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TCEQ ELECTRIC GENERATING UNIT STANDARD PERMIT REGISTRATION
STONE CREEK PEAKER
BRAZORIA COUNTY, TEXAS

by
Haley & Aldrich, Inc.

for
Stone Creek Peaker LLC

File No. 0208830
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SIGNATURE PAGE FOR

TCEQ ELECTRIC GENERATING UNIT STANDARD PERMIT REGISTRATION
STONE CREEK PEAKER PROJECT
BRAZORIA COUNTY, TEXAS

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Acronym/Abbreviation	Definition
AP-42	USEPA's compilation of air pollution emission factors
Btu	British thermal unit
CEMS	continuous emission monitoring system
CFR	Code of Federal Regulations
CHP	combined heat and power
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
DAHS	data acquisition and handling system
EGU	electric generating unit
EPN	Emission Point Number
FCAA	Federal Clean Air Act
GE	General Electric
GHG	greenhouse gas
H_2SO_4	sulfuric acid mist
HAP	hazardous air pollutant
hp	horsepower
kW	kilowatt
lb/hr	pounds per hour
lb/MMBtu	pounds per million British thermal units
lb/MWh	pounds per megawatt-hour
MACT	Maximum Achievable Control Technology
MMBtu/hr	million British thermal units per hour
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NNSR	Nonattainment New Source Review
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
O_2	oxygen
PEMS	predictive emission monitoring system
PM	particulate matter
$PM_{2.5}$	particulate matter with a diameter equal to or less than 2.5 microns
PM_{10}	particulate matter with a diameter equal to or less than 10 microns
ppmv	pounds per million volume
the Project	the proposed Stone Creek Peaker Project
PSD	Prevention of Significant Deterioration
PTE	Potential-to-Emit
SCR	selective catalytic reduction
SO_2	sulfur dioxide
SOCMI	synthetic organic chemical manufacturing industry

Acronym/Abbreviation	Definition
Stone Creek	Stone Creek Peaker LLC
SU/SD	startup/shutdown
TAC	Texas Administrative Code
TCAA	Texas Clean Air Act
TCEQ	Texas Commission on Environmental Quality
tpy	tons per year
ULSD	ultra-low sulfur distillate
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

1. Introduction

Stone Creek Peaker LLC (Stone Creek) is providing this registration to the Texas Commission on Environmental Quality (TCEQ) to authorize the construction and operation of an electric generating facility under Standard Permit No. 6005. Stone Creek is filing this registration pursuant to the requirements in Texas Administrative Code (TAC) Title 30, Chapter 116, Subchapter F.

1.1 FACILITY INFORMATION

Stone Creek is proposing to build the Stone Creek Peaker Project (the Project) in unincorporated Damon, Brazoria County, Texas. The Project will produce and sell electricity to the grid during peak times. This standard permit registration authorizes the Project to produce and sell electricity from four natural gas-powered simple-cycle combustion turbines.

The Project will be located at approximately 1180-1334 Weinbrenner Road, Damon, Texas 77430.

1.2 APPLICATION ORGANIZATION

1.2.1 Application Organization

This permit application is divided into six sections. Section 1 introduces the Project and provides information regarding the permit application organization and points of contact. Section 2 presents a process description and required mapping, including an area map, plot plan, and process flow diagram. Section 3 discusses the air emissions associated with the Project. Section 4 discussions the regulations applicable to the Standard Permit registration and any other State requirements.

Technical appendices are also provided as follows:

- Appendix A – the TCEQ Core Data Form and PI-1S Form;
- Appendix B – emission calculations; and
- Appendix C – TCEQ Table 31.

1.2.2 Application Contacts

To facilitate TCEQ's review of this application, individuals familiar with the Project and this application are identified below.

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2. Process Description

An aerial map depicting the location and surroundings of the Project site is provided as Figure 1. The Project plot plan is provided as Figure 2. Figure 3 presents a process flow diagram depicting the proposed Project's process, as further described in the sections below.

2.1 COMBUSTION TURBINE GENERATORS

The Project consists of four natural gas-powered simple-cycle combustion turbines. The turbine model is the General Electric (GE) LM6000, nominally rated at 50 megawatts (MW) output. The Project is considering three modes of operation for the LM6000 turbines (AEPCO, PCSPRINT, and PF1SPRINT) that result in slightly different emission rates. This document presents the worst-case emissions from any of these operating modes to demonstrate compliance with the standard permit requirements. This allows for flexibility in the Project design.

