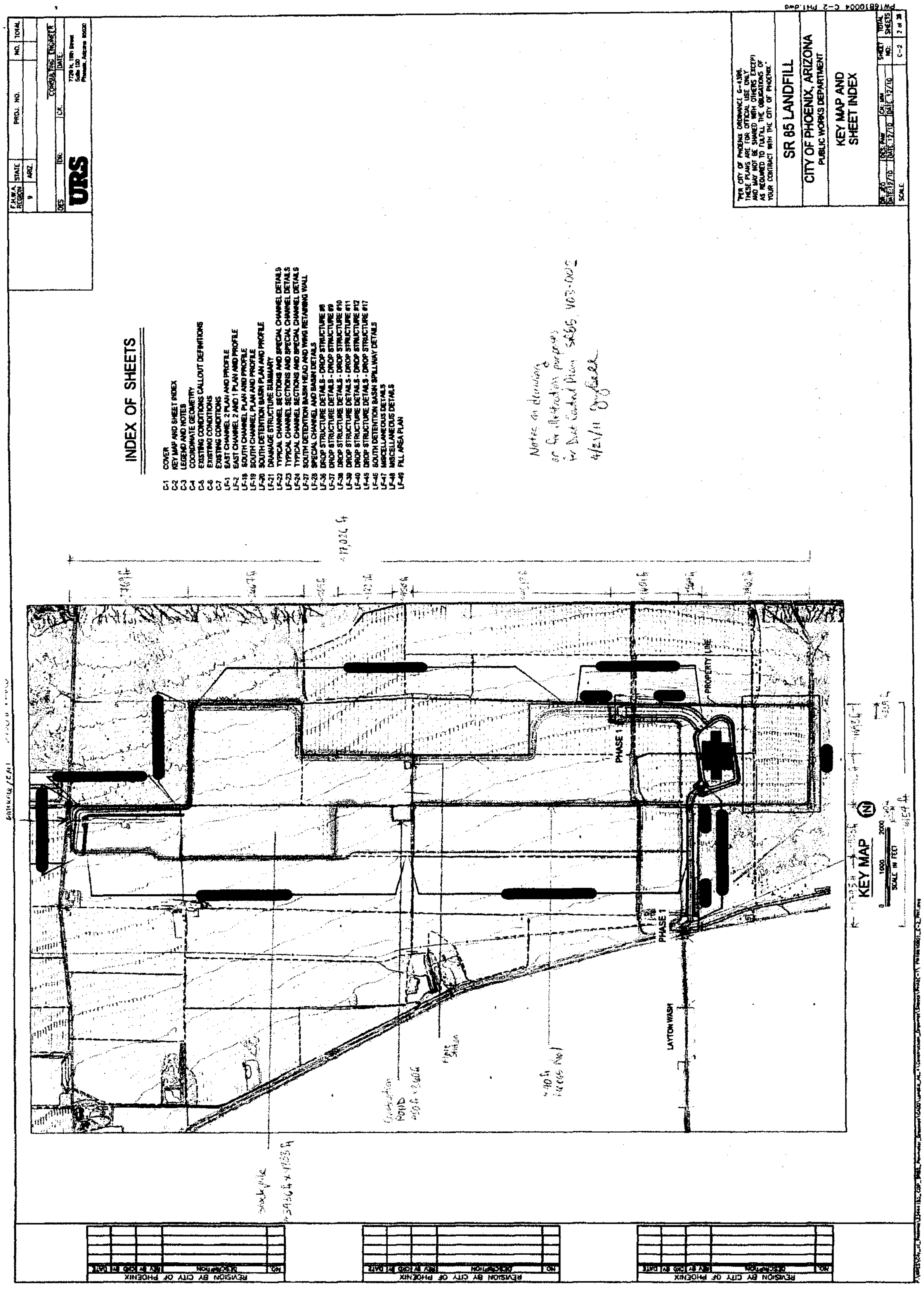


2(b).

List Soil Designations from Appendix F in Maricopa County Air Pollution Control Regulations or, if attaching a copy of the site geotechnical report, check here ☐

For construction projects one acre or larger, except for routine maintenance and repair done under a block permit, designate in the table below which soil texture is naturally present on the work site and which soil texture will be imported onto the work site (if applicable). If the soil on the work site has been tested, then you should rely on the test results to complete the table and you should attach a copy of the site soil report (boring logs) to this application. If the soil on the work site has not been tested, then use Appendix F in the Maricopa County Air Pollution Control Regulations to complete the table below.

Texture of soil naturally present on work site	Texture of soil to be imported onto work site
SC - Clayey Sand	
CL - Sandy Clay	


URS
INDEX OF SHEETS
SR 85 LANDFILL
CITY OF PHOENIX, ARIZONA
PUBLIC WORKS DEPARTMENT
KEY MAP AND
SHEET INDEX
PROPERTY LINE
PHASE 1
LAYTON WASH
KEY MAP

SELECTED IMPORTANT RULE CHANGES

EFFECTIVE JANUARY 2010

1. High Winds

The treatment of wind conditions was adjusted to concentrate on escalating controls as winds increase (Rule 310, Section 303.2(a)). In addition, the definition of "wind event" was removed (Rule 310, old Section 236).

2. Gravel pad trackout control device

The definition of "gravel pad" (Rule 310, Section 217) was expanded to include a work site exit width of less than 30 feet; being clear that the use of a reduced-width gravel pad is contingent on the physical impossibility of widening the existing exit, not mere inconvenience.

3. Dust control permit, plan requirements, and control measures

Project Sign. The project sign expiration date requirement has been removed (Rule 310, Section 308.2).

Project Site Drawing. Clarification and addition of items to include in the project site drawing such as "unpaved parking lot(s)" (Rule 310, Section 402.3(b)).

Control Measures. "Bulk Material Stacking, Loading, and Unloading Operations" and "Open Storage Piles" have been re-formatted and modified for clarity and increased effectiveness (Rule 310, Sections 305.4 and 305.5).

Definitions. "Area accessible to the public" (Rule 310, Section 202) and "unpaved parking lot" (Rule 310, Section 232) have both been modified for clarity and effectiveness while "public roadways" (Rule 310, old Section 227) was deleted as the concept is already captured in "area accessible to the public".

EFFECTIVE MARCH 2008

1. Dust Control Coordinator

A Dust Control Coordinator is required to be on-site at all times during primary dust-generating operations for any site of five or more acres of disturbed surface area that is subject to a Maricopa County dust control permit (Rule 310, Section 310). The contact information for the Dust Control Coordinator(s) must be provided in Question #5 of Part 2 of the Dust Control Permit Application.

2. Dust Control Training Classes

Comprehensive Dust Control Training: Once every three years for the Dust Control Coordinator.

Basic Dust Control Training: Once every three years for Site superintendents or other designated on-site representatives of the permit holder, if present at a site with more than one acre of disturbed surface area. Once every three years for all water truck drivers and water pull drivers as well.

More information on these training classes can be found by calling the Training Line at 602-372-1467 or at: www.maricopa.gov/aq/divisions/compliance/dust/dust_control_training on the Dust Compliance web site.

3. Visible emissions beyond property line

Rule 310, Section 303.1 requires that the owner and/or operator of a dust generating operation shall not cause, suffer, or allow visible emissions of particulate matter, including fugitive dust, beyond the property line within which the emissions are generated. Section 303.2 does provide an exception for dust-generating operations conducted within 25 feet of the property line.

4. Subcontractor Registration

A requirement of Rule 200 (Permit Requirements) is Subcontractor Registration. Subcontractors engaged in dust-generating operations at a site that is subject to a Maricopa County dust control permit are required to register with the department (Rule 200, Section 306) and pay an annual fee as specified in Rule 280, Section 312. The subcontractor shall have its registration number visible and readable by the public without having to be asked by the public. Additional information on Subcontractor Registration requirements, submittal and current fees can be found at http://www.maricopa.gov/aq/divisions/compliance/dust/subcontractorRegistration.aspx

Section 3. Selection of Control Measures

Primary ("P") and Contingency ("C") Control Measures:

Every category and/or sub-category requires at least one Primary control measure ("P") and at least one Contingency control measure ("C"). A contingency control measure is the back-up or secondary action(s) that needs to immediately be implemented when the primary control measure(s) fails to adequately control dust emissions at the named project.

To indicate your choice, mark the box next to the appropriate letter ("P" or "C") in front of each control measure(s) that you have chosen. Do this for both primary and contingency control measures in every category and/or sub-category.

