

Bay Area Air Quality Management District

939 Ellis Street
San Francisco, CA 94109
(415) 771-6000

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

MAJOR FACILITY REVIEW PERMIT

for

**Union Sanitary District
Facility A1209**

Facility Address:

5072 Benson Road
Union City, CA 94587]

Mailing Address:

5072 Benson Road
Union City, CA 94587]

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Title V Statement of Basis

A. Background

This facility is subject to the Operating Permit requirements of Title V of the federal Clean Air Act, Part 70 of Volume 40 of the Code of Federal Regulations (CFR), and BAAQMD Regulation 2, Rule 6, Major Facility Review because it is a major facility as defined by BAAQMD Regulation 2-6-212. It is a major facility because it has the “potential to emit,” as defined by BAAQMD Regulation 2-6-218, of more than 100 tons per year of a regulated air pollutant.

Major Facility Operating permits (Title V permits) must meet specifications contained in 40 CFR Part 70 as contained in BAAQMD Regulation 2, Rule 6. 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 A1209.

This facility received its initial Title V permit on July 1, 1997. This application is for a permit renewal. Although the current permit expired on July 1, 2002, it continues in force until the District takes final action on the permit renewal. The standard sections of the permit have changed since the permit was first issued. The proposed permit shows all changes to the permit in strikeout/underline format.

Changes to permit

Responsible Official/Facility Contact Information

Effective October 27, 2003, Mr. Stephen T. Hayashi retired from Union Sanitary District, and was replaced by Mr. Richard B. Currie. Mr. Currie’s phone number is (510) 477-7502. Mr. James Chen will continue to be listed at the Facility Contact, although Mr. Chen’s phone number has been changed to (510) 477-7500.

B. Facility Description

The Union Sanitary District (USD) is a publicly owned treatment works (POTW) facility that provides wastewater collection, treatment and disposal services to the residents and businesses of the cities of Fremont, Newark and Union City, in Southern Alameda County, California. The

sources that are permitted include liquid and semi-liquid wastewater process sources, support systems such as a gasoline dispensing station, and a number of combustion sources to convert the plant produced digester gas into electricity and hot water to supply the plant energy needs. Liquid sources include preliminary treatment, primary treatment, secondary treatment, clarification, disinfection, sludge handling, and sludge digestion. Combustion operations include hot water boilers, emergency standby diesel generator sets, digester gas emergency flares, and cogeneration engine generators.

Average dry weather wastewater flows are approximately 29,400,000 gal. With the additional wet weather flows, the annual average can potentially approach 75,000,000 gal/day. The wastewater processes at USD are similar to any other “traditional” wastewater treatment facility. The wastewater plant receives flows from a number of satellite pump stations throughout the aforementioned service area. Plant processes render the influent homogeneous, allow for physical separation to occur and hasten the occurrence of normal biological processes. The liquid and semi-solid wastes are processed such that the process resulting sludge is converted into digester gas fuel with residual biomass for offsite disposal. Effluent water outflow meets regional water quality control board standards for discharge or reuse.

The criteria pollutant emissions from the combustion processes, specifically the NO_x and CO have the potential to emit more than 100 tons per year, hence Union Sanitary District's need for a Federal Title V Major Facility Permit.

C. Permit Content

The legal and factual basis for the permit follows. The permit sections are described in the order presented in the permit.

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. 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:

The dates of adoption and approval of rules in Standard Condition 1.A have been updated.

SIP Regulation 2, Rule 4 - Permits, Emissions Banking and BAAQMD Regulation 2, Rule 6 - Permits, Major Facility Review have been added to Standard Condition 1.A.

Standard Condition I.B.1 has been modified to explain that the facility may continue to operate after the permit expiration date if the facility has submitted a complete and timely application and the District has not acted on the application. This is the "application shield" pursuant to BAAQMD Regulation 2-6-407.

Standard Condition I.B.11, which requires the responsible official to certify all documents submitted, was added to conform to changes in Regulation 2, Rule 6.

Standard Condition I.E.1 requiring the permit holder to provide any information, records, and reports requested or specified by the APCO, was added because it was omitted in error.

The dates of the reporting periods and reporting deadlines have been added to Standard Conditions I.F and I.G for additional clarity.

The first sentence of Standard Condition I.F has been changed from " All required monitoring reports must be submitted to the District at least once every six months." to " Reports of all required monitoring must be submitted to the District at least once every six months, except where an applicable requirement specifies more frequent reporting. " to conform more closely to BAAQMD Regulation 2-6-409.18.

Other changes were made to Standard Condition I.F to conform to the current standard.

Standard Condition I.H was modified to conform to the current standard.

Standard Condition I.J has been added to clarify that the capacity limits shown in Table II-A are enforceable limits.

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.

Significant sources are those sources that have a potential to emit of more than 2 tons of a "regulated air pollutant," as defined in BAAQMD Rule 2-6-222, per year or 400 pounds of a "hazardous air pollutant," as defined in BAAQMD Rule 2-6-210, per year.

The District has reviewed the operations at the Union Sanitary District and concluded that there are no sources at this facility that are exempt and significant, as defined above.

All abatement (control) devices that control permitted or significant sources are listed. 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 controls 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 considered to be a source (or “S”).

The equipment section is considered to be 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.

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.

Following are explanations of the differences in the equipment list between the time that the facility originally applied for a Title V permit and the permit proposal date:

Changes to permit:

Devices Removed from Service or Archived since initial Major Facility Review permit was issued:

Source #	Description	Application Number	Explanation
S-4	Reciprocating Engine, Rich Burn	2437	Engine removed from service, replaced by BACT engine, S-16
S-102	Diesel Storage Tank	3905	Exempt source, no longer listed in Title V Permit
S-135	Secondary Treatment, INKA Process	-	Problematic, removed from service in 9/2001
S-145	Secondary Treatment, INKA Clarifiers	-	Problematic, removed from service in 9/2001
S-160	Sludge Handling Processes	-	Problematic, removed from service in 9/2001, along with A-33 and A-36
S-163	Sludge Handling, Pumping Station	-	Removed from service in 1998
S-165	Water Reclamation Plant	-	Pilot Plant, demolished in 2000
A-3	Permanganate Scrubber, for S-160	-	Removed from service along with S-160
A-4	Permanganate Scrubber, for S-160	-	Removed from service along with S-160
A-5	Catalytic Turbulator (for S-15)	2437	Catalyst failure, removed from service
A-31	Atomized Mist Scrubber (for S-135)	-	Removed from service along with S-135
A-36	Atomizer Scrubber (for S-160)	-	Removed from service along with S-160
A-37	Soil Odor Scrubber (for S-135)		Removed from service along with S-160

Devices Permitted Since initial Major Facility Review permit was issued:

Source #	Description	Application Number	Explanation
S-5	Standby Engine/Generator #2, Diesel	1706	Permitted under loss of exemption
S-6	Standby Engine/Generator #3 Diesel	1706	Permitted under loss of exemption
S-16	Engine Generator #9, Digester Gas	2437	Installation of reconditioned engine to replace S-4
S-30	Standby Engine/Generator #5Diesel	1706	Permitted under loss of exemption
S-31	Standby Engine/Generator #6Diesel	1706	Permitted under loss of exemption
S-44	Standby Engine/Generator #7Diesel	1706	Permitted under loss of exemption
S-45	Standby Engine/Generator #8Diesel	1706	Permitted under loss of exemption

Devices with Changed Permit Status since initial Major Facility Review permit was issued:

Source #	Description	Application Number	Explanation
S-14	Waste Gas Burners 1 & 2	3905	Incorrectly permitted; changed to abatement devices, Digester Gas Flares A-401, A-402
S-15	Engine Generator #4, 700 KW, Digester Gas Fired	2437	Turbulator system failed, engine configuration changed from rich burn to lean burn
S-42	Waste Gas Burner #3	3905	Incorrectly permitted; changed to abatement device, Digester Gas Flare A-403
A-26	Atomized Mist Scrubber	-	Removed from S-160 service, abates S-164 only
A-27	Atomized Mist Scrubber	-	Removed from S-160 service, abates S-164 only

District permit applications not included in this proposed permit

Application 3319: S-180 Sludge Dewatering Building, abated by A-31 and A-34
An authority to construct for this project was granted in 2002. The project is expected to be completed sometime in 2004. The application was deemed to be ministerial and includes the construction of a new sludge dewatering building, including the removal of the 5 belt filter presses (part of sludge handling) and replacement by 5 sludge dewatering centrifuges, to be abated by A-31 and A-34. Including the sources and changes inherent in this application in the Title V renewal permit would cause unnecessary confusion as it would not present a correct impression of the sewage sludge treatment plant configuration/sources.

Other changes

S-101, Gasoline Dispensing Facility

The capacity of the gasoline tank has been corrected to 10,000 gallons.

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* pursuant to the definition in BAAQMD Rule 2-6-239. This facility has no unpermitted significant sources.

Changes to permit:

Language has been added to Section III to clarify that this section contains requirements that may apply to temporary sources. This provision allows contractors that have "portable" equipment permits that require them to comply with all applicable requirements to work at the facility on a temporary basis, even if the permit does not specifically list the temporary source. Examples are temporary sand-blasting or soil-vapor extraction equipment.

Section III has been modified to say that SIP standards are now found on EPA's website and are not included as part of the permit.

The note regarding SIP information from the Rule Development Section has been deleted since the SIP standards are now found on EPA's website.

Table III has been updated by adding the following rules and standards to conform to current practice:

- BAAQMD Regulation 2, Rule 1, General Requirements
- BAAQMD 2-1-429, Federal Emissions Statement
- SIP Regulation 2, Rule 1, General Requirements
- SIP Regulation 6 has been deleted because BAAQMD Regulation 6 is now in the SIP.
- BAAQMD Regulation 8, Rule 40 Aeration of Contaminated Soil and Removal of Underground Storage Tanks
- BAAQMD Regulation 8, Rule 47, Air Stripping and Soil Vapor Extraction Operations
- SIP Regulation 8, Rule 51, Adhesive and Sealant Products
- SIP Regulation 9, Rule 1 has been deleted because BAAQMD Regulation 9, Rule 1 is now in the SIP.
- California Health and Safety Code Section 44300 et seq., Air Toxics "Hot Spots" Information and Assessment Act of 1987
- 40 CFR Part 61, Subpart M, National Emission Standards for Hazardous Air Pollutants – National Emission Standard for Asbestos

The dates of adoption or approval of the rules and their "federal enforceability" status in Table III have also been updated.

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)
- 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’s or EPA’s 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.

Complex applicability determination-POTW NESHAP: 40 CFR Part 63, Subpart VVV contains the NESHAP standards for POTWs. This NESHAP was evaluated to determine if Union Sanitary District was subject to the MACT emission control requirements. The NESHAP requires MACT controls at POTWS which are major sources for HAP which are defined thusly: *...any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate 10 tons per year (tpy) or more of any HAP or 25 tpy or more of any combination of HAP.*

The District has reviewed the wastewater borne emissions potential of the most frequently seen HAPs and conclude that Union Sanitary District is not a major source for HAP emissions or for combined HAP emissions. A conservative estimate of HAP emissions may be obtained by using the 80th % factors as developed by the BAAT-AMSA – CWEA studies in the 1990s. Most conservatively, the total plant throughput would have to be over 125 million gallon per day. The Union Sanitary District average flow rate is approximately 30 million gallons per day. Therefore, the facility is not a major source for HAP.

In addition, this POTW is an existing POTW that has not been reconstructed (as defined by 40 CFR 63.1595). Furthermore, the Union Sanitary District is not an Industrial POTW as defined by 40 CFR 63.1595. Union Sanitary District processes strictly domestic wastewater streams.

Digester Gas Combustion, Applicable Regulation 8 Rule: The anaerobic digesters S-170 produce digester gas, which is principally combusted in the digester gas engines or hot water boilers, and secondarily in the digester gas flares. The composition of the digester gas is roughly 59% methane, 41% carbon dioxide, with about 16 ppmv of non methane organic compounds. The District evaluated whether the digester S-170 as well as the associated digester gas energy recovery sources and digester gas flares were subject to Regulation 8-1-110.3 (exemption from Regulation 8 Rules) or to 8-2-301 (Organic Compounds – Miscellaneous Operations). This discussion of applicability follows.

Regulation 8-1-110.3 states

- 8-1-110 Exemptions:** The following shall be exempted from the provisions of this regulation:
- 110.1 Any structure designed and used exclusively as a dwelling for not more than two families, provided that this exclusion does not apply to the application of an architectural coating.
 - 110.2 Any internal combustion engine.
 - 110.3 Any operation or group of operations which are related to each other by being a part of a continuous process, or a series of such operations on the same process material, which are subject to Regulation 8, Rule 2 or Rule 4, and for which emissions of organic compounds are reduced at least 85% on a mass basis. Where such reduction is achieved by incineration, at least 90% of the organic carbon shall be oxidized to carbon dioxide.**

Regulation 8-2-301 states:

8-2-301 Miscellaneous Operations: A person shall not discharge into the atmosphere from any miscellaneous operation an emission containing more than 6.8 kg. (15 lbs.) per day and containing a concentration of more than 300 PPM total carbon on a dry basis.