In each of the simple-cycle turbines, ambient air is drawn in through the turbine air inlet and enters the compressor section of the turbine. A fogging system injects finely atomized water into the inlet air. Rapid evaporation of the water fog cools the inlet air, allowing higher inlet air mass flow rates, resulting in the turbine recapturing output capacity that would be lost during hot summer conditions. A water spray intercooling system may be used to cool the compressed air between compressor stages, which increases the compressor performance, yielding higher power output. Natural gas is mixed with the combustion inlet air and combusted in the combustor section of the turbine unit.

The hot combustion gases expand through the turbine across turbine blades, causing rotation of the turbine shaft, which converts mechanical energy to electrical energy by driving an electric generator. The turbine shaft also drives the inlet compressor. The hot exhaust then passes through an oxidation catalyst to reduce carbon monoxide (CO) and volatile organic compound (VOC) emissions and subsequently pass through a selective catalytic reduction (SCR) system to reduce nitrogen oxide (NO_X) emissions before exiting though a stack (Emission Point Numbers [EPNs] CT-1 through CT-4).

2.2 STARTUP/SHUTDOWN ACTIVITIES

Startup and shutdown (SU/SD) of the turbines are part of the regularly scheduled operations for the Project. SU/SD periods for the turbines will be defined by monitored operating conditions. The startup period will begin when an initial flame detection signal is recorded in the Project's data acquisition and handling system (DAHS) and will end when the startup load ramping is complete, CO and SCR catalysts attain operating temperatures, and emissions have been controlled in a steady state to meet the normal operations emission limits. The shutdown period will begin when a shutdown signal is initiated in the gas turbine controller and will end when a flame detection signal is no longer recorded in the Project's DAHS. Emissions from SU/SD have been included in facility-wide emissions estimates.

2.3 EMERGENCY GENERATOR

The Project will have an emergency diesel generator powered by a 1,500-kilowatt (kW)/ 2,012-horsepower (hp) diesel engine to provide on-site emergency power capabilities independent of the utility grid. The emergency generator engines will be fueled with ultra-low sulfur distillate (ULSD) and will typically operate only for maintenance and readiness testing, with less frequent operation

expected for actual emergencies. A small ULSD storage tank will be integrated into this equipment. Non-emergency generator operation will be limited to less than 100 hours per rolling 12-month period.

2.4 NATURAL GAS, LUBE OIL, AND HYDRAULIC FLUID PIPING

Natural gas will be delivered to the site via pipeline and then metered and piped to the combustion turbines. The lube oil and hydraulic oil systems receive recirculated oil through piping from oil reservoirs. Additionally, natural gas has the potential to be released fugitively from valves, flanges, and other piping components. Fugitive emissions resulting from piping components in natural gas and oil service have been calculated and have been included in facility-wide emissions calculations.

2.5 INHERENTLY LOW EMITTING MAINTENANCE ACTIVITIES

Several maintenance-related activities associated with the Project are expected to result in inherently low or *de minimis* emissions, such that it would be unnecessarily burdensome to require compliance recordkeeping for these activities. Several of these inherently low-emitting maintenance activities include fuel gas purging and fugitives from analytical equipment. Calculations associated with these activities demonstrating the small magnitude of their emissions are found in Appendix B. The TCEQ has recognized and included these types of maintenance activities in numerous New Source Review permits issued for electric generating units (EGUs).

3. Air Emissions Summary

This section describes the air emission calculation methodologies used to estimate hourly and annual emission rates for the facilities and activities represented in this standard permit registration. Detailed emissions rate estimate calculations are provided in in Appendix B. The following discussion provides a general description of the calculation methodology and a summary of key assumptions and calculation basis data. The potential emissions from the turbines assume a facility-wide limit less than major source thresholds of NOx and VOCs, which is equivalent to approximately 9,600 hours per year of operation at full-load conditions.

Table 1 provides a facility-wide summary of potential annual emissions from the Project based on the calculation methodologies described in the following sections.