Categories and/or sub-categories that are not applicable:

When a category and/or sub-category does not apply to the named project this must be acknowledged by completely filling out the final entry in the category and/or sub-category. An explanation must be supplied for WHY the category and/or sub-category is not applicable. This is in addition to simply writing "NA" or "not applicable".

When completing the following Dust Control Plan, use the Instructions in Section 4 to help you select dust control measures and keep in mind the following:

- **Every category and/or sub-category requires at least one "P" (Primary) and at least one "C" (Contingency).**
- Categories and/or sub-categories of dust-generating operations C1, C3, D1, E1, F, and G, in the following Dust Control Plan, have primary control measures, "P", required by Rule 310. You will need to choose a contingency measure, "C", for these dust-generating operations if they are applicable to your project.
- Where ■ has replaced a "P", the dust control measure **CANNOT** be used as a primary control measure; this measure may only be considered a contingency control measure when selected.
- Where ■ has replaced a "C", the dust control measure **CANNOT** be used as a contingency control measure and is required to be used as a primary control measure whenever that category and/or sub-category applies to a project.
- Where "Other" is listed without reference to opacity or surface stabilization standard(s) and is selected as a primary control measure, then the description must meet the criteria in Section 4 for "Unlisted Dust Control Measures."
- If a category and/or sub-category does not apply to the project named in this application the last item in that category and/or sub-category must be fully completed. An explanation of why it is not applicable is required.

Category A. Vehicles/Motorized Equipment

A.1 Unpaved Staging Areas, Unpaved Parking Areas, and Unpaved Material Storage Areas

☑ P ☐ C Apply water

☐ P ☐ C Pave (Choose one of the following): ☐ Beginning of Project* ☐ During Project* ☐ End of Project*
*Must specify additional primary control measure(s) that will be in place prior to paving

☐ P ☑ C Apply and maintain gravel, recycled asphalt, or other suitable material

☐ P ☑ C Apply and maintain dust suppressant(s), other than water

☐ P ☐ C Limit vehicle trips to no more than 20 per day per road **AND** limit vehicle speeds to no more than 15 m.p.h. In the space provided; 1) list the maximum number of vehicle trips on the unpaved parking/staging/material storage areas each day (including number of employee vehicles, earthmoving equipment, haul trucks and water trucks), 2) provide a description of how vehicle speeds will be restricted to no more than 15 m.p.h., and 3) specify which area(s) this will apply to:

☐ P ☑ C Other: Apply and maintain asphalt millings.

Or, explain why this sub-category and its control measures are not applicable

A.2 Unpaved Access Areas/Haul Roads

☑ P ☐ C Apply water

☐ P ☐ C Pave (Choose one of the following): ☐ Beginning of Project* ☐ During Project* ☐ End of Project*
*Must specify additional primary control measure(s) that will be in place prior to paving

☐ P ☑ C Apply and maintain surface gravel, recycled asphalt, or other suitable material

☐ P ☑ C Apply and maintain dust suppressant(s), other than water

☐ P ☐ C Limit vehicle trips to no more than 20 per day per road **AND** limit vehicle speeds to no more than 15 m.p.h. In the space provided; 1) list the maximum number of vehicle trips on the unpaved parking/staging/material storage areas each day (including number of employee vehicles, earthmoving equipment, haul trucks and water trucks), 2) provide a description of how vehicle speeds will be restricted to no more than 15 m.p.h., and 3) specify which road(s) this will apply to:
1-3 vehicle trips per day on perimeter road for maintenance of gas collection systems.

■ ☐ C Cease operations, NOTE: This option CANNOT be considered a ***primary*** control measure.

☐ P ☑ C Other: Primary measure for landfill perimeter & utility easement roads is to limit speed and traffic due to low volume/use there.

Or, explain why this sub-category and its control measures are not applicable

Category B. Disturbed Surface Areas

B.1 Before Active Operations occur

☑ P ☐ C Pre-water site to the depth of cuts

☐ P ☑ C Phase work to reduce the amount of disturbed surface area at any one time. **Attach a map** delineating the phases and their extent

☐ P ☑ C Other: Cease operation

Or, explain why this sub-category and its control measures are not applicable

B.2 During Active Operations

☑ P ☐ C Apply water or other suitable dust suppressant(s) other than water

☐ P ☑ C Apply water to maintain a soil moisture content at a minimum of 12% or at least 70% of the optimum soil moisture content for areas that have an optimum moisture content for compaction of less than 12%

☐ P ☐ C In conjunction with one of the above listed measures construct fences or three-foot to five-foot high wind barriers with 50% or less porosity adjacent to roadways or urban areas to reduce the amount of windblown material leaving the site

■ ☑ C Cease operations, NOTE: This option CANNOT be considered a ***primary*** control measure.

☐ P ☐ C Other:

Or, explain why this sub-category and its control measures are not applicable

B.3 Stabilization for any inactive period, of any length, 24 hours per day, seven days per week including weekends, after work hours, and holidays

☑ P ☐ C Apply water

☐ P ☑ C Apply and maintain surface gravel or dust suppressant(s) other than water

☐ P ☐ C Cover open storage piles with tarps, plastic or other materials such that wind will not remove the covering(s)

☐ P ☐ C Establish vegetative ground cover (landscaping)

☐ P ☑ C Other: Restore area such that the vegetative ground cover and soil characteristics are similar to adjacent or nearby undisturbed native conditions (desert xeriscaping). This may include applying gravel or decomposed granite.

Or, explain why this sub-category and its control measures are not applicable

B.4 **Permanent Stabilization of Disturbed Surface Areas required within ten days following the completion of the Dust-Generating Operation if finished for a period of 30 days or longer**

- ☐ P ☐ C Pave
- ☐ P ☑ C Apply and maintain gravel, recycled asphalt, or other suitable material
- ☐ P ☑ C Apply and maintain dust suppressant(s) other than water
- ☐ P ☑ C Establish vegetative ground cover (landscaping)
- ☐ P ☑ C Implement above control measures and restrict vehicle access to the area
- ☐ P ☑ C Apply water and prevent access/trespass by:

  (Check all of the following that apply)

  ☐ ditches ☑ fences ☑ berms ☐ shrubs ☐ trees ☐ other
- ☑ P ☐ C Restore area such that the vegetative ground cover and soil characteristics are similar to adjacent or nearby undisturbed native conditions (desert xeriscaping)
- ☐ P ☑ C Other: Any combination of above depending on project requirements.

Or, explain why this sub-category and its control measures are not applicable _____

Category C. Bulk Material Handling

C.1 Off-Site Hauling onto Areas Accessible to the Public

☑ P ■ **Required:** Install, maintain, and use a suitable trackout control device that controls and prevents trackout and/or removes particulate matter from tires and the exterior surfaces of haul trucks and/or motor vehicles that traverse the site

☑ P ■ **Required when a cargo compartment is loaded:** cover haul trucks with a tarp or other suitable closure **AND** load all haul trucks such that the freeboard is not less than 3 inches **AND** load all haul trucks such that at no time shall the highest point of the bulk material be higher than the sides, front, and back of the cargo container area **AND** prevent spillage or loss of bulk material from holes or other openings in the cargo compartment

☑ P ■ **Required when a cargo compartment is empty:** cover haul trucks with a tarp or other suitable closure **OR** clean the interior of the cargo compartment before leaving the site

NOTE: The following options CANNOT be considered for a ***primary*** control measure.

■ ☑ C Apply water to the top of the load

■ ☐ C Apply dust suppressant(s) other than water to the top of the load

■ ☑ C Cease operations

■ ☐ C Other: _____

Or, explain why this sub-category and its control measures are not applicable _____

C.2 Hauling/Transporting within the Boundaries of the Work Site but not crossing an Area Accessible to the Public

☐ P ☑ C Limit vehicle speed to 15 m.p.h. or less while traveling on the work site

☐ P ☑ C Apply water to the top of the load

☐ P ☐ C Apply dust suppressant(s) other than water to the top of the load

☐ P ☐ C Cover haul trucks with a tarp or other suitable closure

■ ☑ C Cease operations, NOTE: This option CANNOT be considered a ***primary*** control measure.

☑ P ☐ C Other: Pre-wet soil prior to cut.

