

Bay Area Air Quality Management District

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**Permit Evaluation
and
Statement of Basis
for
RENEWAL of**

MAJOR FACILITY REVIEW PERMIT

for

City of Palo Alto Landfill

Facility #A2721

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Application: 28392

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Title V Statement of Basis for MFR Permit Renewal
City of Palo Alto Landfill
Plant #A2721
Application # 28392

A. BACKGROUND

This facility is subject to the Operating Permit requirements of Title V of the federal Clean Air Act, Part 70 of Title 40 of the Code of Federal Regulations (CFR), and BAAQMD Regulation 2, Rule 6, Major Facility Review because it is a designated facility as defined by BAAQMD Regulation 2-6-204. The Emission Guidelines for Municipal Solid Waste Landfills (40 CFR Part 60, Subpart Cc) require the owner or operator of a landfill that is subject to this part and that has a design capacity of greater than or equal to 2.5 million megagrams and 2.5 million cubic meters to obtain an operating permit pursuant to Part 70. As discussed in more detail below in Section C.IV. of this report, this facility is subject to these emission guidelines and meets the designated facility criteria listed in 40 CFR § 60.32c(c).

Major Facility Operating Permits (Title V permits) must meet specifications contained in 40 CFR Part 70 as contained in BAAQMD Regulation 2, Rule 6, Major Facility Review (MFR). The permits must contain all “applicable requirements” (as defined in BAAQMD Regulation 2-6-202), monitoring requirements, recordkeeping requirements, and reporting requirements. The permit holders must submit reports of all monitoring at least every six months and compliance certifications at least every year.

In the Bay Area, state and District requirements are also applicable requirements and are included in the permit. These requirements can be federally enforceable or non-federally enforceable. All applicable requirements are contained in Sections I through VI of the permit.

Each facility in the Bay Area is assigned a facility identifier that consists of a letter and a 4-digit number. This identifier is also considered to be the identifier for the permit. The identifier for this facility is A2721.

This facility received its initial Title V permit on December 4, 2003. A minor permit revision was issued on April 9, 2004 under A/N 2230 and on October 13, 2004 under A/N 9783. Additionally, administrative amendments were issued on August 2, 2006 for A/N 14875 and on August 28, 2007 for A/N 15698. The Title V renewal (A/N 18263) was issued on June 4, 2012, and minor revision (A/N 26066) was issued on January 13, 2016. This application (A/N 28392) is for a Title V permit renewal. Although the current permit expired on June 3, 2017, it continues in force until the District takes final action on the permit renewal.

Pursuant to Regulation 2, Rule 6, section 416, the District has reviewed the terms and conditions of this Major Facility Review permit and determined that they are still valid and correct. This review included an analysis of all applicability determinations for all sources, including those

that have been modified or permitted since the issuance of the initial Major Facility Review Permit. The review also included an assessment of the sufficiency of all monitoring for determination of compliance with applicable requirements. The statements of basis for permit revisions that have occurred since the initial Major Facility Review permit was issued are hereby incorporated by reference and are available upon request. The proposed permit shows all changes to the permit in strikeout/underline format. These changes are discussed in this Statement of Basis.

B. FACILITY DESCRIPTION

The City of Palo Alto owns and operates the Palo Alto Landfill Facility located at Byxbee Park adjacent to San Francisco Bay marshland and the Palo Alto Flood Basin. The site includes the following permitted equipment: S-1 Palo Alto Landfill with Gas Collection System abated by A-10 Landfill Gas Flare. In addition, this site includes a composting operation, which is being permitted in a separate application.

The Palo Alto Landfill is now an inactive Class III Solid Waste Disposal Site. The site began accepting waste for open burning operations in the 1930s. Beginning in 1954, open burning ceased and landfilling began. Much of the older landfill areas were filled in marsh areas or the bay to extend the bay front land. After 1974, refuse was placed on top of existing refuse and raised the landfill height to 30 to 60 feet above grade. The refuse footprint occupies about 126 acres of the 136-acre disposal site. The total refuse depth varies down to about 75 feet. The maximum design capacity of the Palo Alto Landfill is about 7,759,000 yd³ (total of all materials in the landfill) and 5,830,000 tons of solid waste. The landfill contained 4,720,000 tons of solid waste as of December 31, 2010 and stopped receiving municipal solid waste in July 2011. The final cumulative amount of solid waste in the landfill is estimated to be 4.74 million tons. All of this waste is assumed to be decomposable materials. The facility is still accepting green waste, which will be processed, composted, mixed with clean soil, and used as final cover and landscaping material at the landfill.

The landfill is equipped with an active gas collection system. The landfill gas can be vented to an enclosed flare (A-10, 9 MM BTU/hour capacity) or to sludge incinerators (S-1 and S-2) that are operated by the Palo Alto Regional Water Quality Control Plant #A0617. During the November 2013 source test, gas collection was maximized and was 224.7 scfm of landfill gas at 44.4% methane.

NSR Change of Conditions A/N 26538 was submitted since last renewal. The application allowed up to 24 leachate collection wells to be connected to the GCCS, allowed up to 20 vertical LGF collection wells to be decommissioned and not replaced. In August 2011, the District issued the Change of Conditions for S-1 to install 27 new vertical wells and the Authority to Construct for A-10, a 12 MM BTU/hour enclosed landfill gas flare that could handle up to 400 scfm of landfill gas under NSR A/N 22543. This A/C was renewed for an additional 2 years in August 2013. Based on a re-evaluation of the projected gas generation rates for this landfill, the facility decided that an even smaller flare would meet their needs for this landfill. The City subsequently installed a 9 MM BTU/hour enclosed flare with a maximum capacity of

300 scfm of landfill gas. The District issued Permit to Operate this 9 MMBtu flare on March 13, 2014. Title V Minor Revision A/N 26066 was issued in January 13, 2016 which reflected the new landfill gas Flare A-10 and the well changes. The resulting changes in source descriptions, applicable requirements, permit conditions, and emission limits were identified in the A/N 26066 minor revision.