Table 1. Proposed Potential Emissions (tons per year [tpy])

Pollutant	AEPCO	PCSPRINT	PF1SPRINT	Other Sources	Proposed Potential Emissions
$PM_{10}/PM_{2.5}$	19.1	19.2	23.04	0.41	23.45
SO_2	2.3	0.2	0.24	0.0012	2.28
NO_X	22.9	21.3	23.90	1.06	24.96
CO	18.8	26.3	26.81	0.58	27.39
VOC	3.3	13.1	6.56	0.59	13.65
H_2SO_4	1.537	0.130	0.162	0.0004	1.54
CO_2	265,520	259,056	297,072	116	297,188
CO_2e	265,799	259,311	297,363.54	57.97	297,422
Ammonia	31.0	15.98	16.94	4.18	35.22

PM_{10} = particulate matter with diameters less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with diameters less than or equal to 2.5 microns; SO_2 = sulfur dioxide; H_2SO_4 = sulfuric acid mist; CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalents

3.1 COMBUSTION TURBINE GENERATORS

The Project's EGUs will be fueled by natural gas. Products of combustion from the engines include the following criteria and non-criteria pollutants: NO_X, CO, VOCs, SO_2, PM_{10}, $PM_{2.5}$, H_2SO_4, and CO_2. Emissions of regulated air pollutants from the turbines have been largely based upon equipment vendor emission guarantees. United States Environmental Protection Agency (USEPA) emission factors, mass balance calculations, and engineering estimates have been applied, as necessary. Emissions of non-criteria pollutant emissions and hazardous air pollutants (HAPs) from the turbines were estimated using USEPA's Compilation of Air Pollution Emission Factors (AP 42)[1], with the exception of formaldehyde. Emissions of formaldehyde from the turbines were estimated based upon an emission factor of 0.00022 pounds per million British thermal units (lb/MMBtu), which is the Maximum Achievable Control

[1] USEPA, 2000. *Compilation of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources*.

Technology (MACT) formaldehyde limit identified during the development of National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 Code of Federal Regulations (CFR) 63 Subpart YYYY for combustion turbines.

Table 2 provides a summary of the steady-state maximum hourly criteria pollutant emissions from each engine. Supporting calculations are provided in Appendix B.

Table 2. Steady-State Maximum Hourly Emissions (pounds/hour [lb/hr])

Pollutant	AEPCO	PCSPRINT	PF1SPRINT	Proposed Maximum Emissions
$PM_{10}/PM_{2.5}$	4.08	4.00	4.80	4.80
SO_2	0.48	0.05	0.05	0.48
NO_X	4.37	4.50	4.77	4.77
CO	2.66	4.87	4.65	4.87
VOC	0.75	3.07	1.40	3.07
H_2SO_4	0.33	0.03	0.034	0.33
CO_2	55,767	60,900	64,720	64,720
CO_2e	55,826	60,960	64,784	64,784

3.2 STARTUP AND SHUTDOWN ACTIVITIES

During SU/SD periods, NO_X, CO, VOCs, and particulate matter (PM) are emitted at higher levels than during normal operating conditions. During startup, higher NO_X emissions occur during the transition period before the water injection system can achieve optimal control and before the SCR catalyst bed reaches the optimal operating temperature range. During SU/SD, higher CO and VOC emissions will result due to incomplete combustion because of the low firing levels and the reduced effectiveness of the oxidation catalyst until it reaches its optimal operating temperature range.

The duration of a startup for a GE LM6000 can vary between 10 and 45 minutes; however, it is assumed that the average duration of a startup is 30 minutes. The duration of a shutdown was assumed to be 15 minutes. Generally, there is a minimum of one hour of downtime between startup or shutdown events.

Potential emissions associated with SU/SD of the turbines were developed using vendor-supplied information. In most cases, emissions from these events are "self-correcting" on an annual basis. In other words, the emissions for each SU/SD sequence, incorporating the minimum downtime between events, are less than the corresponding full-load steady-state emission rate. SO_2 emissions are always self-correcting because they are based on fuel consumption, which is less during SU/SD sequences. The facility-wide annual emissions incorporate the emissions from SU/SD for those pollutants that are not self-correcting.

Maximum hourly emission rates for each turbine from SU/SD events were estimated assuming one startup and one shutdown in a 60-minute period. Table 3 provides maximum one-hour emissions rates during SU/SD events.

Table 3. Maximum Hourly Emissions During SU/SD Events (lb/hr)

Pollutant	AEPCO	PCSPRINT	PF1SPRINT	Proposed Maximum Emissions
$PM_{10}/PM_{2.5}$	5.03	5.04	5.44	5.44
NO_X	30.17	29.99	30.28	30.28
CO	55.82	56.66	56.72	56.72
VOC	4.80	5.86	5.17	5.86

3.3 EMERGENCY GENERATOR

Potential emissions from the emergency generator were estimated based on USEPA emission limits under the New Source Performance Standards, except for SO_2 emissions, which use the sulfur content of ULSD.