Organic compounds are defined in 8-1-201 as “any compound of carbon excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates and ammonium carbonate”. The District has performed a conservative calculation (see Appendix C) to estimate the NMOC emissions potential from digester gas. The use of NMOC emissions potential is conservative since this includes all compounds of carbon with the exception of methane and carbon dioxide. USD has a maximum daily digester gas production rate of 600,000 cu ft, with a conservative maximum concentration of 82 micro-grams NMOC per liter of digester gas (16 ppmv, 66 ppm wt basis). While it is expected that the destruction efficiency of NMOC in the heat recovery sources would easily exceed 90% it cannot be assured in any of the digester gas combustion devices. This is due to the very low inlet concentration (16 ppmv) of NMOC which, upon combustion at 90% efficiency would result in an outlet concentration less than 2 ppm NMOC. It is difficult to ensure outlet concentrations at such low levels and to source test for NMOC at concentration levels near the error limits of the test methods. Based on these findings the District concludes 8-1-110.3 is not applicable to digester gas sources and combustion (abatement) devices.

We conclude the 8-2-301 is applicable to the digester gas sources and combustion devices. Based on the aforementioned calculation presented in Appendix C, and assuming all digester gas is vented at the maximum NMOC concentration gives a daily uncontrolled emission limit of approximately 3.1 lb per day, at an average concentration of 16 ppmv (66 ppm, wt). Since the uncontrolled emission level of NMOC from digester gas is less than both the daily average and the emission stream concentration level (on both molar and mass basis), we conclude that the digester S-170 and the respective digester gas fired engines, boilers and flares are subject to and will comply with Reg 8-2-301. Regulation 8-2-301 will be included Table IV, Applicable Requirements for S-170 Anaerobic Digester as well as all combustion devices burning or abating digester gas.

Compliance Assurance Monitoring: The applicability of compliance assurance monitoring (CAM) must be considered at this facility because the facility uses an emission control device to achieve compliance with a federally enforceable emission limit. The control devices in use are flares A-401, A-402 and A-403 (previously identified as sources S-14 and S-42). These flares control emissions from the anaerobic digesters S-170, and are subject to the requirements of Regulation 8, Rule 2-301 (see discussion above) This section prohibits the discharge of an emission containing more than 15 lbs/day and a concentration of more than 300 ppm total carbon.

In Appendix C, the District performed a conservative calculation to estimate the NMOC emissions potential from digester gas. The calculation includes all compounds of carbon with the exception of methane and carbon dioxide. USD has a maximum daily digester gas production rate of 600,000 cu ft, with a maximum concentration of 82 micro-grams NMOC per liter (16 ppmv), of digester gas. Assuming all digester gas is vented at the maximum NMOC concentration gives a daily uncontrolled emission limit of approximately 3.1 lb per day (see Appendix C for calculation). CAM only applies if the uncontrolled emissions are more than 100 tpy. Since the maximum annual emissions are less than a ton (1,131 lb/yr), CAM is not required.

112 (j) Case By Case MACT: This requirement does not apply because there are no major sources for HAP not does the facility qualify as a major facility for HAP.

District permit applications not included in this proposed permit

This facility sends a large number of permit applications to the District every year. Review of the following permit applications was not completed in time to include the results in this Title V permits. The Title V permit will be revised periodically to incorporate these applications as permit revisions following the procedures in Regulation 2, Rule 6, Major Facility Review.

Application #	Project Description
3319	This project is to install a revamped sewage sludge dewatering process. The project is under construction and should be completed in 2004.

Changes to permit:

General:

Section IV has been modified to say that SIP standards are now found on EPA's website and are not included as part of the permit.

BAAQMD Regulation 6, Particulate Matter and Visible Emissions, has been added to all combustion sources, since they are sources of particulate emissions.

BAAQMD Regulation 8, Rule 2, Miscellaneous Operations, has been added to all sources that burn digester gas, since the digester is subject to the standard and the combustion sources are control devices.

BAAQMD Regulation 9, Sulfur Dioxide, has been added to all combustion sources, since they are sources of sulfur dioxide.

By source:

S-4, S-15, S-16, Cogeneration Engines, Application 2437: This application involved replacing unreliable abatement equipment on engine S-15 with a pre-stratified charge ignition system (allowing the engine operate in lean-burn mode), archiving engine S-4 and the installation of a new (reconditioned) lean-burn cogeneration engine S-16. The applicant also installed additional fuel gas conditioning equipment to reduce siloxanes and moisture in the digester gas.

S-15 Engine Generator #4 is a Waukesha Model P9390G, originally permitted under NSR in 1985, the engine was installed with a catalytic converter system to achieve then-BACT for NO_x, 2.0 g/bhp-hr. The engine was also conditioned to a maximum CO level of 550 lb/day (100 tpy), which was the BACT threshold for CO. In the course of issuing the Authority to Construct for the engine to abate NO_x with a catalytic system USD agreed to convert the engine from rich burn operation to lean burn if the catalytic system proved unworkable. Initially the catalytic converter system appeared to operate well, with source tests demonstrating compliance with the 2.0 g/bhp-hr standard. Over time, however, the catalyst eventually fouled and in 1995 USD submitted an application to replace the catalyst unit with a turbulator device, which is a thermal reactor designed to control levels of NO_x and CO to the previously established condition limits.

After the turbulator unit was installed on the rich-burn engine, it proved difficult to operate and failed completely in January, 2000. Although the device failed, the emission levels developed in source tests demonstrated compliance with the limits of Condition 457. The 3-year average NO_x emission rate prior to application 2437 was 1.34 g/hp-hr while the average CO emission rate was 1.16 g/hp-hr (approximately 25 lb/day).

With the conversion of engine S-15 from rich-burn (turbulator controlled) to lean burn with a pre-stratified charge ignition, the emission rate of CO increased above the levels achieved by the turbulator unit, triggering BACT. This was dealt with in application 2437, and a BACT-based (lean-burn engine) CO limit of 2.65 g/bhp-hr established. It should be noted that although the actual emission factor has increased from the low 1.1 g/bhp-hr average for a rich burn catalytically or thermally controlled engine to a level of 2.65 (BACT for lean burn engine) the permitted CO emission level decreased from 550 lb/day (100 tpy) to 151 lb/day (27.6 tpy).

The installation of a pre-stratified charge ignition on engine S-15 NOx emissions was expected to result in NOx emissions which would achieve BACT (1.0 g/bhp-hr) which was less than the baseline emission rate of 1.34 g/bhp-hr. Since there was no increase in the emission rate BACT for NOx was not triggered. In this Title V renewal evaluation process we re-reviewed all existing conditions for applicability and basis and discovered that engine S-15 was erroneously conditioned in AN 2437 to meet 1.0 g/bhp-hr for NOx, along with engine S-16, which was conditioned on the basis of BACT. To clarify the performance requirements for these two engines, we have established individual conditions for engines S-15 and S-16 and have appropriately corrected the NOx condition for S-15 to 1.34 g/bhp-hr.

S-16 cogeneration engine is a reconditioned Waukesha L7042G, 535 Kwe engine permitted under NSR in application 2437. This engine was modified to achieve BACT for NOx, CO and POC via lean-burn operation. The BACT emission level of 0.3 g/hp-hr for SO₂ is approximately equivalent to a digester gas sulfide concentration of 300 ppm. References to sulfides or SO₂ will be taken out of the conditions for S-15 and S-16, and incorporated in the Condition for S-170 digester. It should be noted that Union Sanitary District controls digester gas to 100 ppm with typical levels less than 50 ppm. There should be no difficulty in meeting the 300 ppm H₂S limit in digester gas. All of the other NSR issues including offsets and toxics have been addressed appropriately.

In summary, engine S-16 was issued an NSR permit in application 2437 and was subject to BACT and offsets. The BACT emission standards for NOx and CO are in terms of g/bhp-hr. The emission standards for both engines S-15 and S-16 will be expressed in both g/bhp-hr and ppm of NOx and CO @ 15% oxygen, with compliance with either standard acceptable in demonstrating compliance with the respective emission level.

S-5, S-6, S-30, S-31, S-44, S-45, Emergency Standby Generators Loss of Exemption Application 1706: This application was for the permitting of six diesel engine powered emergency standby generators. Each of these engines was permitted to operate for testing and reliability for a maximum of 200 hours per year and for unlimited hours during actual specifically defined emergencies. In addition to the standard operating conditions containing the above requirements, the engines must meet federally enforceable regulations for particulate/visible emissions (Regulation 6) and sulfur dioxide (Regulation 9-1).

S-40, S-41, Hot Water Sludge Heating Boilers:

BAAQMD Regulation 6.310.3 has been added to the citations because the boilers are subject to the heat transfer operation standard, not the general standard.

The citations of BAAQMD Regulation 9, Rule 7, for Low Fuel Usage boilers have been corrected. The exemption in BAAQMD Regulation 9-7-111 is not required since the table lists the Low Fuel Usage Requirement in BAAQMD 9-7-304. The facility has chosen the tune-up compliance option in BAAQMD 9-7-304.2. Condition 389 has been replaced with Condition 20796. This change is fully explained in Section C.VI of this permit evaluation/statement of basis.

S-43, Hot Water Boiler

The capacity of this boiler is less than 10 MMbtu/hr. Therefore the unit is not subject to the requirements of 9-7-301, 302, or 303. As far as Reg 9-7 is concerned, S-43 is subject to 9-7-304, and has chosen to perform a tune up on the boiler as per 9-7-304.2 at a frequency of at least once every 12 months. The original references to 9-7-301 for NOx and CO emissions as noted in Table IV in the original Title V for S-43 will be removed since they were erroneously included. The correct 9-7-304 requirements are noted appropriately in Table IV and the requirements written into the new operating conditions.

Condition 9238 has been replaced with Condition 18803. This change is fully explained in Section C.VI of this permit evaluation/statement of basis. Underlined references to Condition are shown in Table IV for S-42 with the old Condition number 9238 in ~~strikeout~~.

Additionally the general limitations for opacity, PM, VOC, and SO2 as found in BAAQMD Regulations 6, Regulation 8, Rule 2, and Regulation 9, Rule 1 have been included in Table IV.

S-101, Gasoline Dispensing Facility

The requirements for this source have been updated. A new condition, #14098, has been imposed on the source pursuant to Authority to Construct #1425, submitted on May 18, 2000. The condition is explained in Section C.VI of this permit evaluation/statement of basis.

S-131, Secondary Treatment, and S-162, Sludge Handling Pumping Station

These sources were omitted in error from the Section IV table for the wet processes.

S-160 and S-163, Sludge Handling

These sources have been dismantled.

S-135, Secondary Treatment

This source has been dismantled.

S-170, Anaerobic Digesters

This source was removed from the Section IV table for the wet processes because it has different requirements from the rest of the wet processes. Digester gas, which may have a significant concentration of sulfur is generated at this source. Therefore, a new condition requiring control of the digester gas and monitoring for the digester gas total sulfur content has been added.

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:

“409.10 A 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.

The BAAQMD Compliance and Enforcement Division has conducted a review of compliance over the past year and noted that for the period from January 1, 2003 to December 31, 2003, Union Sanitary District had one Notice of Violation (NOV), no odor complaints, no monitoring excesses, and is under no District variances or Orders of Abatement. The source that received the NOV has returned to compliance. The compliance report is contained in Appendix A of this permit evaluation and statement of basis.

Changes to permit: USD was required to demonstrate compliance with the emission limits for engine S-15 and S-16. This compliance determination was to be completed within 60 days of the introduction of digester gas into the engines. Further, the engines are required to demonstrate on an annual basis that they are still in compliance with the conditioned limits.

The section now reads “The permit holder shall comply with applicable requirements that become effective during the term of the permit on a timely basis.” The phrase “on a timely basis” was added to follow the federal regulation more closely.

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 has 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; 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 have been deleted from the permit or revised as appropriate.

Conditions may also have been deleted due to the following:

- Redundancy in record-keeping 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.

Summary of Changes to Operating Conditions

The following table lists the sources in order with their current and future condition status. The condition changes will be discussed in the numerical order by source.

Source Number(s)	Current Condition No	Post-Permit Cond No.
4	14853	archived
5	None	17712
6	None	17712
15	457 17987	21298
16	17987	20905
30	None	17712
31	None	17712
40	389	20796
41	389	20796

43	9238	18803
44	None	17712
45	None	17712
100	9236	9236
101	none	14098
135	9728	archived
165	11145	archived
170	none	18785

Condition 14853 for Source S-4 This condition was associated with cogeneration engine S-4 that was removed from service as part of application 2437. The condition was archived when S-4 was archived.

Condition 17712 for Sources S-5, S-6, S-30, S-31, S-44, S-45 This condition was added (per permit application 1706) to permit the emergency standby diesel engine generators due to their loss of exemption.