There have been no other NSR applications or equipment changes since the last permit renewal, and no substantive changes to any applicable requirements. This renewal permit includes administrative amendments and minor updates to standard conditions and generally applicable requirements.

**Table 1. 2016 Facility Emissions
Site #A2721, City of Palo Alto Landfill**

Source Number/Description	Emissions (tons/year)				
	PM10	VOC	NO _x	SO ₂	CO
S-1, Landfill with Gas Collection System	0	20.517	0.037	0	0
A-10, Enclosed LFG Flare	0.2	2.194	2.063	10.0	6.8
Total Facility Emissions	0.2	20.7	2.1	10.0	6.8

C. PERMIT CONTENT

The legal and factual basis for the permit follows. The permit sections are described in the order presented in the permit. Routine changes to the standard permit text in Section I “Standard Conditions”, Section III “Generally Applicable Requirements”, and Section XI “Glossary” are not considered part of the Title V permit renewal process, but may be made at the discretion of the District during the term of this permit.

Changes to Permit, Title Page:

- The BAAQMD address and Engineering contact information were updated.

I. Standard Conditions

This section contains administrative requirements and conditions that apply to all facilities. If the Title IV (Acid Rain) requirements for certain fossil-fuel fired electrical generating facilities or the accidental release (40 CFR § 68) programs apply, the section will contain a standard condition pertaining to these programs. This permit does not include Title IV or accidental release provisions.

Many of these conditions derive from 40 CFR § 70.6, Permit Content, which dictates certain standard conditions that must be placed in the permit. The language that the District has developed for many of these requirements has been adopted into the BAAQMD Manual of Procedures, Volume II, Part 3, Section 4, and therefore must appear in the permit.

The standard conditions also contain references to BAAQMD Regulation 1 and Regulation 2. These are the District's General Provisions and Permitting rules.

Changes to Permit, Section I:

- The District updated the dates of adoption and approval of several rules in Standard Condition I.A.
- The District removed SIP Regulation 2, Rules 1 and 2 from Section I.A.
- The BAAQMD address information was updated in Section I.F
- US EPA address information was updated in Section I.G.

II. Equipment

This section of the permit lists all permitted or significant sources. Each source is identified by an S and a number (e.g., S24). Permitted sources are those sources that require a BAAQMD operating permit pursuant to BAAQMD Rule 2-1-302. Each of the permitted sources has previously been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. These permits are issued in accordance with state law and the District's regulations. The capacities in the permitted sources table are the maximum allowable capacities for each source, pursuant to Standard Condition I.J and Regulation 2-1-403. The permitted sources are listed in Table II-A.

Significant sources are those sources that have a potential to emit of more than 2 tons per year of a "regulated air pollutant" (as defined in BAAQMD Rule 2-6-222) or 400 pounds per year of a "hazardous air pollutant" (as defined in BAAQMD Rule 2-6-210). This facility has no unpermitted significant sources.

All abatement (control) devices that control permitted or significant sources are listed in Table II-B. Each abatement device whose primary function is to reduce emissions is identified by an A and a number (e.g., A-24). If a source is also an abatement device, such as when an engine abates VOC emissions, it will be listed in the abatement device table but will have an "S" number. An abatement device may also be a source (such as a thermal oxidizer that burns fuel) of secondary emissions. If the primary function of a device is to control emissions, it is considered an abatement (or "A") device. If the primary function of a device is a non-control function, the device is a source (or "S").

The District may include an exempt equipment list in this section to clarify the status of various sources and operations. Table II-C will identify any equipment or operations that are located at this facility but that are exempt from Title V permitting requirements. Typically, this table will include equipment or operations that are exempt from the District requirement to have a permit to operate pursuant to BAAQMD Regulation 2, Rule 1, Sections 103, 105, or 113-128 and that

are not significant sources. However, it may also include equipment or operations that are required to have a District permit to operate but that are exempt from BAAQMD Regulation 2, Rule 6, Major Facility Review pursuant to Regulation 2, Rule 6, Sections 110-114. The applicable exemption will be identified in Table II-C. Although equipment listed in Table II-C is not required to be identified in the Title V permit, this exempt equipment must still comply with any applicable District, state, or federal regulations.

The equipment section is part of the facility description. It contains information that is necessary for applicability determinations, such as fuel types, contents or sizes of tanks, etc. This information is part of the factual basis of the permit.

Following is a summary of the differences in the equipment list between the time that the Title V permit was last revised (January 2016) and the permit proposal date.

Changes to Permit, Section II:

- None

III. Generally Applicable Requirements

This section of the permit lists requirements that generally apply to all sources at a facility including insignificant sources and portable equipment that may not require a District permit. If a generally applicable requirement applies specifically to a source that is permitted or significant, the standard will also appear in Section IV and the monitoring for that requirement will appear in Sections IV and VII of the permit. Parts of this section apply to all facilities (e.g., particulate, architectural coating, odorous substance, and sandblasting standards). In addition, standards that apply to insignificant or unpermitted sources at a facility (e.g., refrigeration units that use more than 50 pounds of an ozone-depleting compound) are placed in this section.

Unpermitted sources are exempt from normal District permits pursuant to an exemption in BAAQMD Regulation 2, Rule 1. They may, however, be specifically described in a Title V permit if they are considered “significant sources” as defined in BAAQMD Rule 2-6-239.

Changes to Permit, Section III:

- The District updated several rule amendment dates and added a new BAAQMD rule: Regulation 11, Rule 18.