3.4 FUGITIVE EMISSION SOURCES

The turbines and associated generators will be equipped with lubrication systems. Lubricating oil will be circulated through the turbine machinery from the oil sump, and the heating of recirculating lube oil in the turbine and generator housings will create oil vapor and oil condensate droplets in the oil reservoir compartments. Emissions of the condensed droplets will be controlled by a mist eliminator serving each reservoir. The calculation of emissions from the lube oil vents was based on lube oil replacement rates for similar units equipped with mist eliminators and are presented Appendix B. The lube oil vent emissions are counted both as VOCs and $PM/PM_{10}/PM_{2.5}$ for the emission points.

Fugitive emissions from leaking valves, flanges, and other components were calculated utilizing factors from the TCEQ Fugitives Emissions Workbook for the synthetic organic chemical manufacturing industry (SOCMI) without the use of ethylene and the Oil and Gas Production Operation. The factors were multiplied by the respective fugitive equipment component count that have the potential to leak (i.e., valves, sampling points, pumps, relief valves, and flanges, etc.) and the service type associated to each identified component (i.e., gas/vapor, light liquid, and heavy liquid). The emissions for each component were summed to obtain the total pollutant emissions expected.

The emissions from the diesel storage tank associated with the emergency generator were calculated based on the methodology described in AP-42 section 7.1 (Organic Liquid Storage Tanks). Hourly emissions were based on the maximum filling rate of the tank and maximum liquid surface temperature and pressure from process knowledge. Annual emissions were conservatively estimated as continuous operation using a total yearly throughput.

4. Regulatory Applicability

The following discussion presents information demonstrating the Project's compliance with all rules and regulations of the TCEQ and the intent of the Texas Clean Air Act (TCAA), including applicable sections of 30 TAC §116, Subchapter F, and the Standard Permit for EGUs. Each requirement is listed below followed by a discussion in italicized text of how the Project meets the respective requirement.

4.1 30 TAC §116.610 – APPLICABILITY

(a) Under the TCAA, §382.051, a project that meets the requirements for a standard permit listed in this subchapter or issued by the Commission is hereby entitled to the standard permit, provided the following conditions listed in this section are met. For the purposes of this subchapter, project means the construction or modification of a facility, or a group of facilities submitted under the same registration:

(1) Any project that results in a net increase in emissions of air contaminants from the project other than water, nitrogen, ethane, hydrogen, oxygen, or greenhouse gases (GHGs) as defined in §101.1 of this title (relating to Definitions), or those for which a national ambient air quality standard has been established must meet the emission limitations of §106.261 of this title (relating to Facilities [Emission Limitations]), unless otherwise specified by a particular standard permit.

Per section 3(A) of the EGU Standard Permit, units that meet the conditions of the Standard Permit do not have to meet § 116.610(a)(1).

(2) Construction or operation of the project must be commenced prior to the effective date of a revision to this subchapter under which the project would no longer meet the requirements for a standard permit.

There is no pending revision to this subchapter.

(3) The proposed project must comply with the applicable provisions of the Federal Clean Air Act (FCAA), §111 (concerning New Source Performance Standards) as listed under 40 CFR Part 60, promulgated by the USEPA.

The combustion turbines are subject to New Source Performance Standard (NSPS) in 40 CFR Part 60, Subpart KKKK (Standards of Performance for Stationary Combustion Turbines) and Subpart TTTT (Standards of Performance for Greenhouse Gas Emissions for EGUs). The units are expected to comply with all applicable requirements.

(4) The proposed project must comply with the applicable provisions of FCAA, §112 (concerning HAPs) as listed under 40 CFR 61, promulgated by the USEPA.

There are no Subparts under 40 CFR Part 61 that are applicable to facilities affected by this registration.

(5) The proposed project must comply with the applicable maximum achievable control technology standards as listed under 40 CFR Part 63, promulgated by the USEPA

under FCAA, §112 or as listed under Chapter 113, Subchapter C of this title (relating to NESHAPs for Source Categories (FCAA, §112, 40 CFR Part 63)).

40 CFR Part 63, Subpart YYYY, does not apply to the combustion turbines because the site is not a major source of HAPs.

(6) If subject to Chapter 101, Subchapter H, Division 3 of this title (relating to Mass Emissions Cap and Trade Program), the proposed facility, group of facilities, or account must obtain allocations to operate.

The Project is subject to Chapter 101, Subchapter H, Division 3. Stone Creek will obtain the necessary allocations and comply with the NO_X Mass Cap and Trade Program.