1. Hours of Operation:
The emergency standby engine generators S-5, S-6, S-30, S-31, S-44, S-45 each shall only be operated to mitigate emergency conditions or for reliability-related activities. Operation for reliability-related activities shall not exceed 200 hours in any calendar year per engine. Operation while mitigating emergency conditions is unlimited.
(Basis: 9-8-331)

2. Emergency Conditions is defined as any of the following:
 - a. Loss of regular natural gas supply.
 - b. Failure of regular power supply.
 - c. Flood mitigation.
 - d. Sewage overflow mitigation.
 - e. Fire.
 - f. Failure of a primary motor, but only for such time as needed to repair or replace the primary motor.(Basis: 9-8-231)

3. Reliability-related activities is defined as any of the following:
 - a. Operation of an emergency standby engine to test its ability to perform for an emergency use, or
 - b. Operation of an emergency standby engine during maintenance of a primary motor.(Basis: 9-8-232)

4. Each of the emergency standby engine generators shall be equipped with either:

- a. a non-resettable totalizing meter that measures and records the hours of operation for the engine (the maximum hourly fuel rate shall be used to convert hours of operation to fuel usage), or
- b. a non-resettable fuel usage meter (the maximum hourly fuel rate shall be used to convert fuel usage to hours of operation).

(Basis: 9-8-530)

5. Diesel Fuel Sulfur Content:

- a. The permit holder shall not burn diesel fuel with a sulfur content in excess of 0.5% by weight
(Basis: 9-1-304).
- b. To demonstrate compliance with this limit, every delivery of diesel fuel received shall be accompanied by either
 - 1) a vendor certification of sulfur content or
 - 2) a written certification stating the diesel meets the CARB 500 ppmw maximum sulfur content standard, or
 - 3) test results showing sulfur content from a District-approved test. The certifications or test results shall be maintained onsite for at least 5 years and shall be made available to the District upon request.

(Basis: 2-6-409.2, 2-6-501)

6. Records:

The following monthly records shall be maintained in a District-approved log for at least 5 years and shall be made available for District inspection upon request.

- a. Hours of operation (total).
- b. Hours of operation under emergency conditions and a description of the nature of each emergency condition.
- c. Fuel usage.
- d. Fuel sulfur content documentation (see part 5b).

(Basis: 9-8-530)

Conditions for Cogeneration Engines S-15 and S-16

Cogeneration engine S-15 was originally issued a Permit to Operate subject to condition 457 in 1985. In April, 2001, as part of application 2437, an Authority to Construct was issued to remove cogeneration engine S-4 and add engine S-16. The new condition for S-15 and S-16 resulting from application 2437 was condition #17987. Following is a listing of the original condition 457 (for engine S-15) with an italicized explanation of the changes made to that portion of the condition as part of application 2437.

Following the discussion of Condition 457 is a listing of Condition 17987 providing further explanation of the changes made per AN 2437.

Upon the evaluation of the Title V MFR permit renewal application for USD it was determined that a number of changes in the operating conditions (Condition # 17987) for S-15 and S-16 were needed. For the purpose of improved consistency and clarity and to remove some obsolete requirements each engine will be given a separate condition. The new condition for S-16 is condition 20905, with changes from Condition 17987 noted in italics. The new condition for engine S-15 is condition 21298.

Condition# 457 -----

For S-15 Reciprocating Engine, Digester Gas Fired

- ~~1. The NO_x (Calculated as NO₂) emission rate from this engine shall not exceed 2 gram/hp-hr. (Basis: Cumulative Increase)~~

The standard for NO_x emissions was changed from 2 g/hp-hr to 1.0 g/hp-hr, erroneously, in application 2437. The part number was changed due to placement in a different location within the text of the new Condition #17987.

- ~~2. The CO Emission shall not exceed 550 pounds per day. (Basis: Cumulative Increase)~~

The 550 pound per day standard for CO was deleted since the new CO emission rate of 2.65 g/hp-hr (based on BACT for CO) would amount to a maximum daily emission limit of less than 150 pounds per day. The old 550 pounds per day limit was therefore seen to be obsolete and was therefore removed.

3. Union Sanitary shall maintain the following elements in its engine system and shall not operate this engine without them unless the District gives prior approval:
- 3.1 Automatic Air-to-fuel control system
 - 3.2 Addition of ferrous chloride to the digester.
 - 3.3 Sulfide gas scrubbers (iron sponge) following the digester.
 - 3.4 ~~Chemical element gas filter (Nelson Winslow).~~
 - 3.5 Non-metallic gasketed joints in the engine exhaust system.
 - 3.6 Lubricating oil which is relatively phosphorus and heavy metal free.
 - 3.7 ~~A turbulator thermal reactor with a centrifugal air blower to supply oxygen for combustion to reduce emissions as an exhaust emissions abatement measure.~~

Part 3 was altered in Application 2437 to remove reference to the Turbulator thermal reactor, a control device which failed soon after commissioning, forcing the facility to make major physical and operational changes to the engine to meet the appropriate emission standards. The chemical element gas filter was a part of the Turbulator system and was therefore removed. The indexing of this part was changed from numerical to alphabetical to improve consistency.

4. The owner/operator shall ensure that an annual performance test is conducted in accordance with the District test procedures to demonstrate compliance with the NO_x and CO limits. The owner/operator may submit an alternative monitoring plan to the District for approval. If the alternative monitoring plan is approved, the plan shall supersede the annual source test requirement. Approvals shall be processed using the permit modification procedure contained in Regulation 2, Rule 6.
(Basis: Regulation 2-6-409.2)

Part 4 was altered to clarify the meaning of an annual test and to expand the tested substances to include total carbon (to comply with Regulation 8-2-301) and sulfur dioxide (Regulation 9-1-302)

In addition to the italicized changes to the parts of Condition 457, a number of additional requirements (parts) were added to the conditions for sources S-15 and S-16. The above changes as well as the several additions were added to form Condition 17987.

Condition 17987 for Sources S-15 and S-16

The following condition was established as part of permit application 2437, a permit application that archived engine source S-4, installed a new engine S-16 (requiring BACT) and retrofitting engine S-15 to operate in lean-burn mode.

S-15 Engine Generator #4, Lean Burn, 700 KW, Digester Gas Fired
S-16 Engine Generator #9, Lean Burn, 535 KW, Digester Gas Fired

1. Engines S-15 and S-16 may be fired on sewage sludge digester gas only.
(Basis: Cumulative Increase)

The above part was added to clearly specify that only digester gas operation is permitted in this permit.

2. NO_x emissions, expressed as NO₂, shall not exceed 1 g/bhp-hr.
(Basis: BACT)

Application 2437 involved the installation of BACT for NO_x for engine S-16, hence the above statement of BACT for NO_x emissions. It should be noted that the BACT limitation was only applicable for engine S-16. In the establishment of Condition 17987, engine S-15 was erroneously assigned the same emission standards as engine S-16, an engine that underwent NSR requiring BACT and offsets in application 2437.

3. CO emissions shall not exceed 2.65 g/bhp-hr.
(Basis: BACT)

Application 2437 involved the installation of BACT for CO. Both engines S-15 and S-16 were required to meet BACT for CO.

4. SO₂ emissions shall not exceed the following limits:

S-15 17.8 lb/day

S-16 11.9 lb/day

(Basis: BACT)

AN 2437: The above numbers were based on 0.3 g/bhp-hr, which represented BACT2 for IC engines burning digester gas. It should be noted that the BACT limitation was only applicable for engine S-16. In the establishment of Condition 17987, engine S-15 was erroneously assigned the same emission standards as engine S-16, an engine that underwent NSR requiring BACT and offsets in application 2437. The daily emission limits have been stricken from the conditions for both source S-15 and S-16 and instead will be included in the conditions for the anaerobic digester S-170. The digester will be conditioned to a maximum level of 300 ppm H₂S which is equivalent to 0.3 g/bhp-hr SO (BACT). The calculation showing this conversion is in Appendix D.

5. To achieve compliance with Condition 4, Union Sanitary District shall maintain the following elements in its engine system and shall not operate either S-15 or S-16 without them unless The District gives prior approval:

(Basis: BACT)

- a. Automatic Air-to-fuel control system.
- b. Addition of ferrous chloride to the digester feed sludge.
- c. Sulfide gas scrubbers (iron sponge) following the digester S-170.
- d. Non-metallic gasketed joints in the engine exhaust system.
- e. Lubricating oil which is relatively phosphorus and heavy metal free.

As part of permit application 2437, Part 5 was based on part 3 of condition 457, modified appropriately. The requirements listed were process methods used to reduce sulfide levels in the digester gas.

6. District approved flowmeters, to measure fuel flow into the engine, shall be installed prior to any operation and maintained in good working order.

(Basis: Cumulative Increase)

AN 2437: Part 6 was added to provide the ability to monitor and record the digester gas input to the respective engines.

7. Visible particulate emissions shall not exceed 0.5 on the Ringelmann chart.

(Basis: Cumulative Increase)

This limit was added so the plant operator would be reminded to make sure the engines are operated properly to limit visible emissions.

8. Thermal Capacity Limitations: Total thermal throughput shall not exceed the following limits

(Basis: Cumulative Increase)

S-15 8.6 MM Btu/hr

S-16 5.9 MM Btu/hr

This limit was the heat duty basis for the application, which provides a written upper limit of heat input into each engine.

9. Any amount of collected digester gas that exceeds the capacity of the engine generators of the owner/operator shall be vented for abatement to either any of the hot water boilers S-1, S-2, S-3, S-40, S-41, S-43 or to any of the digester gas flares A-401, A-402, or A-403.
(Basis: 1-301)

This part was added to ensure that digester gas would always be properly handled.

10. In order to demonstrate compliance with parts 2 and 3, the owner/operator of these sources shall conduct an initial compliance demonstration test on each of these sources within 60 days of the introduction of digester gas into the source. The owner/operator shall notify the District's Source Test Section of the scheduled test dates at least seven days in advance. Upon completion of the source testing and analysis, the owner/operator shall submit all test results to the District's Compliance and Enforcement Division within 30 days of conducting the test.
(Basis: BACT)

Demonstration of compliance with parts 2 and 3, of condition 17987.

11. The owner/operator shall ensure that a performance test is conducted on each engine at a frequency of not less than once every calendar year of operation after the previous source test. The performance test shall be conducted in accordance with the District test procedures to demonstrate compliance with the NO_x and CO limits required by parts 2 and 3 respectively. The owner/operator may submit an alternative monitoring plan to the District for approval. If the alternative monitoring plan is approved, the plan shall supersede the annual source test requirement. Approvals shall be processed using the permit modification procedure contained in Regulation 2, Rule 6.
(Basis: Regulation 2-6-409.2)

Annual source testing requirement to provide a method to demonstrate ongoing compliance with the BACT limits for NO_x and CO.

12. To demonstrate compliance with part 4, SO₂, the Permit Holder shall calculate the emissions of SO₂ from each engine by material balance, based on the digester gas flow rate to each engine, in conjunction with the sulfur content of the digester gas.
(Basis: Regulation 2-6-409.2)

Demonstration of compliance with daily SO₂ limits.

13. To determine compliance with the above conditions, the Permit Holder shall maintain the following records and provide all of the data necessary to evaluate compliance with the above conditions, including the following information
(Basis: Regulation 2-6-409.2)
 - a. Monthly records of the quantity of digester gas burned at each of these sources.
 - b. Records of all digester gas methane content measurements.

- c. Daily records of methane throughput to these sources, summarized on a monthly basis.
- d. Records of all compliance demonstration test data.
- e. Monthly records shall be totaled for each consecutive 12-month period.

All records shall be retained onsite for five years from the date of entry, and made available for inspection by District staff upon request. These recordkeeping requirements shall not replace the recordkeeping requirements contained in any applicable District Regulations.

New Condition 20905 for S-16 (Application 3905, Title V renewal application)

To provide further clarification and deal with various issues of substance that were considered as part of the Title V renewal, the following condition was established to replace Condition 17987 for engine S-16. Note that a short italicized explanation is included after each part. This explanation will not be included in the actual condition.

S-16 Engine Generator #9, Lean Burn, 535 KW, Digester Gas Fired

1. ~~Engines S-15 and~~ S-16 may be fired on sewage sludge digester gas only.
(Basis: Cumulative Increase)

part 1 of Condition 1798 revised to include only engine S-16.

2. Thermal Capacity Limitation: Total thermal throughput shall not exceed ~~the following annual (consecutive 12-month) limits:~~ (Basis: Cumulative Increase)

~~S-15: 8.6 MM Btu/hr 75,336 million Btu/yr~~

S-16: ~~5.9 MM Btu/hr~~ 51,684 million Btu/yr in any consecutive 12-month period.

This was formerly part 8 of Condition 17987. The requirement was moved closer to the start of the conditions, as maximum firing rate is a basic limitation. Further, the condition was changed from being an hourly limit to an annual limit. This change is made because it is not practical to monitor and record individual engine heat inputs on an hourly basis. The throughput limitations are placed on sources to limit annual emissions for the purpose of minimizing the cumulative increase. A similar requirement is listed in the condition for S-15.