IV. Source-Specific Applicable Requirements

This section of the permit lists the applicable requirements that apply to permitted or significant sources. These applicable requirements are contained in tables that pertain to one or more sources that have the same requirements. The order of the requirements is:

- District Rules
- SIP Rules (if any) are listed following the corresponding District rules. SIP rules are District rules that have been approved by EPA for inclusion in the California State Implementation

Plan. SIP rules are “federally enforceable” and a “Y” (yes) indication will appear in the “Federally Enforceable” column. If the SIP rule is the current District rule, separate citation of the SIP rule is not necessary and the “Federally Enforceable” column will have a “Y” for “yes”. If the SIP rule is not the current District rule, the SIP rule or the necessary portion of the SIP rule is cited separately after the District rule. The SIP portion will be federally enforceable; the non-SIP version will not be federally enforceable, unless EPA has approved it through another program.

- Other District requirements, such as the Manual of Procedures, as appropriate.
- Federal requirements (other than SIP provisions)
- California requirements (such as ATCMs)
- BAAQMD permit conditions. The text of BAAQMD permit conditions is found in Section VI of the permit.
- Federal permit conditions. The text of Federal permit conditions, if any, is found in Section VI of the permit.

Section IV of the permit contains citations to all of the applicable requirements. The text of the requirements is found in the regulations, which are readily available on the District or EPA websites, or in the permit conditions, which are found in Section VI of the permit. All monitoring requirements are cited in Section IV. Section VII is a cross-reference between the limits and monitoring requirements. A discussion of monitoring is included in Section C.VII of this permit evaluation/statement of basis.

Changes to permit, Section IV:

- None

V. Schedule of Compliance

A schedule of compliance is required in all Title V permits pursuant to BAAQMD Regulation 2-6-409.10 which provides that a major facility review permit shall contain the following information and provisions:

“409.10A schedule of compliance containing the following elements:

- 10.1 A statement that the facility shall continue to comply with all applicable requirements with which it is currently in compliance;
- 10.2 A statement that the facility shall meet all applicable requirements on a timely basis as requirements become effective during the permit term; and
- 10.3 If the facility is out of compliance with an applicable requirement at the time of issuance, revision, or reopening, the schedule of compliance shall contain a plan by which the facility will achieve compliance. The plan shall contain deadlines for each item in the plan. The schedule of compliance shall also contain a requirement for submission of progress reports by the facility at least every six months. The progress reports shall contain the dates by which each item in the plan was achieved and an explanation of why any dates in the schedule of compliance were not or will not be met, and any preventive or corrective measures adopted.”

Since the District has not determined that the facility is out of compliance with an applicable requirement, the schedule of compliance for this permit contains only sections 2-6-409.10.1 and 2-6-409.10.2.

Changes to Permit, Section V:

- The District is not proposing any changes to this section.

VI. Permit Conditions

During the Title V permit development, the District has reviewed the existing permit conditions, deleted the obsolete conditions, and, as appropriate, revised the conditions for clarity and enforceability. Each permit condition is identified with a unique numerical identifier, up to five digits.

When necessary to meet Title V requirements, additional monitoring, recordkeeping, or reporting requirements have been added to the permit.

All changes to existing permit conditions are clearly shown in “strike-out/underline” format in the proposed permit. When the permit is issued, all “strike-out” language will be deleted and all “underline” language will be retained, subject to consideration of comments received.

The existing permit conditions are derived from previously issued District Authorities to Construct (A/C) or Permits to Operate (P/O). Permit conditions may also be imposed or revised as part of the annual review of the facility by the District pursuant to California Health and Safety Code (H&SC) § 42301(e), through a variance pursuant to H&SC § 42350 *et seq.*, an order of abatement pursuant to H&SC § 42450 *et seq.*, or as an administrative revision initiated by District staff. After issuance of the Title V permit, permit conditions will be revised using the procedures in Regulation 2, Rule 6, Major Facility Review.

Conditions that are obsolete or that have no regulatory basis may be deleted from the permit. Conditions may also be deleted due to the following reasons:

- Redundancy in recordkeeping requirements.
- Redundancy in other conditions, regulations and rules.
- The condition has been superseded by other regulations and rules.
- The equipment has been taken out of service or is exempt.
- The event has already occurred (i.e. initial or start-up source tests).

The regulatory basis is listed following each condition. The regulatory basis may be a rule or regulation. The District is also using the following terms for regulatory basis:

- BACT: This term is used for a condition imposed by the Air Pollution Control Officer (APCO) to ensure compliance with the Best Available Control Technology in Regulation 2-2-301.

- **Cumulative Increase:** This term is used for a condition imposed by the APCO that limits a source's operation to the operation described in the permit application pursuant to BAAQMD Regulation 2-1-403.
- **Offsets:** This term is used for a condition imposed by the APCO to ensure compliance with the use of offsets for the permitting of a source or with the banking of emissions from a source pursuant to Regulation 2, Rules 2 and 4.
- **PSD:** This term is used for a condition imposed by the APCO to ensure compliance with a Prevention of Significant Deterioration permit issued pursuant to Regulation 2, Rule 2.
- **TRMP:** This term is used for a condition imposed by the APCO to ensure compliance with limits that arise from the District's Toxic Risk Management Policy. This policy was replaced by Regulation 2, Rule 5 in 2005.

Parameter monitoring has been added for each abatement device. Additional monitoring has been added, where appropriate, to assure compliance with the applicable requirements.

Changes to Permit, Section VI:

- None

VII. Applicable Limits and Compliance Monitoring Requirements

This section of the permit is a summary of numerical limits and related monitoring requirements for each source. The summary includes a citation for each monitoring requirement, frequency of monitoring, and type of monitoring. The applicable requirements for monitoring are completely contained in Sections IV, Source-Specific Applicable Requirements, and VI, Permit Conditions, of the permit.

The District has reviewed all monitoring and has determined the existing monitoring is adequate with the following exceptions.