Or, explain why this sub-category and its control measures are not applicable _____

C.3 Hauling/Transporting within the Boundaries of the Work Site and crossing and/or accessing an Area Accessible to the Public

☑ P ■ **Required:** Load all haul trucks such that the freeboard is not less than 3 inches **AND** load all haul trucks such that at no time shall the highest point of the bulk material be higher than the sides, front, and back of the cargo container area **AND** prevent spillage or loss of bulk material from holes or other openings in the cargo compartment **AND** install suitable trackout control device

NOTE: The following options CANNOT be considered for a ***primary*** control measure.

■ ☑ C Cease operations

■ ☐ C Other: _____

Or, explain why this sub-category and its control measures are not applicable NOTE: There is no public access crossing point within the work site. Control measure is selected in case future project need encounters this scenario.

C.4 Bulk Material Stacking, Loading, and Unloading Operations

☑ P ■ **Prior to** stacking, loading, and unloading, **mix** material with water or a dust suppressant other than water
AND
While stacking, loading, and unloading, **apply** water or a dust suppressant other than water to material

NOTE: These following options CANNOT be considered for a ***primary*** control measure.

■ ☑ C Cease operations

■ ☑ C Other: Pre-wet to depth of cut.

Or, explain why this sub-category and its control measures are not applicable _____

C.5 Open Storage Piles

☐ P ☑ C Cover open storage piles with a tarp, plastic, or other material,

☐ P ☑ C Apply water to maintain soil moisture content at a minimum of 12% or maintain at least 70% of the optimum soil moisture content, for areas that have an optimum moisture content for compaction of less than 12%

☑ P ☐ C Maintain a visible crust,

☐ P ☐ C In conjunction with the two measures above, construct and maintain wind barriers, storage silos, or a three-sided enclosure with walls, whose length is no less than equal to the pile length, whose distance from the pile is no more than twice the height of the pile, whose height is equal to the pile height, and whose porosity is no more than 50%

☐ P ☐ C Other: _____

Or, explain why this sub-category and its control measures are not applicable _____

Category D. Trackout, Carry-out, Spillage, and Erosion

D.1 Trackout Control Device

A trackout control device must be installed if a work site has 2 acres or more of disturbed surface area or if a work site has 100 cubic yards of bulk material hauled on-site or off-site per day.

☑ P ■ **Required:** Install at all exits to an area accessible to the public at least one of the following:
(Choose all that apply)

☑ gravel pad ☑ grizzly or rumble grate ☐ wheel wash system ☑ paved area

■ ☑ C Cease operations, NOTE: This option CANNOT be considered a ***primary*** control measure.

☐ P ☑ C Other: Add gravel prior to paved area, if needed.

Or, explain why this sub-category and its control measures are not applicable _____

D.2 Cleaning

Trackout/carry-out must be cleaned up immediately if trackout/carry-out extends a cumulative distance of 25 linear feet or more along an area accessible to the public including curbs, gutters, and sidewalks.

All other trackout/carry-out must be cleaned up no later than the end of the workday (End of Work Day is the end of a working period that may include one or more work shifts. If working 24 hours a day, the end of a working period shall be considered no later than 8:00 p.m.).

☑ P ☐ C Operate a street sweeper or wet broom with sufficient water and at the manufacturer's recommended speed (e.g. kick broom, steel bristle broom, Teflon broom, vacuum)

☐ P ☑ C Manually sweep-up deposits

☐ P ☑ C Other: Operate street sweeper at least once per day as needed and/or manually sweep up deposits at least once per day as needed.

Or, explain why this sub-category and its control measures are not applicable _____

Category E. Weed Abatement by Discing or Blading

E.1 Disturbance Operations

☑ P ■ **Required:** Pre-water site **AND** apply water during weed abatement by discing or blading

NOTE: The following options CANNOT be considered for a ***primary*** control measure.

■ ☑ C Cease operations

■ ☑ C Other: Limit vehicle speed to 15 mph or less during discing or blading operations.

Or, explain why this sub-category and its control measures are not applicable _____

E.2 Stabilization

☐ P ☐ C Pave immediately following weed abatement

☐ P ☐ C Apply gravel

☑ P ☐ C Apply water

☐ P ☑ C Apply dust suppressant(s) other than water

☐ P ☑ C Establish vegetative ground cover (landscaping)

☐ P ☑ C Other: Restore area such that vegetative ground cover and soil characteristics are similar to adjacent or nearby undisturbed native conditions (desert xeriscaping). This may include applying gravel or decomposed granite.

Or, explain why this sub-category and its control measures are not applicable _____

Category F. Blasting Operations

☑ P ■ **Required:** Pre-water **AND** maintain surface soils in a stabilized condition where support equipment and vehicles will operate

☑ P ☐ C Apply water

☐ P ☑ C Apply and maintain dust suppressant(s) other than water

■ ☐ C Other, NOTE: This option CANNOT be considered a ***primary*** control measure. _____

Or, explain why this category and its control measures are not applicable This activity is not done at this time.

Category G. Demolition Activities

☑ P ■ **Required:** Apply water or water in combination with dust suppressant(s) to demolition debris immediately following demolition activity
AND
Required: Apply water or water in combination with dust suppressant(s) to all surrounding areas and to all disturbed soil surfaces immediately following demolition activity

NOTE: The following options CANNOT be considered for a ***primary*** control measure.

■ ☑ C Thoroughly clean debris from paved and other surfaces following demolition activity

■ ☐ C Other: _____

Or, explain why this category and its control measures are not applicable No demolition activities as this time.
Before commencing this activity, a NESHAP notification (asbestos) will be filed with MCAQD.

Category H. Wind-Blown Dust

☑ P ■ **Required:** Ensure that all control measures and requirements of this Dust Control Plan are implemented and the subject violations cannot be prevented by better application, operation, or maintenance of these measures and requirements

☐ P ☑ C Cease operations for the duration of the wind event and stabilize work area by meeting at least one of the following standards:

Maintain a soil crust,
OR
Maintain a threshold friction velocity (TFV) for disturbed surface areas corrected for non-erodible elements of 100 cm/second or higher,
OR
Maintain a vegetative ground cover (landscaping)

☐ P ☐ C Other: _____

Or, explain why this sub-category and its control measures are not applicable _____

Category J. Dust Suppressants other than water

Although water is a dust suppressant, the information required by Category J should not include information on water supply and water application. The information required by Category J is for all other dust suppressants that you use. Fill out the applicable areas in the table below and attach information on environmental impacts and approvals or certifications related to appropriate and safe use for ground application. Also, attach product specification(s) and application sheet(s) or label instructions.

Application Area	Manufacturer Name	Product	Application Frequency *	Intensity**
A Vehicles/Motorized Equipment	Midwest Industrial Supply	Soil Sement	Contingency, as needed	Topical: 0.06 gal/sy undiluted/Heavy Topical: 0.18 gal/sy undiluted.
B Disturbed Surface Areas	Midwest Industrial Supply	Soil Sement	Contingency, as needed	Topical: 0.06 gal/sy undiluted/Heavy Topical: 0.18 gal/sy undiluted.
C Bulk Material Handling				
D Trackout, Carry-out, Spillage, and Erosion				
E Weed Abatement by Discing or Blading	Midwest Industrial Supply	Soil Sement	Contingency, as needed	Topical: 0.06 gal/sy undiluted/Heavy Topical: 0.18 gal/sy undiluted.
F Blasting Operations				
G Demolition Activities				
H Wind Event	Midwest Industrial Supply	Soil Sement	Contingency, as needed	Topical: 0.06 gal/sy undiluted/Heavy Topical: 0.18 gal/sy undiluted.

*How often the surface will receive a complete application of dust suppressant (e.g. 3 times a day)

**The amount used over a period of time (e.g. gallons/minute)

CalCert and California Air Resources Board Certification

CALCERT
INNOVATION ASSURED

The California Environmental Technology Certification Program (CalCert), an internationally recognized independent, scientific and engineering evaluator of environmental performance, and the California Air Resources Board (CARB), one of the world's leading advocates of new environmental technologies, have certified Soil-Sement® performance. These certifications offer users and clients performance assurances when dependability is important and the cost of failure unacceptable.

Pre-certified by the California Air Resources Board

"When topically applied as a dust suppressant in accordance with manufacturer's instructions, including a total target concentration of 0.28 gallons of concentrate per square yard of treated surface applied in multiple passes in a single day, Soil-Sement® reduced PM_{10} emissions by approximately 84 percent after 339 days and 6,780 vehicles (predominantly light-duty) passes on an unpaved roadway consisting of a silty, sandy loam.