3. Nitrogen oxide (NO_x) NO_x emissions, expressed as NO₂, shall not exceed 1.0 grams of NO_x g/bhp-hr (calculated as NO₂) per brake-horsepower-hour. The permit holder may demonstrate compliance with this emission rate limit by demonstrating a NO_x concentration in the engine exhaust of no more than 73 ppm of NO_x, corrected to 15% oxygen, dry basis. An exhaust concentration measurement of more than 73 ppm NO_x shall not be deemed a violation of this part, if the permit holder can demonstrate that NO_x emissions did not exceed 1.0 g/bhp-hr during the test period.
(Basis: BACT)

The facility requested a ppm standard for NOx equivalent to the 1.0 g/bhp-hr that could be used to demonstrate compliance without having to use equipment measuring the horsepower. The use of either standard could be used to demonstrate compliance with NOx emission limits. Appendix C, part 2 contains the calculation with assumptions for this conversion.

4. Carbon Monoxide (CO) emissions shall not exceed 2.65 grams g/bhp-hr of CO per brake-horsepower-hour. The owner/operator may demonstrate compliance with this emission rate limit by demonstrating a CO concentration in the engine exhaust of no more than 318 ppm of CO, corrected to 15% oxygen, dry basis. An exhaust concentration measurement of more than 318 ppm CO shall not be deemed a violation of this part, if the permit holder can demonstrate that CO emissions did not exceed 2.65 g/bhp-hr during the test period.
(Basis: BACT)

The facility requested a ppm standard for CO equivalent to the 2.65 g/bhp-hr that could be used to demonstrate compliance without having to use equipment measuring the horsepower. The use of either standard could be used to demonstrate compliance with CO emission limits. Appendix C, part 3 contains the calculation with assumptions for this conversion.

5. To demonstrate compliance with part 2 above, a District approved totalizing flowmeters shall be installed, maintained, and used to monitor and record measure the fuel flow and heat input into the engines S-15 and S-16. shall be installed prior to any operation and maintained in good working order. Engine fuel and heat input parameters shall be calculated as follows:
(Basis: Cumulative Increase)
- Individual engine digester gas flow shall be calculated by ratioing the respective engine generator electrical production against the total digester gas flow to the engines.
 - Digester gas heat content shall be determined by multiplying the digester gas methane fraction by 1020 Btu/dscf. The methane fraction shall be calculated by averaging the three most recent source test derived digester gas methane fractions. Where three digester gas methane fractions are not available, the operator shall assume a methane fraction of 0.59 for the missing data points.
 - Individual engine heat input shall be calculated by using the digester gas heat content in conjunction with the calculated individual engine digester gas flow.

Due to the digester gas piping and flow parameters on the supply lines to these engines, it was determined it is not practical to have an individual digester gas flow meter for each engine. Currently there is a total digester gas flow meter for both engines combined. The above wording will be used in the conditions for both S-16 as well as S-15.

- ~~6. Visible particulate emissions shall not exceed 0.5 on the Ringelmann chart. (Basis: Cumulative Increase)~~

The 0.5 Ringelmann limit represents a BACT limit for sources that trigger BACT for particulate. This limit was improperly associated with these sources, since neither S-15 nor S-16 triggers BACT for particulate. Hence the part has been removed.

6. ~~9.~~ Any amount of collected digester gas that exceeds the capacity of the engine generators ~~S-16 of the owner/operator~~ shall be vented for abatement to either any of the heat recovery sources ~~hot water boilers~~ S-1, S-2, S-3, S-15, S-40, S-41, S-43 or to any of the digester gas flares A-401, A-402, or A-403. In no case shall raw digester gas be vented to the atmosphere.
(Basis: 1-301)
7. ~~11.~~ The owner/operator shall ensure that a performance test is conducted on ~~each~~ the engine on an annual basis. Source tests to demonstrate annual compliance shall be conducted no sooner than 6 months and no later than 12 months at a frequency of not less than once every calendar year of operation after the previous source test. ~~The performance test shall be conducted in accordance with the District test procedures to demonstrate compliance with the NOx and CO limits required by parts 2 and 3 respectively.~~ The Source Test Section of the District shall be contacted to obtain approval of the source test procedures at least 14 days in advance of each source test. The Source Test Section of the District shall be notified of the scheduled test date at least 7 days in advance of each source test. The source test report shall be submitted to the Compliance and Enforcement Division and the Source Test Section within 45 days of the test date. The annual source tests shall determine the following:
- Total flowrate of digester gas to the IC engine (dry basis)
 - Digester gas composition: Concentration (dry basis) of carbon dioxide (CO₂), nitrogen (N₂), oxygen (O₂), total reduced sulfur compounds (TRS), methane (CH₄), and total non-methane organic compounds.
 - Exhaust gas composition: Concentration (dry basis) of NO_x, CO, and O₂ in the exhaust gases from each IC engine. Corrected concentration of NO_x and CO at 15% oxygen.
 - NO_x, C emissions: The owner/operator may use any of the aforementioned allowable emission units specified in parts 3 and 4, above, to demonstrate compliance with the applicable emission standard.

The owner/operator may submit an alternative monitoring plan to the District for approval. If the alternative monitoring plan is approved, the plan shall supercede the annual source test requirement. Approvals shall be processed using the permit modification procedure contained in Regulation 2, Rule 6. (Basis: 2-6-409.2)

- ~~Monthly records of the quantity of digester gas burned at each of these sources.~~
- ~~Records of all digester gas methane content measurements.~~
- ~~Daily records of methane throughput to these sources, summarized on a monthly basis.~~
- ~~Records of all compliance demonstration test data.~~
- ~~Monthly records shall be totaled for each consecutive 12-month period.~~

8. In order to demonstrate compliance with parts 2, 3, and 4, the owner/operator shall maintain the following records in a District approved logbook for IC engine S-16.
- Total heat input and digester gas input to each engine tabulated on a monthly basis (determined in accordance with part 5 above).

- b. Records of all digester gas methane content measurements and digester gas heat content calculations.
- c. Records of all compliance demonstration test results and any calculation procedures used to show compliance with these conditions.
- d. Monthly records shall be totaled for each consecutive 12-month period.

All records shall be retained onsite for five years from the date of entry, and made available for inspection by District staff upon request. These recordkeeping requirements shall not replace the recordkeeping requirements contained in any applicable District Regulations. (Basis: 2-6-409.2)

New Condition 21298 for S-15 (Application 3905, Title V renewal application)

Engine S-15 has been given a specific condition for the purposes of clarification and appropriate revision. Changes made reflect the current condition 17987, with revisions incorporated into the new condition for S-15.

S-15 Engine Generator #4, Lean Burn, 700 KW, Digester Gas Fired

1. Engines S-15 ~~and S-16~~ may be fired on sewage sludge digester gas only.
(Basis: Cumulative Increase)

Identical to the requirement for engine S-16 in Condition 20905.

2. Thermal Capacity Limitation: Total thermal throughput shall not exceed ~~the following annual (consecutive 12-month) limits:~~
(Basis: Cumulative Increase)

~~S-15: 8.6 MM Btu/hr~~ 75,336 million Btu/yr

This was formerly part 8 of Condition 17987. The requirement was moved closer to the start of the conditions, as maximum firing rate seems to be a basic limitation. Further, the condition was changed from being an hourly limit to an annual limit. This change is made because it is very difficult to effectively monitor and record individual engine heat inputs on an hourly basis. The throughput limitations are placed on sources to limit annual emissions for the purpose of minimizing the cumulative increase. This is applicable only to source S-15, although a similar requirement is listed in the condition for S-16.

3. Nitrogen oxide (NO_x) NO_x emissions, expressed as NO₂, shall not exceed ~~1.0~~ 1.34 grams g/bhp-hr (calculated as NO₂) per brake-horsepower-hour. The permit holder may demonstrate compliance with this emission rate limit by demonstrating a NO_x concentration in the engine exhaust of no more than 98 ppm of NO_x, corrected to 15% oxygen, dry basis. An exhaust concentration measurement of more than 98 ppm NO_x shall not be deemed a violation of this part, if the permit holder can demonstrate that NO_x emissions did not exceed 1.34 g/bhp-hr during the test period.
(Basis: Cumulative Increase)

The earlier permit application 2437 mistakenly applied the same emission limitation used for engine S-16 on engine S-15. This is not appropriate as there is no NOx emissions increase from engine S-15, therefore the same limitations do not apply for this engine. The engine will be conditioned to a maximum NOx level of 1.34 g/bhp-hr that is consistent with the 3-yr baseline average emission rate prior to AN 2437. Emissions from this engine did not increase therefore BACT was not required.. The facility requested a ppm standard for NOx equivalent to the g/bhp-hr standard that could be used to demonstrate compliance without having to use equipment measuring the horsepower. The use of either standard could be used to demonstrate compliance with NOx emission limits. Appendix C, part 4 contains the calculation and assumptions for this conversion.

4. Carbon Monoxide (CO) emissions shall not exceed 2.65 grams g/bhp-hr of CO per brake-horsepower-hour. The owner/operator may demonstrate compliance with this emission rate limit by demonstrating a CO concentration in the engine exhaust of no more than 318 ppm of CO, corrected to 15% oxygen, dry basis. An exhaust concentration measurement of more than 318 ppm CO shall not be deemed a violation of this part, if the permit holder can demonstrate that CO emissions did not exceed 2.65 g/bhp-hr during the test period.
(Basis: BACT)

The facility requested a ppm standard for CO equivalent to the 2.65 g/bhp-hr(BACT) that could be used to demonstrate compliance without having to use equipment measuring the horsepower. The use of either standard could be used to demonstrate compliance with CO emission limits. Appendix C, part 5 contains the calculation and assumptions for this conversion.

5. To demonstrate compliance with part 2 above, a District approved totalizing flowmeters shall be installed, maintained, and used to monitor and record measure the fuel flow and heat input into the engines S-15 and S-16. shall be installed prior to any operation and maintained in good working order. Engine fuel and heat input parameters shall be calculated as follows:
(Basis: Cumulative Increase)
 - a. Individual engine digester gas flow shall be calculated by ratioing the respective engine generator electrical production against the total digester gas flow to the engines.
 - b. Digester gas heat content shall be determined by multiplying the digester gas methane fraction by 1020 Btu/dscf. The methane fraction shall be calculated by averaging the three most recent source test derived digester gas methane fractions. Where three digester gas methane fractions are not available, the operator shall assume a methane fraction of 0.59 for the missing data points.
 - c. Individual engine heat input shall be calculated by using the digester gas heat content in conjunction with the calculated individual engine digester gas flow.

Due to the digester gas piping and flow parameters on the supply lines to these engines, it was determined it is not practical to have an individual digester gas flow meter for each engine. Currently there is a total digester gas flow meter for both engines combined.

~~6. Visible particulate emissions shall not exceed 0.5 on the Ringelmann chart. (Basis: Cumulative Increase)~~

The 0.5 Ringelmann limit represents a BACT limit for sources that trigger BACT for particulate. This limit was improperly associated with these sources, since neither S-15 nor S-16 triggers BACT. Hence the part has been removed.

6. ~~9.~~ Any amount of collected digester gas that exceeds the capacity of the engine generators S-15 of the owner/operator shall be vented for abatement to either combusted in any of the heat recovery sources hot water boilers S-1, S-2, S-3, S-16, S-40, S-41, S-43 or to abated in any of the digester gas flares A-401, A-402, or A-403. In no case shall raw digester gas be vented to the atmosphere.
(Basis: 1-301)

7. ~~11.~~ The owner/operator shall ensure that a performance test is conducted on ~~each~~ the engine on an annual basis. Source tests to demonstrate annual compliance shall be conducted no sooner than 6 months and no later than 12 months at a frequency of not less than once every calendar year of operation after the previous source test. The performance test shall be conducted in accordance with the District test procedures to demonstrate compliance with the NO_x and CO limits required by parts 2 and 3 respectively. The Source Test Section of the District shall be contacted to obtain approval of the source test procedures at least 14 days in advance of each source test. The Source Test Section of the District shall be notified of the scheduled test date at least 7 days in advance of each source test. The source test report shall be submitted to the Compliance and Enforcement Division and the Source Test Section within 45 days of the test date. The annual source tests shall determine the following:

- Total flowrate of digester gas to the IC engine (dry basis).
- Digester gas composition: Concentration (dry basis) of carbon dioxide (CO₂), nitrogen (N₂), oxygen (O₂), total reduced sulfur compounds (TRS), methane (CH₄), and total non-methane organic compounds.
- Exhaust gas composition: Concentration (dry basis) of NO_x, CO, and O₂ in the exhaust gases from the IC engine. Corrected concentration of NO_x and CO at 15% oxygen.
- NO_x, CO emissions: The owner/operator may use any of the aforementioned allowable emission units specified in parts 3 and 4, above, to demonstrate compliance with the respective emission standard.

The owner/operator may submit an alternative monitoring plan to the District for approval. If the alternative monitoring plan is approved, the plan shall supercede the annual source test requirement. Approvals shall be processed using the permit modification procedure contained in Regulation 2, Rule 6.
(Basis: 2-6-409.2)

~~a. Monthly records of the quantity of digester gas burned at each of these sources.
b. Records of all digester gas methane content measurements.
c. Daily records of methane throughput to these sources, summarized on a monthly basis.~~

- ~~d. Records of all compliance demonstration test data.~~
- ~~e. Monthly records shall be totaled for each consecutive 12-month period.~~

8. In order to demonstrate compliance with parts 2, 3, and 4, the owner/operator shall maintain the following records in a District approved logbook for engine S-15.
- a. Total heat input and digester gas input to the engine tabulated on a monthly basis (determined in accordance with part 5 above).
 - b. Records of all digester gas methane content measurements and digester gas heat content calculations.
 - c. Records of all compliance demonstration test results and any calculation procedures used to show compliance with these conditions.
 - d. Monthly records shall be totaled for each consecutive 12-month period.