The tables below contain only the federally enforceable limits for which there is no monitoring or inadequate monitoring in the applicable requirements. The District has examined the monitoring for other limits and has determined that monitoring is adequate to provide a reasonable assurance of compliance. Calculations for potential to emit will be provided in the discussion when no monitoring is proposed due to the size of a source.

Monitoring decisions are typically the result of a balancing of several different factors including: 1) the likelihood of a violation given the characteristics of normal operation, 2) degree of variability in the operation and in the control device, if there is one, 3) the potential severity of impact of an undetected violation, 4) the technical feasibility and probative value of indicator monitoring, 5) the economic feasibility of indicator monitoring, and 6) whether there is some other factor, such as a different regulatory restriction applicable to the same operation, that also provides some assurance of compliance with the limit in question.

These factors are the same as those historically applied by the District in developing monitoring for applicable requirements. It follows that, although Title V calls for a re-examination of all

monitoring, there is a presumption that these factors have been appropriately balanced and incorporated in the District’s prior rule development and/or permit issuance. It is possible that, where a rule or permit requirement has historically had no monitoring associated with it, no monitoring may still be appropriate in the Title V permit if, for instance, there is little likelihood of a violation. Compliance behavior and associated costs of compliance are determined in part by the frequency and nature of associated monitoring requirements. As a result, the District will generally revise the nature or frequency of monitoring requirements only when it can support a conclusion that existing monitoring is inadequate.

The tables below list only the emission limits for which there is no monitoring in the applicable requirements. For each emission limit without corresponding monitoring, the analysis of the individual source compliance status has been documented. If a determination of inadequate monitoring was found, additional monitoring would be proposed through this permit renewal. However, in the cases identified below, no additional monitoring is being recommended for the reasons identified. The District has examined the monitoring for all other emission limits and has determined that monitoring is adequate to provide a reasonable assurance of compliance.

SO₂ Emission Limit with No Associated Monitoring

# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
A-10 Landfill Gas Flare	BAAQMD 9-1-301	Property Line Ground Level SO ₂ Limits: ≤ 0.5 ppm for 3 minutes and ≤ 0.25 ppm for 60 minutes and ≤ 0.05 ppm for 24 hours	None

H₂S Emission Limits with No Associated Monitoring

# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
S-1 City of Palo Alto Landfill and A-10 Landfill Gas Flare	BAAQMD 9-2-301 (not a federally enforceable limit)	Property Line Ground Level Limits: ≤ 0.06 ppm for 3 minutes, AND ≤ 0.03 ppm for 60 minutes	NONE

SO₂ Discussion:

Burning of fuel that contains sulfur compounds will result in emissions of sulfur dioxide (SO₂) as a product of that combustion. The landfill gas burned at the A-10 Landfill Gas Flare contains small levels of sulfur compounds which will contribute to ground level concentrations of SO₂.

From Condition # 1028, Part 14, the revised landfill gas sulfur content limit will be 860 ppmv of total reduced sulfur (TRS) compounds, expressed as H₂S. This limit was derived from the Regulation 9-1-302 outlet concentration limit of 300 ppmv of SO₂ in any exhaust point and an assumption that landfill gas contains 25% methane:

$$(860 \text{ ft}^3 \text{ H}_2\text{S}/1 \text{ MM ft}^3 \text{ LFG})/(2.9 \text{ MM ft}^3 \text{ flue gas}/\text{MM ft}^3 \text{ LFG})*(1 \text{ ft}^3 \text{ SO}_2/1 \text{ ft}^3 \text{ H}_2\text{S}) \\ = 297 \text{ ft}^3 \text{ SO}_2/1 \text{ MM ft}^3 \text{ flue gas} = 297 \text{ ppmv SO}_2$$

Higher inlet landfill gas methane concentrations will result in a higher flue gas generation rates and lower outlet SO₂ concentrations (263 ppmv of SO₂ for LFG containing 30% CH₄, 214 ppmv of SO₂ for LFG containing 40% CH₄, etc.). Therefore, the 25% CH₄ case results in the highest possible SO₂ emission rate.

SO₂ Potential to Emit Calculations for the A-10 Landfill Gas Flare:

$$(9\text{E}6 \text{ BTU}/\text{hour})/(1013 \text{ BTU}/\text{ft}^3 \text{ CH}_4)/(0.25 \text{ ft}^3 \text{ CH}_4/\text{ft}^3 \text{ LFG})*(860 \text{ ft}^3 \text{ H}_2\text{S}/1\text{E}6 \text{ ft}^3 \text{ LFG}) \\ / (379.7 \text{ ft}^3 \text{ H}_2\text{S}/1 \text{ lbmol H}_2\text{S})*(1 \text{ lbmol SO}_2/1 \text{ lbmol H}_2\text{S})*(64.06 \text{ lbs SO}_2/1 \text{ lbmol SO}_2) \\ *(8760 \text{ hours}/\text{year})/(2000 \text{ lbs}/\text{ton}) \\ = 22.585 \text{ tons}/\text{year of SO}_2$$

Actual SO₂ Emission Calculations for the A-10 Landfill Gas Flare:

$$(136,817,000 \text{ ft}^3 \text{ LFG}/\text{year})*(36 \text{ ft}^3 \text{ H}_2\text{S}/1\text{E}6 \text{ ft}^3 \text{ LFG})/(379.7 \text{ ft}^3 \text{ H}_2\text{S}/1 \text{ lbmol H}_2\text{S}) \\ *(1 \text{ lbmol SO}_2/1 \text{ lbmol H}_2\text{S})*(64.06 \text{ lbs SO}_2/1 \text{ lbmol SO}_2)/(2000 \text{ lbs}/\text{ton}) \\ = 0.415 \text{ tons}/\text{year of SO}_2$$

BAAQMD Regulation 9-1-301

Area monitoring to demonstrate compliance with the ground level SO₂ concentration requirements of Regulation 9-1-301 is required at the discretion of the APCO (per BAAQMD Regulation 9-1-501). Since ground level SO₂ monitoring is very expensive, such monitoring is not required if the expected levels of SO₂ emissions are low or if the margin of compliance with the Regulation 9-1-301 ground level SO₂ limits is expected to be high. Modeling analyses performed for other landfill sites has shown that compliance with the Regulation 9-1-302 limit of 300 ppmv of SO₂ in the flare stack exhaust results in ground level SO₂ concentrations that are less than the BAAQMD Regulation 9-1-301 limits. Therefore, landfill sites that are complying with the Regulation 9-1-302 limit are also expected to comply with the Regulation 9-1-301 limits.