Soil-Sement® does not contain detectable levels of polynuclear organic matter which includes polynuclear aromatic hydrocarbons as defined by the Federal Clean Air Act section 112 (b); nor does Soil-Sement® contain detectable levels of fluorinated or brominated compounds that could be expected to contribute to ozone depletion or global warming."

California Environmental Technology Certification

Midwest Industrial Supply, Inc.'s Soil-Sement®

CERTIFIED TECHNOLOGY

For complete Soil-Sement® certification information from CalCert, visit www.calepa.ca.gov/calcert/ or from the California ARB visit www.arb.ca.gov/eopr/matrix.htm or www.soilsement.com.

Evaluation of the Air Quality Performance Claims for the Midwest Industrial Supply, Inc. Soil-Sement® Dust Suppressant, *California Air Resources Board*, Executive Order G-096-029-035.

Maricopa County
Air Quality Department

Return "I" Applications To: One Stop Shop
501 N 44th Street. Suite 200
Phoenix, AZ 85008
Phone (602) 372-1071 Fax (602 372-1078

Dust Control Plan Change

Date. 07/17/12

Permit Number. V03-002

Permit Holder: City of Phoenix SR85 Landfill

Project Name: SR85 Landfill

Project Location: 28361 W. Patterson Road, Buckeye, AZ 85326

Reason for Plan Change. Site boundaries to indicate active area.

Sections Changed (including page # and section name):

1. Dust Control Plan, Section 2, Project Site Drawing/Site Plan
2.
3.
4.
5.

SPECIAL INSTRUCTIONS
Attach the revised dust control plan. A new site plan may be required

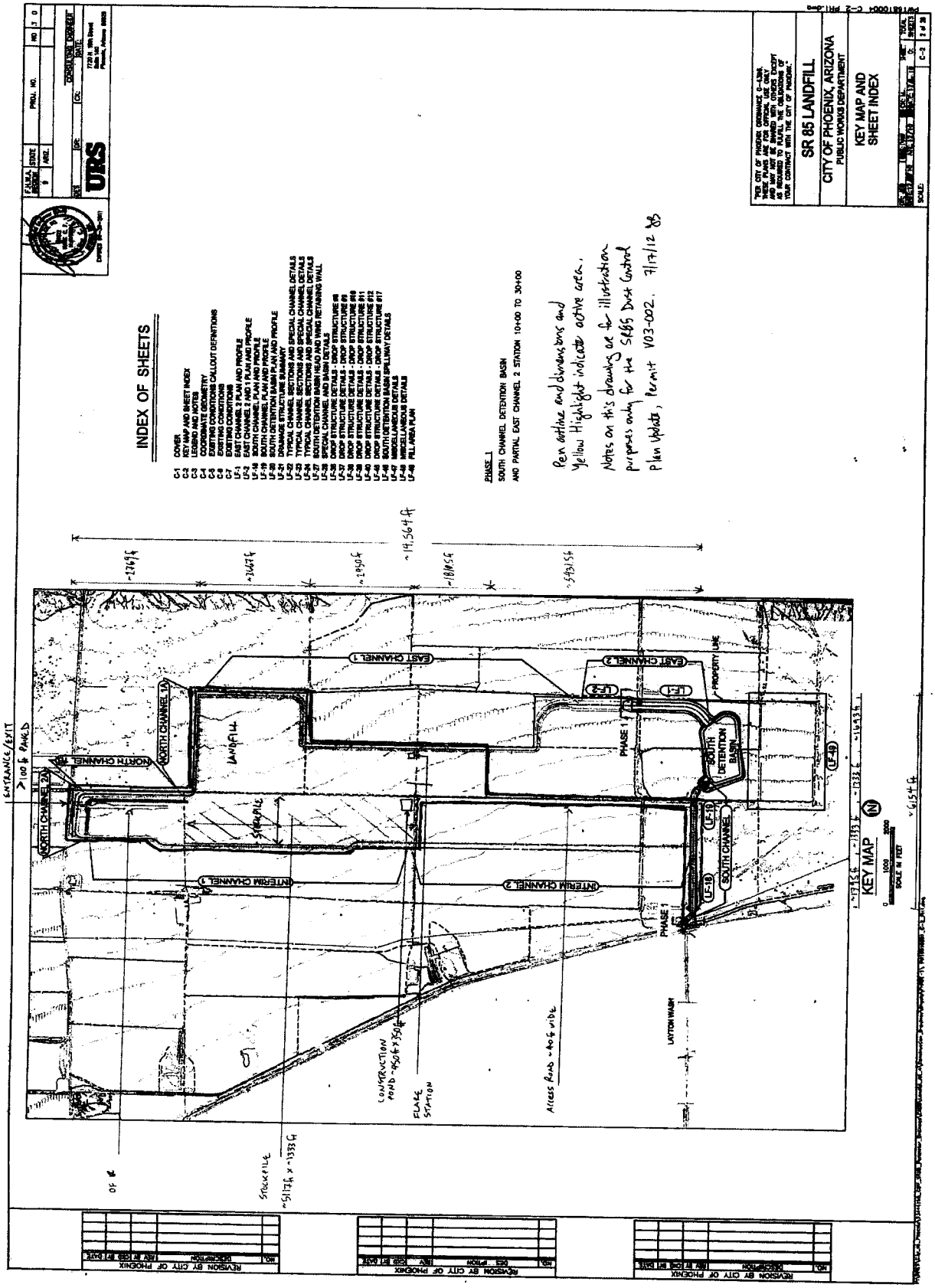
☒ If you would like us to email your permit. (Permits emailed WILL NOT be sent via USPS)

Email Address: joy.bell@phoenix.gov

Requested by(Print): Joy Bell, City of Phoenix, Public Works Department

Signature: Joy Bell Date. 7/17/12

Approved by. Date.


INDEX OF SHEETS
SR 85 LANDFILL
CITY OF PHOENIX, ARIZONA
PUBLIC WORKS DEPARTMENT
KEY MAP AND SHEET INDEX
PHASE 1
SOUTH CHANNEL DETENTION BASIN
AND PARTIAL EAST CHANNEL 2 STATION 10+00 TO 30+00
Pen outline and dimensions and Yellow Highlight indicate active area. Notes on this drawing are for illustration purposes only for the SR85 Dust Control Plan Update, Permit V03-002. 7/17/12
KEY MAP
EAST CHANNEL 1
EAST CHANNEL 2
NORTH CHANNEL 1A
NORTH CHANNEL 2A
NORTH CHANNEL 1
INTERIM CHANNEL 1
INTERIM CHANNEL 2
SOUTH CHANNEL
SOUTH DETENTION BASIN
PROPERTY LINE
LANDFILL
LAYTON WASH
FLARE STATION
ACCESS ROAD
CONSTRUCTION ROAD
STOCKPILE
ENTRANCE/EXIT

Transmission Report

Date/Time	07-17-2008	15:29:13	Transmit Header Text	
Local ID 1	602-534-9278		Local Name 1	COP-PUBLIC WORKS

This document : Confirmed
(reduced sample and details below)
Document size : 8.5"x11"

Maricopa County
Air Quality Department

Return All Applications To: One Stop Shop
501 N 44th Street, Suite 200
Phoenix, AZ 85008
Phone (602) 372-1071 Fax (602) 372-1078

Dust Control Plan Change

Date: 07/17/12

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Attach the revised dust control plan. A new site plan may be required

☒ If you would like us to email your permit. (Permits emailed WILL NOT be sent via USPS)

Email Address: joy.bell@phoenix.gov

Requested by(Print): Joy Bell, City of Phoenix, Public Works Department

Signature: Joy Bell Date: 7/17/12

Approved by: Date:

Total Pages Scanned : 2 Total Pages Confirmed : 2

No.	Job	Remote Station	Start Time	Duration	Pages	Line	Mode	Job Type	Results
001	795	602 3772 1078	15:18:48 07-17-2008	00:07:58	2/2	1	EC	HS	CP14400

Abbreviations:

HS: Host send	PL: Polled local	MP: Mailbox print	CP: Completed	TS: Terminated by system
HR: Host receive	PR: Polled remote	RP: Report	FA: Fail	G3: Group 3
WS: Waiting send	MS: Mailbox save	FF: Fax Forward	TU: Terminated by user	EC: Error Correct

Maricopa County
Air Quality Department

Return request to: Maricopa County Air Quality Department
1001 N Central Ave, Suite 125
Phoenix, AZ 85004
Phone (602) 506-6010 Fax (602) 506-0586
AQPermits@mail.maricopa.gov

DUST CONTROL PLAN CHANGE

Documents may be submitted in person at:
1001 N. Central Ave. Suite 125, Phoenix, AZ 85004 or 501 N. 44th Street, Suite 200, Phoenix, AZ 85008.