(b) Any project that constitutes a new major stationary source or major modification as defined in §116.12 of this title (relating to Nonattainment New Source Review [NNSR] and Prevention of Significant Deterioration [PSD] Review Definitions) because of emissions of air contaminants other than greenhouse gases is subject to the requirements of §116.110 of this title (relating to Applicability) rather than this subchapter. Notwithstanding any provision in any specific standard permit to the contrary, any project that constitutes a new major stationary source or major modification which is subject to Subchapter B, Division 6 of this chapter (relating to PSD Review) due solely to emissions of greenhouse gases may use a standard permit under this chapter for air contaminants that are not greenhouse gases.

The Houston-Galveston-Brazoria ozone non-attainment area is currently classified as "Severe" for the 2008 National Ambient Air Quality Standard (NAAQS) for ozone. The Major Source Potential-to-Emit (PTE) threshold for "Serious" ozone non-attainment areas is 25 tons per year (tpy) of VOCs or NO_X. The Project will not be a Major Source for NNSR applicability purposes; therefore, NNSR will not be triggered by the Project. (Note that with respect to the 2015 NAAQS, the area is currently classified as a "Moderate" non-attainment area, which has a higher NNSR applicability threshold than the Serious classification.)

The PSD Major Source threshold for a simple-cycle power plant is 250 tpy of a PSD-regulated pollutant pursuant to 40 CFR §52.21(b)(1)(i)(b). The Project will not be a Major Source for PSD applicability purposes; therefore, PSD review will not be triggered by the Project.

(c) Persons may not circumvent by artificial limitations the requirements of §116.110 of this title.

Stone Creek will not circumvent the requirements of §116.110.

(d) Any project involving a proposed affected source (as defined in §116.15(1) of this title (relating to Section 112(g) Definitions)) shall comply with all applicable requirements under Subchapter E of this chapter (relating to HAPs: Regulations Governing Constructed or Reconstructed Major Sources (FCAA, §112(g), 40 CFR Part 63)). Affected sources subject to Subchapter E of this chapter may use a standard permit under this subchapter only if the terms and conditions of the specific standard permit meet the requirements of Subchapter E of this chapter.

The Project will not involve an affected source that is subject to Subchapter E.

4.2 30 TAC §116.615 – GENERAL CONDITIONS

The following general conditions are applicable to holders of standard permits but will not necessarily be specifically stated within the standard permit document.

(1) Protection of public health and welfare. The emissions from the facility, including dockside vessel emissions, must comply with all applicable rules and regulations of the Commission adopted under Texas Health and Safety Code, Chapter 382, and with intent of the TCAA, including protection of health and property of the public.

(2) Standard permit representations. All representations with regard to construction plans, operating procedures, and maximum emission rates in any registration for a standard permit become conditions upon which the facility or changes thereto, must be constructed and operated. It is unlawful for any person to vary from such representations if the change will affect that person's right to claim a standard permit under this section. Any change in condition such that a person is no longer eligible to claim a standard permit under this section requires proper authorization under §116.110 of this title (relating to Applicability). If the facility remains eligible for a standard permit, the owner or operator of the facility shall notify the executive director of any change in conditions which will result in a change in the method of control of emissions, a change in the character of the emissions, or an increase in the discharge of the various emissions as compared to the representations in the original registration or any previous notification of a change in representations. Notice of changes in representations must be received by the executive director no later than 30 days after the change.

(3) Standard permit in lieu of permit amendment. All changes authorized by standard permit to a facility previously permitted under §116.110 of this title (relating to Applicability) shall be administratively incorporated into that facility's permit at such time as the permit is amended or renewed.

(4) Construction progress. Start of construction, construction interruptions exceeding 45 days, and completion of construction shall be reported to the appropriate regional office not later than 15 working days after occurrence of the event, except where a different time period is specified for a particular standard permit.

(5) Start-up notification.

(A) The appropriate air program regional office of the Commission and any other air pollution control program having jurisdiction shall be notified prior to the commencement of operations of the facilities authorized by a standard permit in such a manner that a representative of the executive director may be present.

(B) For phased construction, which may involve a series of units commencing operations at different times, the owner or operator of the facility shall provide separate notification for the commencement of operations for each unit.

(C) Prior to beginning operations of the facilities authorized by the permit, the permit holder shall identify to the Office of Permitting, Remediation, and Registration the source or sources of allowances to be utilized for compliance with Chapter 101,

Subchapter H, Division 3 of this title (relating to Mass Emissions Cap and Trade Program).

(D) A particular standard permit may modify start-up notification requirements.

(6) Sampling requirements. If sampling of stacks or process vents is required, the standard permit holder shall contact the Office of Air Quality and any other air pollution control program having jurisdiction prior to sampling to obtain the proper data forms and procedures. All sampling and testing procedures must be approved by the executive director and coordinated with the regional representatives of the Commission. The standard permit holder is also responsible for providing sampling facilities and conducting the sampling operations or contracting with an independent sampling consultant.