Although the potential to emit for A-10 is fairly high when this PTE is calculated based on the Regulation 9-1-302 limit, the actual SO₂ emissions from A-10 are very low (only 0.4 tons/year of SO₂). Since the margin of compliance with the Regulation 9-1-302 limit is very high, the margin of compliance with the Regulation 9-1-301 ground level SO₂ limits are also expected to be very high. Since A-10 is not emitting large amounts of SO₂ (less than 0.5 tons/year of SO₂ total) and the margin of compliance with the Regulation 9-1-301 limits is expected to be very high, the District has not required ground level monitoring for SO₂ at this site.

Annual landfill gas testing will be conducted to ensure compliance with the landfill gas sulfur content limit. Since the landfill is now inactive and landfill gas sulfur contents typically decline

after waste acceptance stops, annual testing is sufficient to ensure compliance with both the Regulation 9-1-302 and 9-1-301 limits.

H2S Discussion:

BAAQMD Regulation 9-2-301

Area monitoring to demonstrate compliance with the ground level H₂S concentration limitations of Regulation 9-1-301 is required at the discretion of the APCO (per BAAQMD Regulation 9-1-501). The H₂S emissions near this site are a result of fugitive emissions from the landfill. Hydrogen sulfide can be detected by its odor at concentrations as low as 0.0005 ppmv and is generally identified by its characteristic rotten egg smell a concentration of 0.005 ppmv or less. Therefore, hydrogen sulfide emissions are typically discovered by smell well before the concentration approaches the lowest 9-2-301 emission limit of 0.03 ppmv.

The District rarely ever receives complaints about hydrogen sulfide odors from Bay Area landfills and has never received any complaints about hydrogen sulfide odors from this facility. Since hydrogen sulfide odors have not been detected at this facility, the concentration of hydrogen sulfide at the property line is expected to be well below the Regulation 9-1-301 limits. Therefore, although this regulation is generally applicable, the landfill is expected to have insignificant H₂S emissions and will not be required to perform ground level H₂S monitoring.

PM Emission Limits with No Associated Monitoring

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
A-10 Landfill Gas Flare	BAAQMD 6-1-301 and SIP 6-301	≤ Ringelmann 1.0 for 3 minutes in any hour	None
A-10 Landfill Gas Flare	BAAQMD 6-1-310 and SIP 6-310	≤ 0.15 gr/dscf	None

PM Discussion:

BAAQMD Regulation 6, Rule 1 “Particulate Matter – General Requirements” and SIP Regulation 6, “Particulate Matter and Visible Emissions”

Active landfill operations generate particulate matter due to vehicle traffic on haul roads, on-site mobile equipment travel, waste and cover material handling activities, and wind erosion at the active face and at stockpiles. Now that this landfill has ceased accepting waste, most of the landfill’s particulate emissions have ceased as well. However, some particulate emissions will continue to be generated on the haul roads due to vehicles delivering green waste to the material processing area, vehicles picking up product from the composting operation, and on-site mobile equipment travel. The material handling operations associated with the final covering operations will also generate some dust. Since these fugitive particulate emissions do not have a defined

stack, the outlet grain loading limit in Section 310 does not apply. Particulate matter emissions from these operations are limited to Ringelmann 1.0.

The site employs a dust mitigation plan to ensure compliance with this Ringelmann 1.0 limit. The landfill operator must use sufficient watering and road cleaning events to prevent the formation of visible emissions, and the site must maintain records of these watering and road cleaning events to verify compliance with the dust mitigation plan. Having a dust mitigation plan, employing the required dust control measures, and maintaining records of the dust control measures that were employed are standard methods that landfills use to demonstrate compliance with the Ringelmann 1.0 limitation. No changes are proposed to these existing monitoring procedures.

The following devices have a particulate limit for which no monitoring is proposed: A-10 Landfill Gas Flare. The maximum potential emissions from these devices are shown below. For A-10, the PM₁₀ emission factors listed below are based on AP-42 emission factors or AP-42 emission factor calculation procedures. The throughput rate for A-10 is the maximum capacity of the device at continuous operation.

PM₁₀ Potential to Emit Calculations for the A-10 Landfill Gas Flare:

$$\begin{aligned} & (9E6 \text{ BTU/hour}) / (1013 \text{ BTU/ft}^3 \text{ CH}_4 \text{ at } 60 \text{ F}) * [(460+68) \text{ ft}^3 \text{ CH}_4 \text{ at } 68 \text{ F} / (460+60) \text{ ft}^3 \text{ CH}_4 \text{ at } 60 \text{ F}] \\ & * (17 \text{ pounds PM}_{10} / 1E6 \text{ ft}^3 \text{ CH}_4 \text{ at } 68 \text{ F}) * (8760 \text{ hours/year}) / (2000 \text{ pounds/ton}) \\ & = 0.674 \text{ tons/year of PM}_{10} \end{aligned}$$

BAAQMD 6-1-301 and SIP 6-301 for Flare:

BAAQMD Regulation 6-1-301 and SIP Regulation 6-301 limit visible emissions to no darker than 1.0 on the Ringelmann Chart, except for periods or aggregate periods less than 3 minutes in any hour. Visible emissions are normally not associated with proper combustion of gaseous fuels, such as landfill gas. Since A-10 burns only landfill gas, no monitoring is required to assure compliance with this limit.