Permit Number:	V03-002	Permit Holder:	City of Phoenix SR85 Landfill
Phone:	602-534-8511 - Superintendent 602-256-5605 DCP Preparer	Project Name:	SR85 Landfill
Project Address:	28361 W. Patterson Road	City: Buckeye	State: AZ Zip: 85326
Reason for plan change:	Site boundaries to indicate active area.		

Sections changed (including page # and section name):

1. Section 2, Project Site Drawing/Site Plan
2.
3.
4.
5.

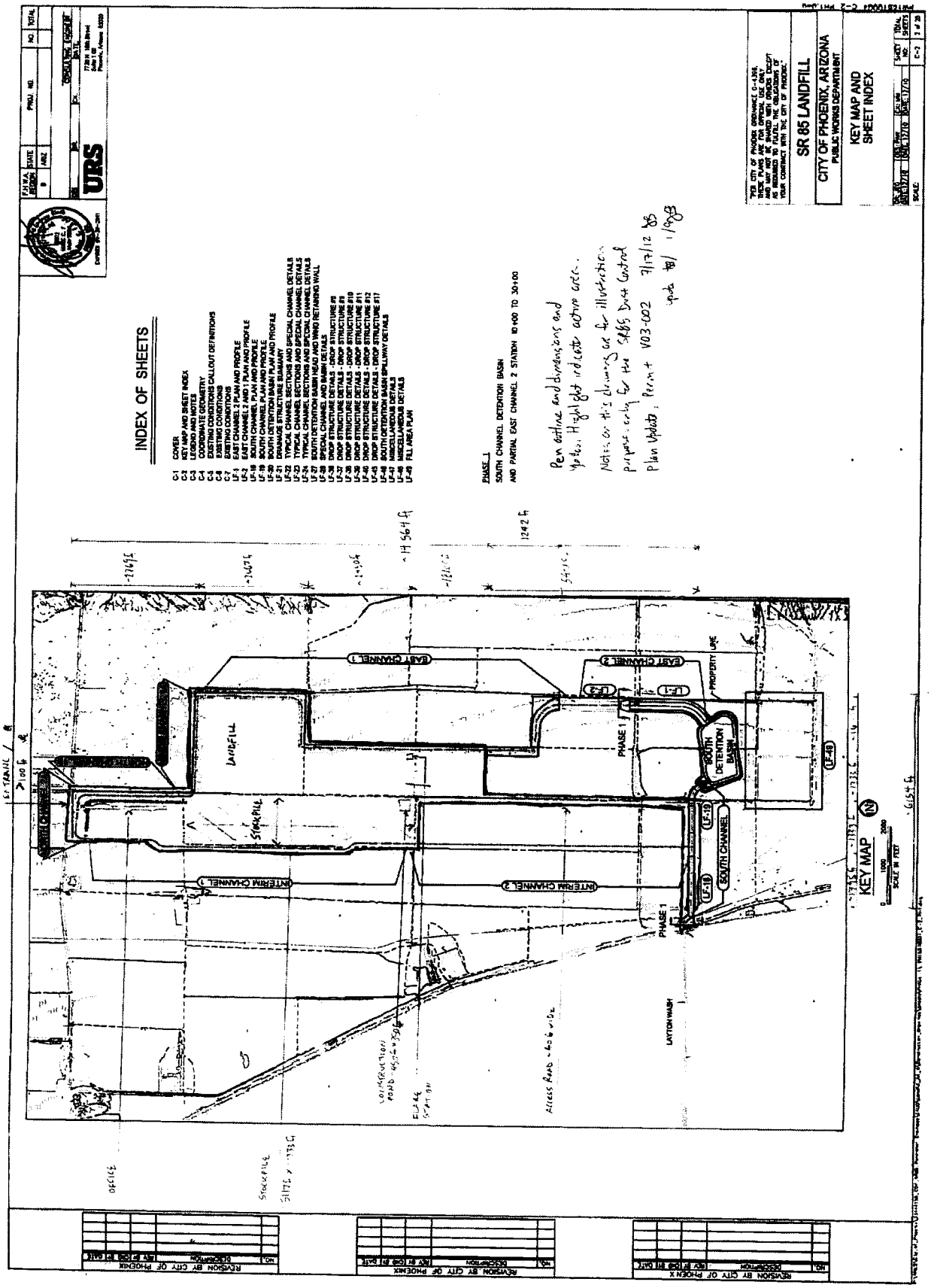
SPECIAL INSTRUCTIONS
Attach the revised dust control plan and a new site plan if necessary.

Certification by the permit holder: I certify that the information provided in this application and accompanying documents is true, correct and complete to the best of my knowledge.

Signature:	Marty Arambel, P.E.	Title:	Project Manager
Email:	marty.arambel@phoenix.gov	Date:	5-9-13

Official Use Only:

Approved By:		Date:	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LAYTON WASH
PROPERTY LINE
Pen outline and dimensions and photos. Highlight indicate active area.
Notes on this drawing are for illustration purposes only for the SR85 Dust Control Plan Update, Permit #V03-002
7/17/12 BB

APPENDIX F

CITY OF PHOENIX STATE ROUTE 85 MUNICIPAL SOLID WASTE LANDFILL
2012 ENCLOSED FLARE SOURCE TESTING SUMMARY SHEETS

SR85 Landfill, 2012 Flare Source Test Results		
Flare ID	NMOC ppmv, as Methane	NMOC ppmv, as Hexane
FL-1	14,367	2,395
FL-2	13,367	2,228
FL-3 *(See note 1)*	13,867	2,311
	Average =	2,311
	LandGEM Input Value =	2,311
(1) The average of FL-1 and FL-2 are used to represent FL-3		

TABLE 1-2
SUMMARY OF TEST RESULTS
BAS AZ
SR85 F1
April 26, 2012

PARAMETER	INLET	EXHAUST	PERMIT LIMIT
O_2, %	0.89	16.35	
CO_2, %	45.45	4.73	
N_2, %	8.73	78.92	
H_20, %	3.16	5.74	
Flow Rate, wscfm	495	11,030	
Flow Rate, dscfm	479	10,260	
Temperature, °F (at the sampling port)	81	1,045	
Temperature, °F (as monitored from the thermocouple)		1,619	>1400
Btu/scf	466.7		
MMBtu/Hr	13.86		18
NOx:			
ppm		7.2	
ppm @ 3% O_2		28.6	
lb/hr (as NO_2)		0.53	
lb/MMBtu (as NO_2)		0.038	0.041
lb/MMCF (as NO_2)		18.53	
CO:			
ppm		33.0	
ppm @ 3% O_2		129.3	
lb/hr		1.47	
lb/MMBtu		0.11	0.13
lb/MMCF		51.11	
Hydrocarbons:			
CH_4, ppm	450,000	29.50	
CH_4, lb/hr	537	0.75	
Destruction Eff. % CH_4		99.86	≥98%
TGNMO, ppm (as CH_4)	14,367	4.43	
TGNMO, lb/hr (as CH_4)	17.2	0.11	
TGNMO, lb/MM Btu (as CH_4)	-	0.008	
TGNMO, lb/day (as CH_4)	411.6	2.70	
TGNMO, ppm (as hexane)		0.74	
TGNMO, ppm @ 3% O_2 (as hexane)		2.88	20
TGNMO, lb/hr (as hexane)		0.10	
Destruction Eff. %		99.34	≥98%
lb/MMCF		3.50	
Total Sulfur Compounds,			
Total Reduced Sulfur Inlet, ppm	89.13		
SOx Exhaust, lb/hr (as SO_2)		0.43	
lb/MMCF		14.81	

Notes:
The results in this table are the averages of all measurements.
Sulfur compounds were colected in triplicate for each flare station.