All records shall be retained onsite for five years from the date of entry, and made available for inspection by District staff upon request. These recordkeeping requirements shall not replace the recordkeeping requirements contained in any applicable District Regulations.

(Basis: 2-6-409.2)

Parts Removed from Condition 17987:

- ~~4. SO₂ emissions shall not exceed the following limits:~~

- ~~— S-15 — 17.8 lb/day~~
- ~~— S-16 — 11.9 lb/day~~
- ~~— (Basis: BACT)~~

These daily limits are being removed based upon a complete review of the SO₂ emissions and standards for the facility. The above daily limits were based on 0.3 g/hp-hr engine emissions, which was approximately equivalent to a digester gas sulfide level of 301 ppm (see calculation, Appendix D). USD controls hydrogen sulfide in digester gas to 100 ppm with typical operational levels less than 50 ppm. All conditions referencing sulfide emissions and levels will be taken from the combustion sources and will be replaced with a 300 ppm limit (equivalent to BACT) on S-170 anaerobic digester.

- ~~5. To achieve compliance with Condition 4, Union Sanitary District shall maintain the following elements in its engine system and shall not operate either S-15 or S-16 without them unless The District gives prior approval: (Basis: BACT)~~

- ~~— a. Automatic Air-to-fuel control system.~~
- ~~— b. Addition of ferrous chloride to the digester feed sludge.~~
- ~~— c. Sulfide gas scrubbers (iron sponge) following~~

- ~~— the digester S-170.~~
- ~~— d. Non-metallic gasketed joints in the engine exhaust system.~~
- ~~— e. Lubricating oil which is relatively phosphorus and heavy metal free.~~

The above requirements were removed as part of the Title V renewal application 3905 because there are a number of process methods that are used and are not mentioned to control digester gas sulfur. A condition limiting digester gas sulfide levels has been established for digester S-170. It is the responsibility of the applicant to meet the condition, regardless of the method(s) used.

- ~~7. Visible particulate emissions shall not exceed 0.5 on the Ringelmann chart. (Basis: Cumulative Increase)~~

This requirement was mistakenly added to the conditions for the cogeneration engines as part of application 2437. The Ringelmann limit of 0.5 represents a BACT limit, therefore the Cumulative Increase basis is incorrect as well. A review of the permit application for engines S-15 and S-16 shows that BACT was not triggered for particulates, and therefore this requirement is not appropriate, and has therefore been struck from the conditions.

- ~~10. In order to demonstrate compliance with parts 2 and 3, the owner/operator of these sources shall conduct an initial compliance demonstration test on each of these sources within 60 days of the introduction of digester gas into the source. The owner/operator shall notify the District's Source Test Section of the scheduled test dates at least seven days in advance. Upon completion of the source testing and analysis, the owner/operator shall submit all test results to the District's Compliance and Enforcement Division within 30 days of conducting the test. (Basis: BACT)~~

This part was removed as the initial source test was performed which demonstrated compliance.

- ~~12. To demonstrate compliance with part 4, SO₂, the Permit Holder shall calculate the emissions of SO₂ from each engine by material balance, based on the digester gas flow rate to each engine, in conjunction with the sulfur content of the digester gas. (Basis: Regulation 2-6-409.2)~~

The above part was removed since a condition limiting digester gas sulfide levels has been established for digester S-170. The S-170 sulfur limitation trumps all other sulfur requirements, hence the above part was removed.

Conditions for Standby Digester Gas Boilers, S-40 and S-41

The existing condition 389 is for the digester hot water heaters S-40 and S-41. This condition has been clarified (new condition number 20796) to specify that the boilers can only be fired on digester gas. There is no need to monitor NO_x, CO or any other pollutant concentration as the boilers are not subject to any emission standard. Further there is no need to specify the firing capacity in the permit conditions, as it would follow that a demonstration of compliance would be required. Since these boilers are so small, the NO_x and CO potential to emit is very small as well, 1,211 lb/yr for NO_x and 1,017 lb/yr for CO.

It bears mentioning that boilers S-40 and S-41 are back up boilers to S-43 boiler. S-43 boiler is the back up boiler for cogen engines S-15 and S-16. Normally S-43 is only needed when one or the other engines is out of service. Boilers S-40 and S-41 are used minimally.

Condition #389 for Sources S-40 and S-41

~~For Sources S-40 and S-41 (Hot Water Sludge Heating Boilers
— #4 & #5 respectively)~~

- ~~*1. S-40 and S-41 shall meet one of the following: a)
— Operate in a manner that maintain stack gas oxygen
— concentrations at less than or equal to 3 percent by
— volume on a dry basis; or b) Tune at a frequency of at
— least once every twelve months by a technician as
— directed by the BAAQMD Manual of Procedures, Volume I,
— Chapter 5 (Basis: BAAQMD Regulation 9-7-304)~~

Condition # 389 was revised to the new condition (# 20796) that contains revised language reflecting Union Sanitary District's decision to perform annual tuning of the boilers S-40 and S-41. In addition, the District has added the requirements that only digester gas can be burned in the units, and that records be maintained which demonstrate compliance with the tune up specifications.

New Condition #20796 for Sources S-40 and S-41

For sources S-40 and S-41 (Standby Hot Water Boilers #4 & #5 respectively)

1. S-40 & S-41 may be fired on sewage sludge digester gas only.
(Basis: Cumulative Increase)
2. The owner/operator of the hot water boilers S-40 and S-41 shall perform a regular inspection and tune up of the combustion section(s) to ensure the proper air-to-fuel ratio is being used to maximize efficiency and minimize the production of nitrogen oxides and carbon monoxide, following the procedure of Regulation 9, Rule 7, Section 604 (CARB

BARCT tune up procedure). The time interval between boiler tune-ups shall not exceed 12 months.

(Basis: 9-7-304.2)

3. In order to demonstrate compliance with the requirements of part #2, the owner/operator of the hot water boilers S-40 and S-41 shall document each tune up as follows:

(Basis: 9-7-503.1)

- a. Time and date of the tune up and the identity of the qualified technician.
- b. Stack gas oxygen concentrations (ppm dry) and carbon monoxide concentrations (ppm dry) before and after any adjustments are made.

The records associated with the above requirements shall be maintained for a period of at least 5 years from the date of the inspection or test and be available for review by District personnel upon request.

(Basis: 2-6-501)

Condition Revisions for Source S-43

Condition 9238 is for S-43 hot water boiler. Part 3 of Condition 9238 specifying a maximum sulfide concentration in the digester gas to S-43 has been removed and will be essentially relocated to a new condition for S-170 anaerobic digester. The balance of Condition 9238 has undergone some extensive reorganization to improve the clarity. Additionally, the requirement to perform an annual boiler tune up per Regulation 9-7-304 is included in the condition, as are recordkeeping requirements. For these reasons a new condition (Condition #18803) was developed for source S-43 hot water boiler. References to initial compliance source testing in the original condition 9238 have been removed, since the initial performance tests were conducted, demonstrating compliance with the BACT limits within 60 days of initial startup of source S-43. Additional explanations of the revisions or additions are noted in italics.

Condition 9238 for S-43 (revised into new Condition 18803)

For S-43 Hot Water Boiler, Digester Gas Fired

1. Throughput

Digester gas usage at S-43 boiler shall not exceed 52.8 E3 MM Btu/yr (gross basis).
(Basis: Cumulative Increase)

2. Flue Gas NO_x, CO Concentrations

The maximum S-43 flue gas NO_x concentration shall not exceed 40 ppmv (at3% oxygen).
The maximum S-43 flue gas CO concentrations shall not exceed 100 ppmv (at3% oxygen).
(Basis: BACT)

3. ~~Digester Gas H₂S Content~~

~~Union Sanitary District shall operate the ferric chloride addition at S-161 to maintain the concentration of hydrogen sulfide in the digester gas being fired in S-43 at a level not to exceed 100 ppmv hydrogen sulfide. (Basis: BACT)~~

Upon review of the Condition 9238 for source S-43, it was discovered that this limit was placed on the hot water boiler in error. The limit should have been placed on the anaerobic digester at a level corresponding to 0.3 g/bhp-hr as published as BACT for digester gas fired engines. This limit will be placed on source S-170 anaerobic digester.

4. Source Testing

~~To demonstrate compliance with permit condition 2, above, Union Sanitary District shall within 60 days of startup of this source, conduct a District approved source test pursuant to the following protocols. Source test results shall be submitted to the District within 60 days of completion of the source test. (Basis: BACT)~~

~~Protocol NO_x Determination: The methods by which sample of exhaust gases are collected and analyzed to determine concentrations of nitrogen oxides are set forth in the District's Manual of Procedures, Volume IV, ST-13A.~~

~~Protocol CO, O₂ Determination: The methods by which samples of exhaust gases are collected and analyzed to determine concentrations of carbon monoxide and stack gas oxygen are set forth in the District's Manual of Procedures, Volume IV, ST-6 (carbon monoxide) and ST-14 (oxygen).~~

The above part was removed since the original source test was conducted within 60 days of startup of the boiler – demonstrating compliance with the BACT standards noted in Part 2. The standards will remain, but references to past requirements which have been met will be removed.

5. Recordkeeping

To demonstrate compliance with permit conditions 1 and 3 above, USD shall keep monthly records (on site) of S-43 operation. ~~Such records shall include hours of operation, quantities of fuel being fired, and average H₂S concentration of the digester gas.~~ Such records shall be maintained on site for a period of at least five years. The log shall be kept on site and made available to the District staff upon request. (Basis: Cumulative Increase, BACT 2-6-501).

References to digester gas H2S levels will be removed and associated instead with S-170 anaerobic digesters.

New Condition 18803 for S-43, per Title V renewal application 3905

S-43 Hot Water Boiler, Digester or Natural Gas fired

1. S-43 Hot Water Boiler may be fired on any combination of sewage sludge digester gas or natural gas only.
(Basis: Cumulative Increase)

Part 1 is added to clarify the fact that the boiler S-43 may be operated on any combination of digester gas or natural gas, as permitted originally in application 9735.

2. Throughput
Total Fuel usage at S-43 boiler shall not exceed ~~52.8 E3~~ 52,800 MM Btu/yr (gross basis).
(Basis: Cumulative Increase)

The fuel throughput limit has not been changed, only the form altered to clarify the throughput limitation.

3. Flue Gas NOx, CO Concentrations

The maximum S-43 flue gas NOx concentration shall not exceed 40 ppmv (at 3% oxygen).
The maximum S-43 flue gas CO concentrations shall not exceed 100 ppmv (at 3% oxygen).
(Basis: BACT)

4. The owner/operator of S-43 Boiler shall perform a regular inspection and tune up of the combustion section to ensure the proper air-to-fuel ratio is being used to maximize efficiency and minimize the production of nitrogen oxides and carbon monoxide, following the procedures of Regulation 9 Rule 7, Section 604 (CARB BARCT Tune Up Procedures). The time interval between boiler tune-ups shall not exceed 12 months.
(Basis: 9-7-304.2)

Source S-43 boiler is subject to 9-7-304 and the operator has chosen to comply with the requirement by conducting a regular inspection as specified in 9-7-304 and detailed in 9-7-604.

5. Recordkeeping

To demonstrate compliance with parts 1, 2 and 3, above, the owner/operator of hot water boiler S-43 shall document the operation and tune ups by keeping the following records:

- a. Monthly records of operation including hours of operation and quantities and type of fuel fired.
- b. Time and date of the tune up and the identity of the qualified technician.

- c. Stack gas oxygen concentrations (ppm dry) and carbon monoxide concentrations (ppm dry) before and after any adjustments are made.

The records associated with the above requirements shall be maintained for a period of at least 5 years from the date of the inspection or test and be available for review by District personnel upon request.

(Basis: 2-6-501)

The recordkeeping section has been re-written to address the removal of H₂S monitoring of digester gas and the regular inspection of the boiler as enumerated in Part 4, above.

Condition 9236 for Source S-100 This condition is for the S-100 wastewater treatment plant (liquid sources). There are no changes proposed for this condition that specifies steps to be taken by the facility in the event of a public nuisance odor problem.

Condition 14098 for S-101 Gasoline Dispensing Facility This is a new condition and was established for the gasoline dispensing facility (GDF), source S-101 (G-6873), as a result of Application . The condition contains standard wording that limits gasoline throughput to 940,000 gal in any 12 month period.

For: S-101, Non-Retail Gasoline Dispensing Facility G# 6873

1. Pursuant to BAAQMD Toxic Section Policy, this facility's annual gasoline throughput shall not exceed 940,000 gallons in any consecutive 12-month period.
(Basis: Toxic Risk Management)

Condition 9728 for Source S-135 This condition was archived, when source S-135, INKA Secondary Treatment process was removed from service in September of 2001, due to major operational problems.