BAAQMD 6-1-310 and SIP 6-310 for Flare: BAAQMD Regulation 6-1-310 and SIP 6-310 limit filterable particulate (FP) emissions in the stack from any source to 0.15 grains per dry standard cubic foot (gr/dscf) of exhaust volume.

Based on the AP-42 emission factor for landfill gas flares and a flue gas generation rate of 5.163 ft³ flue gas/ft³ LFG for LFG at 55% CH₄, A-10 will emit 0.012 gr/dscf of exhaust at 0% oxygen. A lower inlet methane concentration in the landfill gas will result in more dilution and a lower grain loading in the exhaust.

The grain loading limit (0.15 gr/dscf) is far above any expected PM emissions for these devices: a 12:1 compliance ratio for the flare. Since maximum potential PM emissions from the flare are low and an excess of the emission standard is not likely, it would not be appropriate to add periodic monitoring for this grain loading standard considering the high cost of PM emissions testing. Furthermore, the District expects that the Ringelmann standard would be exceeded

before the grain loading standard is exceeded. Since visible emissions are not expected from these sources, PM monitoring for this grain loading standard has not been required.

Changes to Permit, Section VII:

- None

VIII. Test Methods

This section of the permit lists test methods that are associated with standards in District or other rules. It is included only for reference. In most cases, the test methods in the rules are source test methods that can be used to determine compliance but are not required on an ongoing basis. They are not “applicable requirements” as defined by Regulation 2-6-202.

If a rule or permit condition requires ongoing testing, the requirement will also appear in Section IV of the permit.

Changes to the Permit, Section VIII:

- None

IX. Permit Shield

The District rules allow two types of permit shields. The permit shield types are defined as follows: (1) A provision in a major facility review permit explaining that specific federally enforceable regulations and standards do not apply to a source or group of sources, or (2) A provision in a major facility review permit explaining that specific federally enforceable applicable requirements for monitoring, recordkeeping and/or reporting are subsumed because other applicable requirements for monitoring, recordkeeping, and reporting in the permit will assure compliance with all emission limits.

The second type of permit shield is allowed by EPA’s “White Paper 2 for Improved Implementation of the Part 70 Operating Permits Program.” The District uses the second type of permit shield for all streamlining of monitoring, recordkeeping, and reporting requirements in Title V permits. The District’s program does not allow other types of streamlining in Title V permits.

This facility had one permit shield that expired on 8/1/2011 because waste acceptance ceased on 7/28/2011 and no future activities will use VOC-laden soil. No new permit shields were requested by the applicant

Changes to the Permit, Section IX:

- None

X. Revision History

This section of the permit summarizes each revision to the permit.

Changes to Permit, Section X:

- The District added the permit revisions associated with this MFR Renewal Permit (Application # 28392) to Section X.

XI. Glossary

This section of the permit defines and explains acronyms, abbreviations, and other terms that are used in this permit.

Changes to Permit, Section XI:

- None

D. ALTERNATE OPERATING SCENARIOS

No alternate operating scenario has been requested for this facility.

E. COMPLIANCE STATUS

The responsible official for City of Palo Alto Landfill submitted a signed Certification Statement from dated December 18, 2017. On this form, the responsible official certified that the following for statements are true:

Based on information and belief formed after reasonable inquiry, the sources identified in the Applicable Requirements and Compliance Summary form that are in compliance will continue to comply with the applicable requirements;

Based on information and belief formed after reasonable inquiry, the sources identified in the Applicable Requirements and Compliance Summary form will comply with future-effective applicable requirements, on a timely basis;

Based on information and belief formed after reasonable inquiry, information on application forms, all accompanying reports, and other required certifications is true, accurate, and complete;

All fees required by Regulation 3, including Schedule P have been paid.

F. DIFFERENCES BETWEEN APPLICATION AND PROPOSED PERMIT

The Title V permit application was originally submitted on October 31, 2016. The Title V permit was last revised on January 13, 2016. This version is the basis for constructing the proposed Title V permit. The applicant has not submitted new NSR or Title V applications since 10/31/2016.

In addition to the changes discussed above, the District has proposed numerous updates to the standard permit language, regulatory descriptions, and regulatory amendment dates throughout the permit to reflect regulatory changes, to clarify limits and other applicable requirements, to explain permit terminology, to remove obsolete requirements, and to correct permit errors. Each of these changes is explained in detail in Section C of this document.

H:\Engineering\TitleV Permit Appls\1 All T5 Application Files Here\A2721\Renewal-28392\3.0 Public Notice-Proposed\A2721_SOB_App28392.doc

APPENDIX A
GLOSSARY

ACT

Federal Clean Air Act

AP-42

An EPA Document “Compilation of Air Pollution Emission Factors” that is used to estimate emissions from numerous source types. It is available electronically from EPA’s web site at: <http://www.epa.gov/ttn/chief/ap42/index.html>

APCO

Air Pollution Control Officer

ARB

Air Resources Board

ASTM

American Society for Testing and Materials

ATCM

Airborne Toxic Control Measure

BAAQMD

Bay Area Air Quality Management District

BACT

Best Available Control Technology

BARCT

Best Available Retrofit Control Technology

Basis

The underlying authority which allows the District to impose requirements.