TABLE 4-1
GENERAL RESULTS
BAS AZ
SR85 F1
April 26, 2012

	INLET				EXHAUST			
Parameter	First Run	Second Run	Third Run	Average	First Run	Second Run	Third Run	Average
O_2, %	0.87	0.70	1.11	0.89	16.12	16.32	16.61	16.35
CO_2, %	45.2	45.6	45.5	45.5	4.96	4.75	4.48	4.73
N_2, %	9.1	8.1	9.1	8.7	78.9	78.9	78.9	78.9
H_2O, %	3.1	3.1	3.2	3.2	5.72	5.97	5.53	5.74
Flow Rate, wscfm	502	499	484	495	10,981	11,248	10,860	11,030
Flow Rate, dscfm	486	484	468	479	9,849	10,352	10,577	10,260
Temperature, °F	77.0	81.0	86.0	81.3	1,031	1,058	1,046	1,045
Btu/scf	462	468	470	467				
MMBtu/Hr	13.92	14.02	13.64	13.86				
NOx:								
ppm					6.83	7.58	7.33	7.24
ppm @ 3% O_2					25.6	29.6	30.6	28.6
lb/hr (as NO_2)					0.48	0.56	0.56	0.53
lb/MM Btu (as NO_2)					0.035	0.040	0.041	0.038
CO:								
ppm					39.8	31.9	27.4	33.0
ppm @ 3% O_2					149.2	124.7	114.2	129.3
lb/hr					1.709	1.439	1.262	1.470
lb/MM Btu					0.123	0.103	0.093	0.106
Hydrocarbons:								
CH_4, ppm	445,000	452,000	453,000	450,000	32.90	22.40	33.20	29.50
CH_4, lb/hr	539.1	544.6	528.3	537.3	0.807	0.578	0.875	0.753
Destruction Eff. % CH_4	-	-	-	-	99.850	99.894	99.834	99.860
TGNMO, ppm (as CH_4)	14,200	14,200	14,700	14,367	5.80	4.40	3.10	4.43
TGNMO, lb/hr (as CH_4)	17.20	17.11	17.14	17.15	0.14	0.11	0.08	0.11
TGNMO, ppm (as hexane)	2,366.7	2,366.7	2,450.0	2,394.4	0.97	0.73	0.52	0.74
TGNMO, ppm @ 3% O_2 (as hexane)	2,115.0	2,097.2	2,216.0	2,142.7	3.62	2.87	2.16	2.88
TGNMO, lb/hr (as hexane)	15.41	15.33	15.36	15.36	0.13	0.10	0.07	0.10
Destruction Eff. %					99.17	99.34	99.52	99.34
Sulfur Compounds:								
H_2S, ppm	49.0	53.0	49.2	50.4				
Carbonyl Sulfide, ppm	< 0.2	< 0.2	< 0.2	< 0.2				
Methyl Mercaptan, ppm	4.86	4.84	4.70	4.80				
Ethyl Mercaptan, ppm	< 0.2	< 0.2	< 0.2	< 0.2				
Dimethyl Sulfide, ppm	33.0	33.0	32.4	32.8				
Carbon Disulfide, ppm	0.20	0.20	0.2	0.2				
isopropyl mercaptan, ppm	0.93	0.92	0.88	0.93				
n-propyl mercaptan, ppm	< 0.2	< 0.2	< 0.2	< 0.2				
Dimethyl Disulfide,ppm	< 0.2	< 0.2	< 0.2	< 0.2				
Total Sulfur Compounds,								
Total Reduced Sulfur Inlet, ppm	88.0	92.0	87.4	89.1				
SOx Exhaust, lb/hr (as SO_2)					0.426	0.443	0.408	0.426

The exhaust volume flow values are based on EPA Method 19.
Sulfur compounds were colected in triplicate for each flare station.

TABLE 1-2
SUMMARY OF TEST RESULTS
BAS AZ
SR85 F2
April 25, 2012

PARAMETER	INLET	EXHAUST	PERMIT LIMIT
O_2, %	1.41	13.96	
CO_2, %	43.25	7.04	
N_2, %	10.11	78.99	
H_20, %	3.38	7.71	
Flow Rate, wscfm	789	11,139	
Flow Rate, dscfm	763	10,460	
Temperature, °F (at the sampling port)	92	1,475	
Temperature, °F (as monitored from the thermocouple)		1,619	>1400
Btu/scf	445.7		
MMBtu/Hr	21.11		42
NOx:			
ppm		11.1	
ppm @ 3% O_2		28.7	
lb/hr (as NO_2)		0.83	
lb/MMBtu (as NO_2)		0.039	0.041
lb/MMCF (as NO_2)		18.15	
CO:			
ppm		37.3	
ppm @ 3% O_2		95.1	
lb/hr		1.68	
lb/MMBtu		0.079	0.13
lb/MMCF		36.70	
Hydrocarbons:			
CH_4, ppm	405,000	1.24	
CH_4, lb/hr	769.4	0.032	
Destruction Eff. % CH_4	-	99.996	≥98%
TGNMO, ppm (as CH_4)	13,367	6.46	
TGNMO, lb/hr (as CH_4)	25.4	0.17	
TGNMO, lb/MM Btu (as CH_4)	-	0.008	
TGNMO, lb/day (as CH_4)	609.6	4.03	
TGNMO, ppm (as hexane)		1.08	
TGNMO, ppm @ 3% O_2 (as hexane)		2.78	20
TGNMO, lb/hr (as hexane)		0.15	
Destruction Eff. %		99.33	≥98%
lb/MMCF		3.29	
Total Sulfur Compounds,			
Total Reduced Sulfur Inlet, ppm	89.13		
SOx Exhaust, lb/hr (as SO_2)		0.68	
lb/MMCF		14.80	

Notes:
The results in this table are the averages of all measurements.
Sulfur compounds were colected in triplicate for each flare station.

TABLE 4-1
GENERAL RESULTS
BAS AZ
SR85 F2
April 25, 2012

	INLET				EXHAUST			
Parameter	First Run	Second Run	Third Run	Average	First Run	Second Run	Third Run	Average
O_2, %	1.40	1.33	1.50	1.41	14.38	13.86	13.65	13.96
CO_2, %	43.1	43.4	43.2	43.2	6.66	7.14	7.33	7.04
N_2, %	10.1	9.8	10.4	10.1	79.0	79.0	79.0	79.0
H_2O, %	3.3	3.4	3.4	3.4	7.61	7.73	7.78	7.71
Flow Rate, wscfm	781	790	797	789	11,224	10,852	11,343	11,139
Flow Rate, dscfm	755	763	769	763	10,997	10,370	10,013	10,460
Temperature, °F	91.0	93.0	93.0	92.3	1,482	1,472	1,472	1,475
Btu/scf	444	449	444	446				
MMBtu/Hr	20.82	21.29	21.22	21.11				
NOx:								
ppm					10.95	11.24	11.07	11.09
ppm @ 3% O_2					30.1	28.6	27.3	28.7
lb/hr (as NO_2)					0.86	0.84	0.79	0.83
lb/MM Btu (as NO_2)					0.041	0.039	0.037	0.039
CO:								
ppm					23.6	30.0	58.5	37.3
ppm @ 3% O_2					64.7	76.3	144.3	95.1
lb/hr					1.130	1.355	2.553	1.679
lb/MM Btu					0.054	0.064	0.120	0.079
Hydrocarbons:								
CH_4, ppm	421,000	400,000	394,000	405,000	1.08	1.02	1.62	1.24
CH_4, lb/hr	792.3	760.5	755.3	769.4	0.030	0.026	0.040	0.032
Destruction Eff. % CH_4	-	-	-	-	99.996	99.997	99.995	99.996
TGNMO, ppm (as CH_4)	13,200	13,000	13,900	13,367	5.97	6.82	6.60	6.46
TGNMO, lb/hr (as CH_4)	24.84	24.72	26.65	25.40	0.16	0.18	0.16	0.17
TGNMO, ppm (as hexane)	2,200.0	2,166.7	2,316.7	2,227.8	1.00	1.14	1.10	1.08
TGNMO, ppm @ 3% O_2 (as hexane)	2,019.5	1,981.8	2,137.5	2,046.3	2.73	2.89	2.71	2.78
TGNMO, lb/hr (as hexane)	22.25	22.14	23.87	22.76	0.15	0.16	0.15	0.15
Destruction Eff. %					99.34	99.29	99.35	99.33
Sulfur Compounds:								
H_2S, ppm	49.0	53.0	49.2	50.40				
Carbonyl Sulfide, ppm	0.20	0.21	0.20	< 0.21				
Methyl Mercaptan, ppm	4.86	4.84	4.70	4.80				
Ethyl Mercaptan, ppm	< 0.2	< 0.2	< 0.2	< 0.20				
Dimethyl Sulfide, ppm	33.0	33.0	32.4	32.80				
Carbon Disulfide, ppm	0.20	0.20	0.2	0.20				
Isoprpyl mercaptan, ppm	0.93	0.92	0.88	0.93				
n-propyl mercaptan, ppm	< 0.2	< 0.2	< 0.2	< 0.20				
Dimethyl Disulfide,ppm	< 0.2	< 0.2	< 0.2	< 0.20				
Total Sulfur Compounds,								
Total Reduced Sulfur Inlet, ppm	88.0	92.0	87.4	89.13				
SOx Exhaust, lb/hr (as SO_2)					0.662	0.700	0.670	0.677

The exhaust volume flow values are based on EPA Method 19.
Sulfur compounds were colected in triplicate for each flare station.