Condition 11145 for Source S-165 This condition was associated with source S-165, a pilot plant water reclamation plant that was demolished in 2000. The source was archived in August of 2000.

New Condition 18785 for Source S-170 This condition is for source S-170, the anaerobic digester. This is a new condition for S-170 and requires that all digester gas be processed in the heat recovery units preferentially, or in the waste gas flares if insufficient capacity exists in the other combustion sources. The condition also presents a maximum sulfide limit for the digester gas. The limit is established as a BACT limit as required by the installation of engine S-16 in AN 2437. Monthly digester gas monitoring and recordkeeping is required.

1. Emissions from S-170 shall be abated at all times by combustion at any or all of the following sources: S-1, S-2, S-3, S-15, S-16, S-40, S-41, S-43, except as specified in Part 2.
(Basis: 1-301)
2. Emissions from S-170 shall be abated by A-401, A-402, any of or A-403 only when equipment failure or other emergencies require the flaring of digester gas, or when digester gas production exceeds the combustion capacity of the sources noted in part 1, above.
(Basis: Cumulative Increase)
3. Digester gas total sulfur content shall not exceed 300 ppm.
(Basis: BACT)
4. To demonstrate compliance with the standard noted in part 3, the permit holder shall monitor and record the sulfur content of the digester gas at a frequency of at least once every calendar month. If the observed sulfur content of the digester gas meets or exceeds 100 ppm, the permit holder shall automatically increase the monitoring frequency to at least once every calendar week. The monitoring frequency may return to a calendar month basis with four consecutive digester gas sulfur content measurements less than 100 ppm.
(Basis: Regulation 1-441)
5. Records of monthly digester gas sulfur content measurements shall be maintained in a District-approved log. Records shall be maintained for at least 5 years and shall be made available for District inspection upon request.
(Basis: Regulation 1-441)

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 tables below contain only the 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 only when it can support a conclusion that existing monitoring is inadequate.

NOX Sources

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Periodic Monitoring
S-15 Engine Generator #4, Lean Burn	Condition 21298, part 3	1.34 g/hp-hr or 98 ppm at 15% Oxygen (Cumulative Increase)	Condition 21298, part 7 (annual source test)
S-16 Engine Generator #9, Lean Burn	Condition 20905, part 3	1.0 g/hp-hr or 73 ppm at 15% Oxygen (BACT)	Condition 20905, part 7 (annual source test)
S-15 Engine Generator #4, Lean Burn	Regulation 9-8-302.1	140 ppm at 15% Oxygen	Condition 21298, part 7 (annual source test)
S-16 Engine Generator #9, Lean Burn	Regulation 9-8-302.1	140 ppm at 15% Oxygen	Condition 20905, part 7 (annual source test)

NOx Emissions Discussion

The sources of NOx at USD are the standby diesel generators, the cogeneration engines, S-15 and S-16, the standby hot water heaters S-40 and S-41 the main hot water boiler, S-43, and the digester gas flares. S-43 is permitted to be fired on either digester gas or natural gas. With the exception of the diesel generators, the rest of the sources are fired on 100% digester gas. The NOx requirements of each source will be discussed in turn.

Cogeneration Engines S-15 and S-16, Digester Gas Fired: The NOx emission standard for these engines is based on cumulative increase for engine S-15 and BACT for S-16 as per permit application 2437, with annual monitoring to demonstrate compliance with the respective standards. As noted in the discussion of the permit condition changes for these sources, to assist in determining compliance with this standard, an equivalent ppm NOx standard at 15% oxygen has been determined and included in the condition. The equivalent concentration of NOx are listed in part 3 of Conditions 20905 and 21298 with the calculations shown in Appendix C. The Regulation 9, Rule 8 NOx emission standard is 140 ppm at 15% O2 and is based on Best Available Retrofit Control Technology (BARCT). The BARCT limit is not shown in the permit conditions. Since the requirement shown for both engines are more stringent than the Regulation 9-8 requirement, the source test will demonstrate compliance with both limits.

NOx PTE, S-15: $(1,081 \text{ hp})(1.34 \text{ g/bhp-hr})(\text{lb}/454 \text{ g})(8760 \text{ hr/yr}) = 27,950 \text{ lb/yr}$
 NOx PTE, S-16: $(742 \text{ hp})(1.0 \text{ g/bhp-hr})(\text{lb}/454 \text{ g})(8760 \text{ hr/yr}) = 14,317 \text{ lb/yr}$

Standby Hot Water Boilers S-40 and S-41, Digester Gas Fired: These boilers are subject to Regulation 9-7, Inorganic Pollutants, Industrial Boilers. This regulation sets the NOx and CO standards for boilers. These boilers are used only for emergencies with each having a heat input capacity of 1.4 MM Btu/hr fired with 100% digester gas. These boilers were permitted in 1988 and were not determined to be subject to BACT due to their small size. The potential to emit NOx from each boiler if fired 100% of the time is less than a ton per year. Due to their relatively small size, these boilers are only required (per 9-7-304) to either operate with a stack gas oxygen content not to exceed 3% or to have an annual tuning by a technician according to the requirements of 9-7-604. USD has chosen to perform the annual tuning, which has been written into the new operating conditions.

NOx PTE: $(100 \text{ lb NOx}/1\text{E}6 \text{ scf})(\text{scf}/1013 \text{ Btu})(1.4\text{E}6 \text{ Btu/hr})(8760 \text{ hr/yr}) = 1,211 \text{ lb/yr}$

S-43 Hot Water Boiler, Digester or Natural Gas Fired: The NOx emission standard for S-43 has not been changed. This 40 ppm at 3% oxygen was based on BACT at the time of permitting in 1993. S-43 is also subject to certain requirements of Regulation 9-7, although the thermal input capacity of the boiler is less than 10 MM Btu/hr and the boiler is in fact conditioned to an annual thermal throughput that represents an operating factor of 0.72. Since the capacity is less than 10 MM Btu/hr, the unit is not subject to the requirements of 9-7-301, 302, or 303. S-43 is subject to 9-7-304, and has chosen to perform a tune up on the boiler at a frequency of at least once every 12 months. The original references to 9-7-301 in the original Title V Permit Table VII for S-43 will be removed since they were included in error. The correct 9-7-304 requirements will be written into the operating conditions. It should be noted that the PTE for NOx emissions is less than 2 tpy. At this low emission level we conclude ongoing testing to demonstrate compliance with the 40 ppm standard is not necessary. The PTE calculation is shown as follows:

F, Digester Gas (0% oxygen) = 5.9053 dscf flue gas/dscf digester gas
 Digester gas heating value = 646 Btu/scf
 NOx MW = 46.01 (as nitrogen dioxide)

NOx PTE = $(5.9053 \text{ dscf flue gas}/\text{scf DG})(53,800 \text{ E}6 \text{ Btu/yr})(\text{scf DG}/646 \text{ Btu})[(20.95 - 0)/20.95 - 3](40 \text{ scf NOx}/1\text{E}6 \text{ scf flue gas})(\text{lb-mole NOx}/386 \text{ scf})(46.01 \text{ lb NO}_2/\text{mole NO}_2) = 2,736 \text{ lb/yr}$
 (< 2 tpy)

CO Sources

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
S-15 Engine Generator #4, Lean Burn	Condition 21298, part 4	2.65 g/hp-hr or 318 ppm @ 15% Oxygen (BACT)	Condition 21298, part 7 (annual source test)

CO Sources

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
S-16 Engine Generator #9, Lean Burn	Condition 20905, part 4	2.65 g/hp-hr (BACT) or 318 ppm @ 15% Oxygen (BACT)	Condition 20905, part 7 (annual source test)
S-15 Engine Generator #4, Lean Burn	Regulation 9-8-302.3	2000 ppm at 15% Oxygen	Condition 21298, part 7 (annual source test)
S-16 Engine Generator #9, Lean Burn	Regulation 9-8-302.3	2000 ppm at 15% Oxygen	Condition 20905, part 7 (annual source test)

CO Emissions Discussion

Cogeneration Engines S-15 and S-16, Digester Gas Fired: The CO emission standard for these engines is based on BACT as per permit application 2437, with annual monitoring to demonstrate compliance with the 2.65 g/hp-hr standard. As noted in the discussion of the permit condition changes for these sources, to assist in determining compliance with this standard, an equivalent ppm CO standard at 15% oxygen has been determined and included in the condition. The equivalent concentration of CO is 318 ppm at 15% oxygen with the calculation shown in Appendix C. The regulation 9 Rule 8 CO emission standard is 2000 ppm at 15% O₂ and is based on Best Available Retrofit Control Technology (BARCT). The BARCT limit is not shown in the permit conditions. Since the BACT requirement is more stringent than the Regulation 9-8 requirement, the source test will demonstrate compliance with both limits.

Standby Hot Water Boilers S-40 and S-41, Digester Gas Fired: These boilers are subject to Regulation 9-7, Inorganic Pollutants, Industrial Boilers. This regulation sets the NO_x and CO standards for boilers. These boilers are used only for emergencies with each having a heat input capacity of 1.4 MM Btu/hr fired with 100% digester gas. These boilers were permitted in 1988 and were not determined to be subject to BACT due to their small size. The potential to emit CO from each boiler if fired 100% of the time is less than a ton per year. Due to their relatively small size, these boilers are only required to either operate with a stack gas oxygen content not to exceed 3% or to have an annual tuning by a technician according to the requirements of 9-7-604. USD has chosen to perform the annual tuning, which has been written into the revised operating conditions.

CO PTE: $(84 \text{ lb}/1\text{E}6 \text{ scf}) (\text{scf}/1013 \text{ Btu})(1.4\text{E}6 \text{ Btu/hr})(8760 \text{ hr/yr}) = 1,017 \text{ lb/yr}$

Hot Water Boiler S-43, Digester or Natural Gas Fired:

The CO emission standard for S-43 has not been changed. This 100 ppm was based on BACT at the time of permitting, 1993. Since the boiler capacity is less than 10 MM Btu/hr, the unit is not subject to the requirements of 9-7-301, 302, or 303. S-43 is subject to 9-7-304, and has chosen to perform a tune up on the boiler at a frequency of at least once every 12 months. The original references to 9-7-301 in the original Title V Permit Table VII for S-43 will be removed since they were included in error. The correct 9-7-304 requirements will be written into the operating conditions.

It should be noted that the PTE for CO emissions is approximately 2.1 tpy. At this low emission level we conclude ongoing testing to demonstrate compliance with the 100 ppm standard is not necessary. The PTE calculation is shown as follows:

F, Digester Gas (0% oxygen) = 5.9053 dscf flue gas/dscf digester gas
 Digester gas heating value = 646 Btu/scf
 CO MW = 28.01

CO PTE = (5.9053 dscf flue gas/scf DG)(53,800 E6 Btu/yr)(scf DG/646 Btu)[(20.95 - 0)/20.95-3](100 scf CO/1E6 scf flue gas)(lb-mole CO/386 scf)(28.01 lb CO/mole CO) = 4,165 lb/yr (~ 2.1 tpy)

SO₂ Sources

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
S-5 Standby Diesel Generator #2, 750 kW S-6 Standby Diesel Generator #2, 750 kW S-30 Standby Diesel Generator #5, 750 kW S-31 Standby Diesel Generator #6, 750 kW S-44 Standby Diesel Generator #7, 2518 hp S-45 Standby Diesel Generator #8, 2518 hp	Condition 17712, part 5a	0.5% Diesel Sulfur Content	Vendor Certification or CARB Certification
S-15 Engine Generator #4, Lean Burn S-16 Engine Generator #9, Lean Burn S-40 Standby Hot Water Boiler #4, Digester Gas Fired S-43 Hot Water Boiler #6, Digester or Natural Gas Fired	Regulation 9-1-301	GLC 0.5 ppm (3 min) or 0.25 ppm (60 min)	none

SO₂ Sources

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
S-15 Engine Generator #4, Lean Burn S-16 Engine Generator #9, Lean Burn S-40 Standby Hot Water Boiler #4, Digester Gas Fired S-43 Hot Water Boiler #6, Digester or Natural Gas Fired	Regulation 9-1-302	300 ppm SO ₂ from any source	none
S-5 Standby Diesel Generator #2, 750 kW S-6 Standby Diesel Generator #2, 750 kW S-30 Standby Diesel Generator #5, 750 kW S-31 Standby Diesel Generator #6, 750 kW S-44 Standby Diesel Generator #7, 2518 hp S-45 Standby Diesel Generator #8, 2518 hp	Regulation 9-1-304	0.5% liquid fuel sulfur content	Vendor Certification of diesel sulfur content or statement of CARB Certified Diesel
S-170 Anaerobic Digester	Condition 18785, part 3	300 ppm total sulfur content	Condition 18785, part 4 (monthly monitoring)

SO₂ Emissions Discussion

The overwhelming source of SO₂ emissions at USD is from the combustion of digester gas containing sulfides. BACT for digester gas fired IC engines has been identified as 0.3 g/bhp-hr that is approximately equivalent to 300 ppm sulfide level in the digester gas. Since the operation of the digester is the only source that has a direct control over SO₂ emissions, the condition limiting SO₂ will be placed on S-170 in the form of an H₂S limit. The engines, flares and boilers which burn digester gas have no real means of controlling SO₂ emissions, and therefore it is not appropriate to attach SO₂ emissions conditions to these sources. The limits should be placed on the anaerobic digesters, source S-170. The digesters will be conditioned to a maximum of 300 ppm H₂S which represents BACT (0.3 g/bhp-hr) for digester gas.