(7) Equivalency of methods. The standard permit holder shall demonstrate or otherwise justify the equivalency of emission control methods, sampling or other emission testing methods, and monitoring methods proposed as alternatives to methods indicated in the conditions of the standard permit. Alternative methods must be applied for in writing and must be reviewed and approved by the executive director prior to their use in fulfilling any requirements of the standard permit.

(8) Recordkeeping. A copy of the standard permit along with information and data sufficient to demonstrate applicability of and compliance with the standard permit shall be maintained in a file at the plant site and made available at the request of representatives of the executive director, the USEPA, or any air pollution control program having jurisdiction. For facilities that normally operate unattended, this information shall be maintained at the nearest staffed location within Texas specified by the standard permit holder in the standard permit registration. This information must include, but is not limited to, production records and operating hours. Additional recordkeeping requirements may be specified in the conditions of the standard permit. Information and data sufficient to demonstrate applicability of and compliance with the standard permit must be retained for at least two years following the date that the information or data is obtained. The copy of the standard permit must be maintained as a permanent record.

(9) Maintenance of emission control. The facilities covered by the standard permit may not be operated unless all air pollution emission capture and abatement equipment is maintained in good working order and operating properly during normal facility operations. Notification for emissions events and scheduled maintenance shall be made in accordance with §101.201 and §101.211 of this title (relating to Emissions Event Reporting and Recordkeeping Requirements; and Scheduled Maintenance, Startup, and Shutdown Reporting and Recordkeeping).

(10) Compliance with rules. Registration of a standard permit by a standard permit applicant constitutes an acknowledgment and agreement that the holder will comply with all rules, regulations, and orders of the Commission issued in conformity with the TCAA and the conditions precedent to the claiming of the standard permit. If more than one state or federal rule or regulation or permit condition is applicable, the most stringent limit or condition shall govern. Acceptance includes consent to the entrance of commission employees and designated representatives of any air pollution control program having jurisdiction into the permitted premises at reasonable times to investigate conditions relating to the emission or concentration of air contaminants, including compliance with the standard permit.

Stone Creek will adhere to these General Conditions and will operate the units authorized by the Standard Permit in compliance with the above subparagraphs.

4.3 COMPLIANCE WITH REQUIREMENTS OF THE EGU STANDARD PERMIT

The following discussion presents the requirements of the Air Quality Standard Permit for Electric Generating Units (Effective Date May 16, 2007) and explains how Stone Creek will comply with each of the requirements.

This standard permit authorizes EGUs that generate electricity for use by the owner or operator and/or generate electricity to be sold to the electric grid; EGUs shall meet all of the conditions listed below.

(1) Applicability

(A) This standard permit may be used to authorize EGUs installed or modified after the effective date of this standard permit and that meet the requirements of this standard permit.

This Standard Permit is being used to authorize four EGUs that meet the requirements of the permit.

(B) This standard permit may not be used to authorize boilers. Boilers may be authorized under the Air Quality Standard Permit for Boilers; 30 TAC § 106.183, Boilers, Heaters, and Other Combustion Devices; or a permit issued under the requirements of 30 TAC Chapter 116.

The units authorized by the Standard Permit are simple-cycle gas turbines, not boilers.

(2) Definitions

(A) East Texas Region – All counties traversed by or east of Interstate Highway 35 or Interstate Highway 37, including Bosque, Coryell, Hood, Parker, Somervell and Wise Counties.

(B) Installed – a generating unit is installed on the site when it begins generating electricity.

(C) West Texas Region – includes all of the state not contained in the East Texas Region.

(D) Renewable fuel – fuel produced or derived from animal or plant products, byproducts or wastes, or other renewable biomass sources, excluding fossil fuels. Renewable fuels may include, but are not limited to, ethanol, biodiesel, and biogas fuels.

This section contains no requirements.

(3) Administrative Requirements

(A) EGUs shall be registered in accordance with 30 TAC § 116.611, Registration to Use a Standard Permit, using a current Form PI-1S. Units that meet the conditions of this standard permit do not have to meet 30 TAC § 116.610(a)(1), Applicability.

A completed Form PI-1S is included in this registration package (Appendix A).