TABLE 1-2
SUMMARY OF TEST RESULTS
BAS AZ
Skunk Creek FS1 F3
April 17, 2012

PARAMETER	INLET		EXHAUST	PERMIT LIMIT
O_2, %	2.76		13.83	
CO_2, %	30.09		6.58	
N_2, %	33.35		79.59	
H_20, %	3.90		6.74	
Flow Rate, wscfm	1,478		16,265	
Flow Rate, dscfm	1,420		15,065	
Temperature, °F (at the sampling port)	101		1,339	
Temperature, °F (as monitored from the thermocouple)			1,474	>1400
Btu/scf	334.7			
MMBtu/Hr	29.68			
NOx:				
ppm			10.2	
ppm @ 3% O_2			25.9	
lb/hr (as NO_2)			1.11	
lb/MMBtu (as NO_2)			0.037	0.041
lb/MMCF (as NO_2)			12.97	
Tons/yr (as NO_2)			4.84	7.2
CO:				
ppm			15.3	
ppm @ 3% O_2			38.8	
lb/hr			1.01	
lb/MMBtu			0.034	0.13
lb/MMCF			11.82	
Tons/yr			4.41	22.8
Hydrocarbons:				
CH_4, ppm	292,667	<	1.00	
CH_4, lb/hr	1,035.7	<	0.04	
Destruction Eff. % CH_4	-	>	99.996	≥98%
TGNMO, ppm (as CH_4)	5,523		7.88	
TGNMO, lb/hr (as CH_4)	19.5		0.30	
TGNMO, lb/MM Btu (as CH_4)	-		0.010	
TGNMO, lb/day (as CH_4)	468.8		7.11	
TGNMO, ppm (as hexane)			1.31	
TGNMO, ppm @ 3% O_2 (as hexane)			3.33	20
TGNMO, lb/hr (as hexane)			0.27	
Destruction Eff. %			98.40	≥98%
lb/MMCF			3.11	
Total Sulfur Compounds,				
Total Reduced Sulfur Inlet, ppm	48.97			
SOx Exhaust, lb/hr (as SO_2)			0.69	
lb/MMCF			8.13	

Notes:
The results in this table are the averages of all measurements.

TABLE 4-1
GENERAL RESULTS
BAS AZ
Skunk Creek FS1 F3
April 17, 2012

	INLET				EXHAUST			
Parameter	First Run	Second Run	Third Run	Average	First Run	Second Run	Third Run	Average
O_2, %	2.96	2.66	2.66	2.76	13.81	13.76	13.91	13.83
CO_2, %	29.7	30.1	30.4	30.1	6.59	6.62	6.54	6.58
N_2, %	33.6	33.4	33.1	33.4	79.6	79.6	79.6	79.6
H_20, %	3.4	4.1	4.2	3.9	6.60	6.70	6.93	6.74
Flow Rate, wscfm	1,470	1,497	1,467	1,478	16,241	16,368	16,187	16,265
Flow Rate, dscfm	1,420	1,436	1,406	1,420	14,756	15,169	15,272	15,065
Temperature, °F	98.0	102.0	104.0	101.3	1,322	1,341	1,353	1,339
Btu/scf	329	335	340	335				
MMBtu/Hr	29.01	30.09	29.94	29.68				
NOx:								
ppm					9.90	10.36	10.46	10.24
ppm @ 3% O_2					25.0	26.0	26.8	25.9
lb/hr (as NO_2)					1.05	1.13	1.14	1.11
lb/MM Btu (as NO_2)					0.036	0.037	0.038	0.037
CO:								
ppm					15.8	14.6	15.7	15.3
ppm @ 3% O_2					39.8	36.6	40.1	38.8
lb/hr					1.015	0.966	1.042	1.008
lb/MM Btu					0.035	0.032	0.035	0.034
Hydrocarbons:								
CH_4, ppm	261,000	311,000	306,000	292,667	< 1	< 1	< 1	< 1
CH_4, lb/hr	923.1	1112.2	1071.7	1035.7	< 0.04	< 0.04	< 0.04	< 0.04
Destruction Eff. % CH_4	-	-	-		> 99.996	> 99.997	> 99.996	> 99.996
TGNMO, ppm (as CH_4)	4,480	5,670	6,420	5,523	7.16	7.83	8.66	7.88
TGNMO, lb/hr (as CH_4)	15.84	20.28	22.48	19.54	0.26	0.30	0.33	0.30
TGNMO, ppm (as hexane)	746.7	945.0	1,070.0	920.6	1.19	1.31	1.44	1.31
TGNMO, ppm @ 3% O_2 (as hexane)	745.0	927.4	1,050.1	907.5	3.01	3.27	3.69	3.33
TGNMO, lb/hr (as hexane)	14.19	18.16	20.14	17.50	0.24	0.27	0.30	0.27
Destruction Eff. %					98.34	98.54	98.31	98.40
Sulfur Compounds:								
H_2S, ppm	30.0	31.1	31.8	30.97				
Carbonyl Sulfide, ppm	< 0.2	< 0.2	< 0.2	< 0.20				
Methyl Mercaptan, ppm	2.37	2.41	2.43	2.40				
Ethyl Mercaptan, ppm	< 0.2	< 0.2	< 0.2	< 0.20				
Dimethyl Sulfide, ppm	15.3	15.4	1.5	10.73				
Carbon Disulfide, ppm	< 0.2	< 0.2	< 0.2	0.20				
Isoprpyl mercaptan, ppm	0.21	0.21	0.21	< 0.21				
n-propyl mercaptan, ppm	< 0.2	< 0.2	< 0.2	< 0.20				
Dimethyl Disulfide,ppm	< 0.2	< 0.2	< 0.2	0.20				
Total Sulfur Campounds,								
Total Reduced Sulfur Inlet, ppm	47.9	49.1	49.9	48.97				
SOx Exhaust, lb/hr (as SO_2)					0.678	0.702	0.699	0.693

The exhaust volume flow values are based on EPA Method 19.
Sulfur compounds were colected in triplicate for each flare station.

SUMMARY OF FLOW RATE SOURCE TEST DATA AND CALCULATIONS

Date:	April 26, 2012
Facility:	BAS AZ
Source I.D./Condition	SR85 F18

MEASURED SOURCE PARAMETERS	SYMBOL	UNITS	RUN 1	RUN 2	RUN 3	AVERAGE
STACK DIAMETER	Ds	IN	76.00	76.00	76.00	76.00
STACK AREA	Ds	FT^2	31.50	31.50	31.50	31.50
BAROMETERIC PRESSURE	Pbar	IN. Hg	29.10	29.10	29.10	29.10
STATIC PRESSURE	Pstat	IN. H2O	-0.05	-0.05	-0.05	-0.05
STACK PRESSURE	Ps	IN. Hg	29.10	29.10	29.10	29.10
AVERAGE STACK TEMPERATURE	Ts	DEG. F	1030.8	1058.3	1046.2	1045.1
AVERAGE SQ. ROOT VELOCITY PRESSURE	dP	IN. H2O	0.0744	0.1627	0.1527	0.1299
SAMPLING PARAMETERS						
STANDARD TEMPERATURE	Tstd	DEG. F	68.0	68.0	68.0	68.0
STANDARD PRESSURE	Pstd	IN. Hg	29.92	29.92	29.92	29.92
PERCENT CARBON DIOXIDE	CO2	%	4.96	4.75	4.48	4.73
PERCENT OXYGEN	O2	%	16.12	16.32	16.61	16.35
PITOT CORRECTION FACTOR	Cp		0.840	0.840	0.840	0.840
SAMPLING TIME	t	MIN.	60.0	60.0	60.0	60.0
GAS VOLUME SAMPLED	Vm	DCF	46.129	46.449	46.525	46.368
WATER VAPOR COLLECTED	Vlc	GRAMS	56.3	57.0	53.5	55.6
DRY GAS METER CORRECTION FACTOR	Y		0.9810	0.9810	0.9810	0.9810
DRY GAS METER TEMPERATURE	Tm	DEG. F	72.8	94.1	85.5	84.1
ORIFICE PRESSURE	dH	IN. H2O	1.500	1.500	1.500	1.500
CALCULATED RESULTS						
CORRECTED GAS VOLUME SAMPLED	Vmstd	DSCF	43.785	42.391	43.129	43.102
VOLUME OF WATER CONDENSED	Vwstd	SCF	2.66	2.69	2.53	2.62
MOISTURE CONTENT OF FLUE GAS	Bws	%	5.72	5.97	5.53	5.74
DRY MOLECULAR WEIGHT OF FLUE GAS	MWdry	lb/lb-mol	29.44	29.41	29.38	29.41
WET MOLECULAR WEIGHT OF FLUE GAS	MWwet	lb/lb-mol	28.78	28.73	28.75	28.76
FLUE GAS VELOCITY	Vs	ft/sec	7.13	15.75	14.71	12.53
FLUE GAS FLOW RATE (ACTUAL CONDITIONS)	ACFM	ACFM	13,469	29,768	27,811	23,682
FLUE GAS FLOW RATE (STD WET CONDITIONS)	SCFM	SCFM	4,639	10,067	9,481	8,062
FLUE GAS FLOW RATE (STD DRY CONDITIONS)	SDCFM	SDCFM	4,374	9,466	8,957	7,599
FLUE GAS FLOW RATE (CALCULATED)	SDCFM	SDCFM	9,849	10,352	10,577	10,260