C1

An organic chemical compound with one carbon atom, for example: methane

C3

An organic chemical compound with three carbon atoms, for example: propane

C5

An organic chemical compound with five carbon atoms, for example: pentane

C6

An organic chemical compound with six carbon atoms, for example: hexane

C₆H₆

Benzene

CAA

The federal Clean Air Act

CAAQS

California Ambient Air Quality Standards

CAM

Compliance Assurance Monitoring per 40 CFR Part 64

CAPCOA

California Air Pollution Control Officers Association

CEM

A “continuous emission monitor” is a monitoring device that provides a continuous direct measurement of some pollutant (e.g. NO_x concentration) in an exhaust stream.

CEQA

California Environmental Quality Act

CFR

The Code of Federal Regulations. 40 CFR contains the implementing regulations for federal environmental statutes such as the Clean Air Act. Parts 50-99 of 40 CFR contain the requirements for air pollution programs.

CCR

The California Code of Regulations

CEC

California Energy Commission

CH₄ or CH₄

Methane

CI

Compression Ignition

CIWMB

California Integrated Waste Management Board

CO

Carbon Monoxide

CO₂ or CO_{2e}

Carbon DioxideCO_{2e}

Carbon Dioxide Equivalent. A carbon dioxide equivalent emission rate is the emission rate of a greenhouse gas compound that has been adjusted by multiplying the mass emission rate by the global warming potential of the greenhouse gas compound. These adjusted emission rates for individual compounds are typically summed together, and the total is also referred to as the carbon dioxide equivalent (CO_{2e}) emission rate.

CT

Combustion Zone Temperature

Cumulative Increase

The sum of permitted emissions from each new or modified source since a specified date pursuant to BAAQMD Rule 2-1-403, Permit Conditions (as amended by the District Board on 7/17/91) and SIP Rule 2-1-403, Permit Conditions (as approved by EPA on 6/23/95). Cumulative increase is used to determine whether threshold-based requirements are triggered.

District

The Bay Area Air Quality Management District

E6, E9, E12

Very large or very small number values are commonly expressed in a form called scientific notation, which consists of a decimal part multiplied by 10 raised to some power. For example, 4.53E6 equals $(4.53) \times (10^6) = (4.53) \times (10 \times 10 \times 10 \times 10 \times 10 \times 10) = 4,530,000$. Scientific notation is used to express large or small numbers without writing out long strings of zeros.

EG

Emission Guidelines

EO

Executive Order

EPA

The federal Environmental Protection Agency.

Excluded

Not subject to any District regulations.

Federally Enforceable, FE

All limitations and conditions which are enforceable by the Administrator of the EPA including those requirements developed pursuant to 40 CFR Part 51, subpart I (NSR), Part 52.21 (PSD), Part 60 (NSPS), Part 61 (NESHAPs), Part 63 (MACT), and Part 72 (Permits Regulation, Acid Rain), including limitations and conditions contained in operating permits issued under an EPA-approved program that has been incorporated into the SIP.

FP

Filterable Particulate as measured by BAAQMD Method ST-15, Particulate.

GDF

Gasoline Dispensing Facility

GHG

Greenhouse Gas

GLM

Ground Level Monitor

Grains

1/7000 of a pound

GRS

Gas Recovery Systems, Inc.

GWP

Global Warming Potential. A comparison of the ability of each greenhouse gas to trap heat in the atmosphere relative to that of carbon dioxide over a specific time period.

H₂S or H₂S

Hydrogen Sulfide

H₂SO₄ or H₂SO₄

Sulfuric Acid

H&SC

Health and Safety Code

HAP

Hazardous Air Pollutant. Any pollutant listed pursuant to Section 112(b) of the Act. Also refers to the program mandated by Title I, Section 112, of the Act and implemented by 40 CFR Part 63.

Hg
Mercury

HHV
Higher Heating Value. The quantity of heat evolved as determined by a calorimeter where the combustion products are cooled to 60 °F and all water vapor is condensed to liquid.

LEA
Local Enforcement Agency

LFG
Landfill gas

LHV
Lower Heating Value. Similar to the higher heating value (see HHV) except that the water produced by the combustion is not condensed but retained as vapor at 60°F.

Long ton
2200 pounds

Major Facility
A facility with potential emissions of: (1) at least 100 tons per year of regulated air pollutants, (2) at least 10 tons per year of any single hazardous air pollutant, and/or (3) at least 25 tons per year of any combination of hazardous air pollutants, or such lesser quantity of hazardous air pollutants as determined by the EPA administrator.

MAX or Max.
Maximum

MFR
Major Facility Review. The District's term for the federal operating permit program mandated by Title V of the Federal Clean Air Act and implemented by District Regulation 2, Rule 6.

MIN or Min.
Minimum

MOP
The District's Manual of Procedures.

MSDS
Material Safety Data Sheet

MSW

Municipal solid waste

MW

Molecular weight

N2 or N₂

Nitrogen

NA

Not Applicable

NAAQS

National Ambient Air Quality Standards

NESHAPS

National Emission Standards for Hazardous Air Pollutants. See in 40 CFR Parts 61 and 63.

NMHC

Non-methane Hydrocarbons (Same as NMOC)

NMOC

Non-methane Organic Compounds (Same as NMHC)

NO₂

Nitrogen Dioxide

NO_x

Oxides of nitrogen.

NSPS

Standards of Performance for New Stationary Sources. Federal standards for emissions from new stationary sources. Mandated by Title I, Section 111 of the Federal Clean Air Act, and implemented by 40 CFR Part 60 and District Regulation 10.

NSR

New Source Review. A federal program for pre-construction review and permitting of new and modified sources of pollutants for which criteria have been established in accordance with Section 108 of the Federal Clean Air Act. Mandated by Title I of the Federal Clean Air Act and implemented by 40 CFR Parts 51 and 52 and District Regulation 2, Rule 2. (Note: There are additional NSR requirements mandated by the California Clean Air Act.)

O2 or O₂

Oxygen

Offset Requirement

A New Source Review requirement to provide federally enforceable emission offsets for the emissions from a new or modified source. Applies to emissions of POC, NO_x, PM₁₀, and SO₂.