Cogeneration Engines S-15 and S-16: Permit application 2437 established daily sulfur dioxide emission limits based on BACT for IC engines burning digester gas. Those limits were based on the published BACT emission level of 0.3 g/hp-hr that is equivalent to approximately 300 ppm sulfide in digester gas. Since the operator has no means of controlling SO₂ emissions at the engines, it is not appropriate to have SO₂ emission limits on the engines. The limits have been placed on the anaerobic digesters, S-170.

S-43 SO₂ Emission Limits: Permit application 9735 (3/17/93) included the permitting of hot water boiler S-43. The boiler was originally conditioned to a sulfide ppm level in digester gas of 100 ppm that represents the operating control parameter. Although USD controls to 100 ppm H₂S, this level has not been defined to be BACT, as every wastewater treatment plant is different and there are a number of variables, both in and out of the control of the plant operators which affect sulfide levels in digester gas. Since there are no adjustments at the boiler that can affect the emissions of SO₂, this part has been removed from the conditions for S-43. The sulfide limit that will be placed on the digesters is 300 ppm, which is the currently defined BACT standard for digester gas.

BAAQMD Regulation 9-1-301 (Ground-Level SO₂ Concentration Limitations)

Digester Gas Combustion: Area monitoring to demonstrate compliance with the ground level SO₂ concentration requirements of Regulation 9-1-301 is at the discretion of the APCO (per BAAQMD Regulation 9-1-501). Based on an hourly digester gas production rate of 25,000 cu ft/hr at 300 ppm sulfide level the SO₂ emission rate would be 1.2 lb/hr (0.15 g/sec). Using conservative meteorology in conjunction with typical exhaust rates gives a BEEST modeled concentration of 0.0032 ppm of SO₂, far below the 0.05 ppm averaged over 24 hours. We conclude no ground level monitoring is needed.

Diesel Fuel Combustion: The maximum diesel sulfur content is 0.5% or 5000 ppm. Although the maximum permitted diesel sulfur content is 0.5%, the more typical diesel is CARB diesel, which is 500 ppm or 0.05% sulfide level. The engines are operated on a standby emergency basis or rather infrequently for testing purposes only. Due to the dilution effects, the infrequent usage, and the fact that the diesel that is typically purchased is CARB diesel, we conclude that ground level monitoring to show compliance with 9-1-301 is unnecessary.

BAAQMD Regulation 9-1-302 (300 ppm maximum, from any vapor stream)

This regulation prohibits the discharge of any stream containing SO₂ in excess of 300 ppm (liquid or solid fuel burning sources are exempt).

Digester Gas Combustion: The digester gas is limited to 300 ppm H₂S (sulfide). Since combustion results in further dilution, it is impossible to increase the concentration above 300 ppm, therefore 300 ppm cannot be exceeded from digester gas combustion.

BAAQMD Regulation 9-1-304 (Sulfur Content of Liquid & Solid Fuels)

This section establishes sulfur limits for liquid and solid fuels. The only liquid fuels at this facility is diesel fuel, hence the rule is applicable only to those sources burning diesel fuel. References to 9-1-304 applicability for all other sources have been removed.

PM Sources

# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
S-15 Digester Gas Cogen Engine #4, S-16 Digester Gas Cogen Engine #9, S-40 Digester Gas Fired Boiler #4, S-41 Digester Gas Fired Boiler # 5 A-401, A-402, A-403 Digester Gas Flares	BAAQMD Regulation 6-301	Ringelmann 1.0	Casual visual observation of sources during operation
S-5, S-6, S-30, S-31, S-44, S-45 Diesel Fired Emergency Standby Generators	BAAQMD Regulation 6-303	Ringelmann 2.0	None, operated infrequently
S-15 Digester Gas Cogen Engine #4, S-16 Digester Gas Cogen Engine #9, S-40 Digester Gas Fired Boiler #4, S-41 Digester Gas Fired Boiler # 5, S-43 Digester/Natural Gas Boiler, A-401, A-402, A-403 Digester Gas Flares	BAAQMD Regulation 6-310	0.15 gr/dscf	None

PM Emissions Discussion

Regulation 6-301 Visible Emissions

BAAQMD Regulation 6-301 limits visible emissions to a Federally enforceable limit of Ringelmann 1.0 for 3 minutes in any hour. Visible emissions from gaseous fuel combustion are not expected to exceed this limitation. This includes emissions from all sources burning digester gas, including the cogeneration engines S-15 and S-16, as well as boilers S-40, S-41, and S-43. There are no visible emissions from the liquid wastewater sources. Since there are no gaseous fuel derived visible emissions expected, periodic monitoring to ensure compliance with Regulation 6-301 from liquid sources as well as combustion sources burning digester gas is not required. No monitoring for visible emissions from the digester gas combustion is necessary.

Regulation 6-303 Visible Emissions

BAAQMD Regulation 6-303 applies to sources S-5, S-6, S-30, S-31, S-44, and S-45 diesel fired emergency standby generators. 6-301 (Ringelmann 1.0) does not apply since 6-303 applies to these engines due to their use in emergency standby service (6-303.1) Although there may be a potential for some visible emissions from diesel engine operation, we do not expect the

intermittent and brief operation of the diesel engines to necessarily exceed the Ringelmann 2.0 standard. No monitoring for visible emissions from or diesel combustion sources is necessary.

Particulate Weight Limitation (Regulation 6-310)

BAAQMD Regulation 6-310 limits filterable particulate (FP) emissions from any source to 0.15 grains per dry standard cubic foot (gr/dscf) of exhaust volume. Section 310.3 limits filterable particulate emissions from “heat transfer operations” to 0.15 gr/dscf at 6% O₂. These are the “grain loading” standards. There are no sources burning gaseous fuel (digester gas) that would ever be expected to have emissions near this limitation.

The only sources that could potentially exceed these limits are the standby diesel generators. These engines operate infrequently and therefore no periodic monitoring is required. We do not have any specific factors for the standby gensets at this facility. AP-42 gives a factor of 0.1 lb/MM Btu for large diesel engines (>250 hp). All standby diesel gensets at USD are larger than 750 hp. The flue gas production rate for diesel fuel is 9190 dscf/MM Btu at 0% oxygen. At the typical oxygen level in the flue gas of 15%, the factor becomes 32,358 dscf/MM Btu. Converting the AP-42 factor into a grain loading and then an exhaust concentration gives the following: [(0.1 lb/MM Btu)(7000 grain/lb)]/32,358 dscf flue gas = 0.02 gr/dscf. The calculated compliance margin is greater than 6:1. Periodic monitoring is not necessary for these sources since their operation is intermittent and since it is expected the engines will easily meet the 0.15 gr/dscf standard of 6-310.

POC Sources

# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
S-15 Digester Gas Cogen Engine #4, S-16 Digester Gas Cogen Engine #9, S-40 Digester Gas Fired Boiler #4, S-41 Digester Gas Fired Boiler # 5, S-43 Digester/Natural Gas Boiler, A-401, A-402, A-403 Digester Gas Flares	8-2-301	15 lb/day and greater than 300 ppm total carbon	none
S-5, S-6, S-30, S-31, S-44, S-45 Diesel Fired Emergency Standby Generators	8-2-301	15 lb/day and greater than 300 ppm total carbon	None
S-100 Wastewater Plant	8-2-301	15 lb/day and greater than 300 ppm total carbon	None
S-170 Anaerobic Digesters	8-2-301	15 lb/day and greater than 300 ppm total carbon	None

POC Discussion: Potential POC emission sources include the combustion sources as a result of incomplete combustion of any organics that may be in the digester gas (trace amounts) and the precursor organics that may result from the wastewater processes. Conservative digester gas sampling indicates the precursor organic levels are less than 82 microgram/liter (5.1 lb/MM cu ft). For the purposes of this PTE calculation, we will estimate uncontrolled emissions, although combustion typically destroys at the very least 90% of hydrocarbons.

The potential to emit is based on the estimated maximum digester gas production rate of 25,000 cu ft/hr (maximum digester production rate)

$$\text{PTE, organics from digester gas, uncontrolled} = (25,000 \text{ scf DG/hr})(8760 \text{ hr/yr})(5.1 \text{ lb/1E6 scf DG}) = 1,117 \text{ lb/yr (3.1 lb/day)}$$

Since the potential to emit POC from digester gas combustion sources is less than a ton a day, no compliance assurance monitoring of POC emissions from digester gas sources is needed.

Wastewater Sources: The PTE for organics from the wastewater sources is based on emission factors developed from the AB-2588 programs for sewage treatment plants. The maximum plant liquid flow rate is 50 MM gpd with an uncontrolled POC emission factor of 393 lb/yr per million gallon per day. The PTE for POCs from the wastewater processes is:

$$\text{PTE} = (50 \text{ E6 gpd})(243 \text{ lb/yr-1E6 gpd}) = 12,150 \text{ lb/yr (33 lb/day throughout wastewater sources, all combined)}$$

The emissions of POCs occur at numerous locations, at numerous liquid sources throughout the wastewater processes and are typically represented in high volume, highly dilute vapor streams, spread out over many liquid processes that are difficult to capture and control. Modern grassroots POTWs are increasingly being covered and vented to high efficiency control systems, but the costs associated with such retroactive controls are not cost effective. There are no conditions to control and/or monitor POC emissions from any of the liquid wastewater sources. We do not expect any wastewater POC emission source to have a concentration approaching 300 ppm, hence no monitoring is needed.

Changes to permit

General

B AAQMD Regulation 6, Particulate Matter and Visible Emissions, has been added to all combustion sources, since they are sources of particulate emissions.

BAAQMD Regulation 8, Rule 2, Miscellaneous Operations, has been added to all sources that burn digester gas, since the digester is subject to the standard and the combustion sources are control devices.

BAAQMD Regulation 9, Sulfur Dioxide, has been added to all combustion sources, since they are sources of sulfur dioxide.

S-4, Reciprocating Engine

This source has been dismantled.

S-5, S-6, S-30, S-31, S-44, S-45, Emergency Standby Generators

These sources have lost their exemption and are now permitted sources.

S-15 and S-16, Reciprocating Engine

The NO_x limit in BAAQMD Regulation 9-8-302 has changed because the engines are now lean-burn engines.

The changes in permit conditions are discussed in Section C.VI of this permit evaluation/statement of basis.

S-43, Hot Water Boiler

The changes in permit conditions are discussed in Section C.VI of this permit evaluation/statement of basis.

S-131, Secondary Treatment

This source was omitted in error from the Section IV table for the wet processes.

S-135, Secondary Treatment

This source has been dismantled.

S-160 and S-163, Sludge Handling

These sources have been dismantled.

S-170, Anaerobic Digesters

This source was removed from the Section VII table for the wet processes because it has different requirements from the rest of the wet processes. Digester gas, which may have a significant concentration of sulfur is generated at this source. Therefore, a new condition requiring monitoring for the digester gas total sulfur content has been added.

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.

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

Changes to permit

BAAQMD Regulation 6-303, Ringelmann No. 2 limitation, has been added because it applies to the emergency generators.

An alternate method was added for Regulation 6-310 and 6-311.

The test methods for Regulation 6-303, 9-1-304, 9-8-302.1, and Conditions 17712, part 5a and 20905, part 3 were added.

BAAQMD Regulation 9-8-302.1, Waste Derived Fuel Gas, was added because it now applies to S-15 and S-16, Reciprocating Engines.

A method was added for BAAQMD Condition 17712, part 5a, for diesel sulfur content.

Test methods were added for NO_x and CO limits in new permit conditions.

IX. Glossary

The glossary was updated.

X. State Implementation Plan

Changes to permit:

Section X has been modified to say that SIP standards are now found on EPA's website and are not included as part of the permit.

D. Alternate Operating Scenarios:

No alternate operating scenario has been requested for this facility.

E. Compliance Status:

A January 28, 2004 office memorandum, from the Director of Compliance and Enforcement to the Director of Permit Services, presents a review of the compliance record of Union Sanitary District (Site #A1209). The Compliance and Enforcement Division staff has reviewed the records for Site #A1209 for the period between January 1, 2003 to December 31, 2003. This review was initiated as part of the District evaluation of an application by Union Sanitary District for a Title V permit. During the review period:

- One Notice of Violation (NOV) was issued during the review period. The NOV was issued for Regulation 2, Rule 1, Section 307 for a failed source test for a NO_x limit permit condition. The facility conducted another sources test, which was acceptable. The source is now in compliance.
- No monitor excesses or equipment breakdowns were reported or documented by District Staff.
- Union Sanitary District is not operating under a Variance or an Order of Abatement from the District Board.