(B) Registration applications shall comply with 30 TAC § 116.614, Standard Permit Fees, for any single unit or multiple units at a site with a total generating capacity of 1 MW or greater. The fee for units or multiple units with a total generating capacity of less than 1 MW at a site shall be $100.00. The fee shall be waived for units or multiple units with a total generating capacity of less than 1 MW at a site that have certified NO_X emissions that are less than 10 percent of the standards required by this standard permit.

A registration fee of $900 has been submitted to the TCEQ.

(C) No owner or operator of an electric generating unit shall begin construction and/or operation without first obtaining written approval from the executive director.

Stone Creek will not begin construction and/or operation until written approval has been obtained.

(D) Records shall be maintained and provided upon request to the TCEQ for the following:

(i) Hours of operation of the unit;

(ii) Maintenance records, maintenance schedules, and/or testing reports for the unit to document re-certification of emission rates as required by subsection (4)(G) below; and

(iii) Records to document compliance with the fuel sulfur limits in subsection (4)(C).

Stone Creek will maintain the applicable records.

(E) Electric generators powered by gas turbines must meet the applicable conditions, including testing and performance standards, of Title 40 CFR Part 60, Subpart GG, Standards of Performance for Stationary Gas Turbines, and applicable requirements of 40 CFR Part 60 Subpart KKKK, Standards of Performance for Stationary Combustion Turbines.

The combustion turbines will meet the requirements of 40 CFR Part 60, Subpart KKKK.

(F) Compliance with this standard permit does not exempt the owner or operator from complying with any applicable requirements of 30 TAC Chapter 117, Control of Air Pollution from Nitrogen Compounds, or 30 TAC Chapter 114, Control of Air Pollution from Motor Vehicles.

Stone Creek will comply with the applicable requirements of 30 TAC Chapters 114 and 117.

(4) General Requirements

(G) Emissions of NO_X from the electric generating unit shall be certified by the manufacturer or by the owner or operator in pounds of pollutant per megawatt hour (lb/MWh). This certification must be displayed on the name plate of the unit or on a label attached to the unit. Test results from USEPA reference methods, California Air Resources Board methods, or equivalent alternative testing methods approved by the executive director used to verify this certification shall be provided upon request to the TCEQ. The unit must operate on the same fuel(s) for which the unit was certified.

The emissions certification is displayed on the units and test results will be provided to the TCEQ upon request. The units burn natural gas.

(H) Electric generating units that use combined heat and power (CHP) may take credit for the heat recovered from the exhaust of the combustion unit to meet the emission standards in subsections (4)(D), (4)(E), and (4)(F). Credit shall be at the rate of one MWh for each 3.4 million British Thermal Units of heat recovered. The following requirements must be met to take credit for CHP for units not sold and certified as an integrated package by the manufacturer:

(i) The owner or operator must provide as part of the application documentation of the heat recovered, electric output, efficiency of the generator alone, efficiency of the generator including CHP, and the use for the non-electric output, and

(ii) The heat recovered must equal at least 20 percent of the total energy output of the CHP unit.

The combustion turbine units do not use combined heat and power.

(I) Fuels combusted in these electric generating units are limited to:

(i) Natural gas containing no more than ten grains total sulfur per 100 dry standard cubic feet;

(ii) Landfill gas, digester gas, stranded oilfield gas, or gaseous renewable fuel containing no more than 30 grains total sulfur per 100 dry standard cubic feet; or

(iii) Liquid fuels (including liquid renewable fuel) not containing waste oils or solvents and containing less than 0.05 percent by weight sulfur.

The fuel combusted is natural gas containing no more than 10 grains total sulfur per 100 dry standard cubic feet.

(J) Except as provided in subsections (4)(F) and (4)(H), NO_X emissions for units 10 MW or less shall meet the following limitations based upon the date the unit is installed and the region in which it operates:

East Texas Region:

(i) Units installed prior to January 1, 2005 and

(a) operating more than 300 hours per year - 0.47 lb/MWh;

(b) operating 300 hours or less per year - 1.65 lb/MWh;

(ii) Units installed on or after January 1, 2005 and

(a) operating more than 300 hours per year, with a capacity greater than 250 kilowatts (kW) - 0.14 lb/MWh;

(b) operating 300 hours or less per year - 0.47 lb/MWh; or

(c) any unit with a capacity of 250 kW or less - 0.47 lb/MWh.

West Texas Region:

(i) Units operating more than 300 hours per year - 3.11 lb/MWh;

(ii) Units operating 300 hours or less per year - 21 lb/MWh.

Units certified to comply with applicable Tier 1, 2, or 3 emission standards in 40 CFR Part 89, Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines, are deemed to satisfy this emission limit.

This section does not apply as the units are rated greater than 10 MW in output capacity.