PERP

Portable Equipment Registration Program

Phase II Acid Rain Facility

A facility that generates electricity for sale through fossil-fuel combustion and is not exempted by 40 CFR 72 from Titles IV and V of the Clean Air Act.

POC

Precursor Organic Compounds

PM

Particulate Matter

PM₁₀ or PM₁₀

Particulate matter with aerodynamic equivalent diameter of less than or equal to 10 microns

PSD

Prevention of Significant Deterioration. A federal program for permitting new and modified sources of those air pollutants for which the District is classified "attainment" of the National Air Ambient Quality Standards. Mandated by Title I of the Act and implemented by both 40 CFR Part 52 and District Regulation 2, Rule 2.

PTE

Potential to Emit as defined by BAAQMD Regulation 2-6-218

PV or P/V Valve or PRV

Pressure / Vacuum Relief Valve

RICE

Reciprocating Internal Combustion Engine

RMP

Risk Management Plan

RWQCB

Regional Water Quality Control Board

S

Sulfur

SCR

A “selective catalytic reduction” unit is an abatement device that reduces NOx concentrations in the exhaust stream of a combustion device. SCRs utilize a catalyst, which operates within a specific temperature range, and injected ammonia to promote the conversion of NOx compounds to nitrogen gas.

Short ton

2000 pounds

SIP

State Implementation Plan. State and District programs and regulations approved by EPA and developed in order to attain the National Air Ambient Quality Standards. Mandated by Title I of the Act.

SO₂ or SO₂

Sulfur dioxide

SO₃ or SO₃

Sulfur trioxide

SSM

Startup, Shutdown, or Malfunction

SSM Plan

A plan, which states the procedures that will be followed during a startup, shutdown, or malfunction, that is prepared in accordance with the general NESHAP provisions (40 CFR Part 63, Subpart A) and maintained on site at the facility.

TAC

Toxic Air Contaminant

TBACT

Best Available Control Technology for Toxics

THC

Total Hydrocarbons (NMHC + Methane)

therm

100,000 British Thermal Units

Title V

Title V of the federal Clean Air Act. Requires a federally enforceable operating permit program for major and certain other facilities.

TOC

Total Organic Compounds (NMOC + Methane, Same as THC)

TPH

Total Petroleum Hydrocarbons

TRMP

Toxic Risk Management Plan

TRS

Total Reduced Sulfur, which is a measure of the amount of sulfur-containing compounds in a gas stream, typically a fuel gas stream, including, but not limited to, hydrogen sulfide. The TRS content of a fuel gas determines the concentration of SO₂ that will be present in the combusted fuel gas, since sulfur compounds are converted to SO₂ by the combustion process.

TVP

True Vapor Pressure

VOC

Volatile Organic Compounds

VMT

Vehicle Miles Traveled

Symbols:

<	=	less than
>	=	greater than
≤	=	less than or equal to
≥	=	greater than or equal to

Units of Measure:

atm	=	atmospheres
bbl	=	barrel of liquid (42 gallons)
bhp	=	brake-horsepower
btu	=	British Thermal Unit
BTU	=	British Thermal Unit
°C	=	degrees Centigrade
cu. ft.	=	cubic foot
cfm	=	cubic feet per minute
dscf	=	dry standard cubic foot

dscfm	=	dry standard cubic foot per minute
°F	=	degrees Fahrenheit
ft ³	=	cubic feet
g	=	gram
gal	=	gallon
gpm	=	gallons per minute
gr	=	grain
hp	=	horsepower
hr	=	hour
in	=	inch
KW	=	kilowatt
lb	=	pound
lbmol	=	pound-mole
max	=	maximum
m ²	=	square meter
m ³	=	cubic meter
min	=	minute
mm	=	million
MM	=	million
MMbtu	=	million btu
MMcf	=	million cubic feet
Mg	=	mega grams
M scf	=	one thousand standard cubic feet
MW	=	megawatts
ppb	=	parts per billion
ppbv	=	parts per billion, by volume
ppm	=	parts per million
ppmv	=	parts per million, by volume
ppmw	=	parts per million, by weight
psia	=	pounds per square inch, absolute
psig	=	pounds per square inch, gauge
scfm	=	standard cubic feet per minute
sdcf	=	standard dry cubic feet
sdcfm	=	standard dry cubic feet per minute
yd	=	yard
yd ³	=	cubic yards
tpy	=	tons per year
yr	=	year

APPENDIX B
EMISSION INVENTORY FOR YEAR 2016

PLANT # 2721 EMISSIONS: CURRENT CALCULATION (2016 DATA)

S#	SOURCE NAME	SOURCE CODE	DATE	PM	EMISSIONS IN LBS/DAY			CO
					ORG	NOx	S02	
MATERIAL THROUGHPUT								

1	Palo Alto Landfill with Gas Collection System							
Landfill gas	G7145511							
165620.0 thou cubic/yr	12/31/16			.0	.0	.2	.0	.0
Landfill	G7145580							
5.83E+06 tons-in-pl/yr	12/31/16			.0	112.2	.0	.0	.0
-10 Landfill Gas Flare								
Landfill gas	C8550511							
136817.0 thou cu ft/yr	12/31/15			1.1	1.0	11.3	54.9	37.5
=====								
PLANT TOTAL:	lbs/day			1.1	113.2	11.5	54.9	37.5
	tons/day			.0	.1	.0	.0	.0
	tons/year			.2	20.7	2.1	10.0	6.8

* The inventory above is a corrected inventory. For the current database emissions inventory for this site, flare emissions were determined using 2015 landfill gas throughput data. The flare emissions shown above are based on an updated actual landfill gas throughput rate of 136,817 Mscf for Year 2015 at A-10.