The Compliance and Enforcement Division finds that on-going compliance can be reasonably assured for Union Sanitary District, due to the above record.

F. Differences between the Application and the Proposed Permit:

Source S-4 digester gas engine was removed from service. S-15 digester gas engine was modified and S-16 digester gas engine permitted as a new engine source. Sources S-14 and S-42 represent three (3) digester gas flares. These flares were mislabeled as sources and have accordingly been changed to abatement devices A-401 and A-402.

Additionally the conditions for all combustion sources have been modified to more appropriately address current regulation requirements. A new condition has been established for the anaerobic digester S-170, with digester gas sulfide concentration limitations representing BACT for digester operation.

G. 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 has no permit shields.

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Permit Evaluation and Statement of Basis: Site #A1209, Union Sanitary District,
5072 Benson Road, Union City, CA 94587

APPENDIX A
BAAQMD COMPLIANCE REPORT

APPENDIX B
GLOSSARY

ACT

Federal Clean Air Act

APCO

Air Pollution Control Officer

ARB

Air Resources Board

BAAQMD

Bay Area Air Quality Management District

BACT

Best Available Control Technology

Basis

The underlying authority that allows the District to impose requirements.

BHP (bhp)

Brake Horsepower, see Units of Measure

BTU

British Thermal Unit. See units of measure.

CAA

The federal Clean Air Act

CAAQS

California Ambient Air Quality Standards

CAPCOA

California Air Pollution Control Officers Association

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.

CO

Carbon Monoxide

Cu Ft

Cubic foot = ft^3 , see Units of Measure

Cu M

Cubic meter = m^3 , see Units of Measure

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.

DG

Digester Gas

District

The Bay Area Air Quality Management District

DSCF (dscf)

Dry Standard Cubic Feet, see Units of Measure

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.

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.

HHV

Higher Heating Value: The heat extracted by a reaction assuming all water vapor is condensed within the process, and the resulting heat of condensation recovered for useful work.

LHV

Lower Heating Value: The heat extracted by a reaction assuming all water vapor goes out the exhaust stack with none of the heat of condensation recovered for useful work.

Mole

Quantity of a compound. One mole of a compound is estimated to have 6.023×10^{23} molecules ($6.023 \text{ E } +23$) of the respective compound.

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.

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.

Microgram

Unit of weight. 1 microgram (μg) = 1/1,000,000th of a gram or 1 millionth of a gram.

MM Btu/hr

Million BTU per hour.

MW

Molecular Weight. The weight of one mole or 6.023 E23 molecules of a compound.

PPM

Unit of concentration. Part Per Million. For vapor ppm is equivalent to a molar or volumetric concentration. For liquids and solids ppm is essentially equivalent to a weight fraction. See Units of Measure.

MOP

The District's Manual of Procedures.

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)

NO_x

Oxides of nitrogen.

NOV

Notice of Violation

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.)

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.

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

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

POTW

Publicly Owner Treatment Works. Also known as wastewater treatment plant (WWTP) or sewage treatment plant (STP)

PPMV

Parts Per Million, by Volume. See Units of Measure.

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

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

Sulfur dioxide

STP

Sewage Treatment Plant. Also known as a publicly owned treatment works (POTW) or wastewater treatment plant (WWTP).

THC

Total Hydrocarbons (NMHC + Methane)

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

TSP

Total Suspended Particulate

VOC

Volatile Organic Compounds

Units of Measure:

bhp	=	brake-horsepower
btu	=	British Thermal Unit
cfm	=	cubic feet per minute
dscf	=	dry standard cubic feet
g	=	grams
gal	=	gallon
gpm	=	gallons per minute
hp	=	horsepower
hr	=	hour
lb	=	pound
in	=	inches
max	=	maximum
m ²	=	square meter
m ³	=	cubic meter
min	=	minute
mm	=	million
MMbtu	=	million btu
MMcf	=	million cubic feet
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
yr	=	year

USD

Union Sanitary District

Permit Evaluation and Statement of Basis: Site #A1209, Union Sanitary District,
5072 Benson Road, Union City, CA 94587

WWTP

Wastewater Treatment Plant. Also known as publicly owned treatment works (POTW) or sewage treatment plant (STP).

APPENDIX C CALCULATIONS

1. NMOC Compound Concentrations in Digester Gas

Average MW of NMOC: 113 lb/lb-mole (113 g/g-mole)
Concentration of NMOC: 82 $\mu\text{g/l}$ = 82 E-06 g/l (there are no digester gas test results for Union Sanitary District digester gas, 82 $\mu\text{g/l}$ taken from EBMUD Source Tests, based on highest observed concentration; μg = microgram = 1,000,000th of a gram; average measured concentration = 30 $\mu\text{g/l}$)
USD Digester Gas Production Rate: 600,000 cu ft/day (25,000 cu ft/hr)

Digester Gas Typical Composition:

Methane: 59% (typical, dry basis)
CO₂: 41%
(Average DG Density = 1.22 g/l at STP)
Nitrogen + Oxygen: <1%

NMOC Emissions, Uncontrolled = (600,000 cu ft/day)(82 E-06 g NMOC/liter)(1000 liter/cu m)(cu m/35.314cu ft)(lb/454 g) = 3.1 lb/day (1,119 lb/yr)

Conversion of 82 $\mu\text{g/l}$ to ppmv, basis 1,000,000 liter digester gas: (82 E-06 g NMOC/liter DG)(1,000,000 liter DG)(g-mole NMOC/113 g NMOC)(22.4 liter NMOC/g-mole NMOC) = 16 liter NMOC per 1,000,000 liter DG = 16 ppmv

Concentration Conversion from Volume to Weight basis:

[82 E-6 g/l DG][L DG/1.22 g] = 66 ppm, wt

300 ppm Carbon in Digester Gas (DG):

MW, Methane: 16.1 lb/mole

Total carbon (NMOC) emitted @ 300 ppm = [600,000 cu ft/day][300 cu ft NMOC as methane/1E6 cu ft DG][lb-mole/386 cu ft][16.1 lb/lb-mole] = 7.5 lb/day

2. S-16, Conversion of NO_x standard from 1.0 g/bhp-hr to ppm NO_x in flue gas at 15% oxygen:

Basis: S-16 Heat Input: 5.9E6 Btu/hr heat input (gross)
Mechanical Efficiency: 0.32
Digester Gas: (0.59)(1020 Btu/scf) = 602 Btu/scf HHV
DG, 59% methane: 5.4525 cu ft flue gas produced per scf digester gas
MW, NO_x: 46.01

Digester Gas flowrate, Q = (5.9 MMbtu/hr)(scf/602 Btu)(hr/60 min) = 163.3 dscf/min

Horsepower = [5.9E6 Btu/hr][hp-hr/2545 Btu][0.32] = 742 hp

NO_x Concentration, ppm at 15% oxygen = (1.0 g/bhp-hr)(742 bhp)(hr/60 min)(min/163.3 scf)(lb/454 gram)(lb-mole/46.01 lb)(386.8 scf NO_x/lb-mole NO_x)(scf DG/5.4525 scf flue gas)(1E6 ppm NO_x/cu ft NO_x/cu ft flue gas)[(20.95 - 15% O₂)/(20.95 - 0)] = 73 ppm, at 15% oxygen.

3. S-16 Conversion of CO standard from 2.65 g/bhp-hr to ppm CO in flue gas at 15% oxygen:

Assumptions: See part 2, above.

MW, CO: 28.01

CO Concentration, ppm at 15% oxygen = $(2.65 \text{ g/bhp-hr})(742 \text{ bhp})(\text{hr}/60 \text{ min})(\text{min}/163.3 \text{ scf})(\text{lb}/454 \text{ gram})(\text{lb-mole}/28.01 \text{ lb})(386.8 \text{ scf CO/lb-mole CO})(\text{scf DG}/5.4525 \text{ scf flue gas})(1\text{E}6 \text{ ppm CO/cu ft CO/cu ft flue gas})[(20.95 - 15\% \text{ O}_2)/(20.95 - 0)] = 318 \text{ ppm}$, at 15% oxygen.

4. S-15, Conversion of NOx standard from 1.34 g/bhp-hr to ppm @ 15% oxygen in flue gas

Basis: S-15 Heat Input: 8.6E6 Btu/hr heat input (gross)
Mechanical Efficiency: 0.32
Digester Gas: (0.59)(1020 Btu/scf) = 602 Btu/scf HHV
DG, 59% methane: 5.4525 cu ft flue gas produced per scf digester gas
MW, NOx: 46.01

Digester Gas flowrate, Q = $(8.6 \text{ MMbtu/hr})(\text{scf}/602 \text{ Btu})(\text{hr}/60 \text{ min}) = 238.1 \text{ dscf/min}$
Horsepower = $[8.6\text{E}6 \text{ Btu/hr}][\text{hp-hr}/2545 \text{ Btu}][0.32] = 1,081 \text{ hp}$

NOx Concentration, ppm at 15% oxygen = $(1.34 \text{ g/bhp-hr})(1,081 \text{ bhp})(\text{hr}/60 \text{ min})(\text{min}/238.1 \text{ scf})(\text{lb}/454 \text{ gram})(\text{lb-mole}/46.01 \text{ lb})(386.8 \text{ scf NOx/lb-mole NOx})(\text{scf DG}/5.4525 \text{ scf flue gas})(1\text{E}6 \text{ ppm NOx/cu ft NOx/cu ft flue gas})[(20.95 - 15\% \text{ O}_2)/(20.95 - 0)] = 98 \text{ ppm}$, at 15% oxygen.

5. S-15 Conversion of CO standard from 2.65 g/bhp to ppm CO @ 15% oxygen in flue gas:

Assumptions: See part 4 above
MW, CO = 28.01 lb/lb-mole

CO Concentration, ppm at 15% oxygen = $(2.65 \text{ g/bhp-hr})(1,081 \text{ bhp})(\text{hr}/60 \text{ min})(\text{min}/238.1 \text{ scf})(\text{lb}/454 \text{ gram})(\text{lb-mole}/28.01 \text{ lb})(386.8 \text{ scf CO/lb-mole CO})(\text{scf DG}/5.4525 \text{ scf flue gas})(1\text{E}6 \text{ ppm CO/cu ft CO/cu ft flue gas})[(20.95 - 15\% \text{ O}_2)/(20.95 - 0)] = 318 \text{ ppm}$, at 15% oxygen.

6. Conversion of 0.3 g/hp-hr SO2 (BACT) to ppm H2S in Digester Gas

Basis: 1 hour
MW, SO2 = 64.05 lb/lb-mole

SO2 emission = $[(0.3 \text{ g/hp-hr})(1,081 \text{ hp S-15})(\text{lb}/454 \text{ g})]/64.05 \text{ lb/mole} = 0.0111 \text{ lb-mole/hour H}_2\text{S} = 0.0111 \text{ lb-mole H}_2\text{S required}$

Digester Gas Flow = $(8.6\text{E}6 \text{ Btu/hr})(\text{scf}/602 \text{ Btu})(\text{hr}/60 \text{ min}) = 238.1 \text{ dscf/min} (14.28 \text{ mscf/hr})$

Ppm H2S in Digester Gas = $0.0111 \text{ lb-mole H}_2\text{S}/([(14.28\text{E}3 \text{ scf})(\text{lb-mole}/386.8 \text{ scf})]/1\text{E}6) = 301 \text{ ppm}$

APPENDIX D

EMISSIONS INCREASES

The following table lists the emissions increases from the three permit applications processed since the original Title V Permit Issuance

Union Sanitary District (plant A1209) Emission Increases Since Initial Title V Permit

	MM Btu/hr	NOx (tpy)	CO (tpy)	POC (tpy)	SO2 (tpy)	PM10 (tpy)
AN 1706						
S-5 Genset	2.60E+06	1.25	0.33	0.032	0.197	0.027
S-6 Genset	2.60E+06	1.25	0.33	0.032	0.197	0.027
S-30 Genset	2.60E+06	1.25	0.33	0.032	0.197	0.027
S-31 Genset	2.60E+06	1.25	0.33	0.032	0.197	0.027
S-44 Genset	1.63E+07	7.8	2.08	0.2	1.23	0.17
S-45 Genset	1.63E+07	7.8	2.08	0.2	1.23	0.17
Total, AN 1706		20.6	5.48	0.528	3.248	0.448
AN 2437						
S-15 Cogen Engine		-	16.2	-	-	-
S-16 Cogen Engine		7.2	19.2	0.9	2.2	0.6
Total, AN 2437		7.2	35.4	0.9	2.2	0.6
AN 3319						
S-180 Sludge Handling		0	0	0	0	0
Total Permitted Emissions Increases, tpy		27.8 tpy	40.8	1.428 tpy	5.448 tpy	1.048 tpy
Actual Plant Emissions, Initial Title V Permit (12/95)		86.3 tpy	43.5 tpy	11.7 tpy	5.8 tpy	1.3 tpy
Actual Plant Emissions, Current Level (3/2004)		21.1 tpy	43.8 tpy	5.9 tpy	2.5 tpy	0.8 tpy

Permit Evaluation and Statement of Basis: Site #A1209, Union Sanitary District,
5072 Benson Road, Union City, CA 94587