Note: NA = Not Applicable for the test program.

SUMMARY OF FLOW RATE SOURCE TEST DATA AND CALCULATIONS

Date:	April 25, 2012					
Facility:	BAS AZ					
Source I.D./Condition	SR85 F42					
MEASURED SOURCE PARAMETERS	**SYMBOL**	**UNITS**	**RUN 1**	**RUN 2**	**RUN 3**	**AVERAGE**
STACK DIAMETER	Ds	IN	106.00	106.00	106.00	106.00
STACK AREA	Ds	FT^2	61.28	61.28	61.28	61.28
BAROMETERIC PRESSURE	Pbar	IN. Hg	29.10	29.10	29.10	29.10
STATIC PRESSURE	Pstat	IN. H2O	-0.05	-0.05	-0.05	-0.05
STACK PRESSURE	Ps	IN. Hg	29.10	29.10	29.10	29.10
AVERAGE STACK TEMPERATURE	Ts	DEG. F	1481.8	1472.2	1472.1	1475.4
AVERAGE SQ. ROOT VELOCITY PRESSURE	dP	IN. H2O	0.0762	0.0744	0.0762	0.0756
SAMPLING PARAMETERS						
STANDARD TEMPERATURE	Tstd	DEG. F	68.0	68.0	68.0	68.0
STANDARD PRESSURE	Pstd	IN. Hg	29.92	29.92	29.92	29.92
PERCENT CARBON DIOXIDE	CO2	%	6.66	7.14	7.33	7.04
PERCENT OXYGEN	O2	%	14.38	13.86	13.65	13.96
PITOT CORRECTION FACTOR	Cp		0.840	0.840	0.840	0.840
SAMPLING TIME	t	MIN.	60.0	60.0	60.0	60.0
GAS VOLUME SAMPLED	Vm	DCF	46.541	46.632	46.323	46.499
WATER VAPOR COLLECTED	Vlc	GRAMS	74.6	75.5	75.7	75.3
DRY GAS METER CORRECTION FACTOR	Y		0.9810	0.9810	0.9810	0.9810
DRY GAS METER TEMPERATURE	Tm	DEG. F	90.4	94.1	93.3	92.6
ORIFICE PRESSURE	dH	IN. H2O	1.500	1.500	1.500	1.500
CALCULATED RESULTS						
CORRECTED GAS VOLUME SAMPLED	Vmstd	DSCF	42.758	42.558	42.340	42.552
VOLUME OF WATER CONDENSED	Vwstd	SCF	3.52	3.56	3.57	3.55
MOISTURE CONTENT OF FLUE GAS	Bws	%	7.61	7.73	7.78	7.71
DRY MOLECULAR WEIGHT OF FLUE GAS	MWdry	lb/lb-mol	29.64	29.70	29.72	29.69
WET MOLECULAR WEIGHT OF FLUE GAS	MWwet	lb/lb-mol	28.75	28.79	28.81	28.78
FLUE GAS VELOCITY	Vs	ft/sec	8.34	8.11	8.31	8.25
FLUE GAS FLOW RATE (ACTUAL CONDITIONS)	ACFM	ACFM	30,654	29,823	30,549	30,342
FLUE GAS FLOW RATE (STD WET CONDITIONS)	SCFM	SCFM	8,106	7,925	8,119	8,050
FLUE GAS FLOW RATE (STD DRY CONDITIONS)	SDCFM	SDCFM	7,489	7,313	7,487	7,430
FLUE GAS FLOW RATE (CALCULATED)	SDCFM	SDCFM	10,995	10,370	10,013	10,459

Note: NA = Not Applicable for the test program.

SUMMARY OF FLOW RATE SOURCE TEST DATA AND CALCULATIONS

Date:	April 17, 2012
Facility:	BAS AZ
Source I.D./Condition	Skunk Creek FS1 F3

MEASURED SOURCE PARAMETERS	SYMBOL	UNITS	RUN 1	RUN 2	RUN 3	AVERAGE
STACK DIAMETER	Ds	IN	106.00	106.00	106.00	106.00
STACK AREA	Ds	FT^2	61.28	61.28	61.28	61.28
BAROMETERIC PRESSURE	Pbar	IN. Hg	28.70	28.70	28.70	28.70
STATIC PRESSURE	Pstat	IN. H2O	-0.03	-0.03	-0.03	-0.03
STACK PRESSURE	Ps	IN. Hg	28.70	28.70	28.70	28.70
AVERAGE STACK TEMPERATURE	Ts	DEG. F	1322.4	1340.6	1353.3	1338.7
AVERAGE SQ. ROOT VELOCITY PRESSURE	dP	IN. H2O	0.1431	0.1482	0.1463	0.1459
SAMPLING PARAMETERS						
STANDARD TEMPERATURE	Tstd	DEG. F	68.0	68.0	68.0	68.0
STANDARD PRESSURE	Pstd	IN. Hg	29.92	29.92	29.92	29.92
PERCENT CARBON DIOXIDE	CO2	%	6.59	6.62	6.54	6.58
PERCENT OXYGEN	O2	%	13.81	13.76	13.91	13.83
PITOT CORRECTION FACTOR	Cp		0.840	0.840	0.840	0.840
SAMPLING TIME	t	MIN.	60.0	60.0	60.0	60.0
GAS VOLUME SAMPLED	Vm	DCF	47.521	47.424	47.737	47.561
WATER VAPOR COLLECTED	Vlc	GRAMS	64.3	64.5	66.9	65.2
DRY GAS METER CORRECTION FACTOR	Y		0.9810	0.9810	0.9810	0.9810
DRY GAS METER TEMPERATURE	Tm	DEG. F	91.9	97.7	101.5	97.0
ORIFICE PRESSURE	dH	IN. H2O	1.500	1.500	1.500	1.500
CALCULATED RESULTS						
CORRECTED GAS VOLUME SAMPLED	Vmstd	DSCF	42.945	42.414	42.403	42.587
VOLUME OF WATER CONDENSED	Vwstd	SCF	3.04	3.04	3.16	3.08
MOISTURE CONTENT OF FLUE GAS	Bws	%	6.60	6.70	6.93	6.74
DRY MOLECULAR WEIGHT OF FLUE GAS	MWdry	lb/lb-mol	29.61	29.61	29.60	29.61
WET MOLECULAR WEIGHT OF FLUE GAS	MWwet	lb/lb-mol	28.84	28.83	28.80	28.82
FLUE GAS VELOCITY	Vs	ft/sec	15.08	15.70	15.56	15.45
FLUE GAS FLOW RATE (ACTUAL CONDITIONS)	ACFM	ACFM	55,443	57,742	57,204	56,796
FLUE GAS FLOW RATE (STD WET CONDITIONS)	SCFM	SCFM	15,753	16,241	15,977	15,990
FLUE GAS FLOW RATE (STD DRY CONDITIONS)	SDCFM	SDCFM	14,713	15,153	14,869	14,912
FLUE GAS FLOW RATE (CALCULATED)	SDCFM	SDCFM	14,756	15,169	15,272	15,065

Note: NA = Not Applicable for the test program.