(K) Except as provided in subsections (4)(F) and (4)(H), NO_X emissions for units greater than 10 MW shall meet the following limitations:

(i) Units operating more than 300 hours per year - 0.14 pounds per megawatt hour (lb/MWh);

(ii) Units operating 300 hours or less per year - 0.38 lb/MWh.

The units will operate more than 300 hours per year and will meet the NO_X emission certification requirement of 0.14 lb/MWh when the units are operating at 80 percent and greater of the rated load.

(L) Electric generating units firing any gaseous or liquid fuel that is at least 75 percent landfill gas, digester gas, stranded oil field gas, or renewable fuel content by volume, shall meet a NO_X emission limit of 1.90 lb/MWh. Units in West Texas with a capacity of 10 MW or less that fire at least 75 percent landfill gas, digester gas, stranded oilfield gases, or gaseous or liquid renewable fuel by volume, must comply with the applicable West Texas NO_X limit in subsection (4)(D).

This section does not apply, as the units will be fueled by natural gas.

(M) To ensure continuing compliance with the emissions limitations, the owner or operator shall re-certify a unit every 16,000 hours of operation, but no less frequently than every three years. Re-certification may be accomplished by following a maintenance schedule that the manufacturer certifies will ensure continued compliance with the required NO_X standard or by third party testing of the unit using

appropriate USEPA reference methods, California Air Resources Board methods, or equivalent alternative testing methods approved by the executive director to demonstrate that the unit still meets the required emission standards. After re-certification, the unit must operate on the same fuel(s) for which the unit was re-certified.

Stone Creek will comply with the recertification requirements of this subparagraph.

(N) The NO_X emission limits in subsections (4)(D)-(4)(F) are subject to the following exceptions:

(i) The hourly NO_X emission limits do not apply at times when the ambient air temperature at the location of the unit is less than 0 degrees Fahrenheit.

Stone Creek is aware that the hourly NO_X emission limit will not apply when the local ambient temperature is less than 0 degrees Fahrenheit.

(ii) At times when a unit is operating at less than 80 percent of rated load, an alternative NO_X emission standard for that unit may be determined by multiplying the applicable emission standard in subsections (4)(D)-(4)(F) by the rated load of the EGU (in MW), to produce an allowable hourly mass NO_X emission rate. In order to use this alternative standard, an owner or operator must maintain records that demonstrate compliance with the alternative emission standard, and make such records available to the TCEQ or any local air pollution control agency with jurisdiction upon request.

Stone Creek will maintain the appropriate records if choosing to demonstrate compliance with the alternative NO_X emission standard. Maximum NO_X mass emissions during SU/SD of the turbines are presented in the emissions calculations in Appendix B and are not considered subject to the lb/MWh normal operating limits specified in this paragraph because the units are in startup mode and not generating electricity for a portion of that time.

4.4 30 TAC CHAPTER 117, CONTROL OF AIR POLLUTION FROM NITROGEN COMPOUNDS

The provisions of Chapter 117, Subchapter D, Division 1 Houston-Galveston-Brazoria Ozone Non-attainment Area Minor Sources are applicable to the Project, located in Brazoria County. Specific applicable provisions are discussed below.

4.4.1 §117.2000 – Applicability

This division (relating to Houston-Galveston-Brazoria Ozone Non-attainment Area Minor Sources) applies in the Houston-Galveston-Brazoria ozone non-attainment area to the following equipment at any stationary source of NO_X that is not a major source of NO_X:

(1) boilers and process heaters;
(2) stationary, reciprocating internal combustion engines; and
(3) stationary gas turbines, including duct burners.

Stone Creek is proposing to install stationary gas turbines and is, therefore, subject to this subchapter.

4.4.2 §117.2003 – Exemptions

(a) This division (relating to Houston-Galveston-Brazoria Ozone Nonattainment Area Minor Sources) does not apply to the following, except as specified in §§117.2030(c), 117.2035(g), and 117.2045(b) and (c) of this title (relating to Operating Requirements; Monitoring and Testing Requirements; and Recordkeeping and Reporting Requirements):

(1) boilers and process heaters with a maximum rated capacity of 2.0 million British thermal units per hour (MMBtu/hr) or less;

(2) the following stationary engines:

(A) engines with a horsepower (hp) rating of less than 50 hp;

(B) engines used in research and testing;

(C) engines used for purposes of performance verification and testing;

(D) engines used solely to power other engines or gas turbines during startups;

(E) engines operated exclusively in emergency situations, except that operation for testing maintenance purposes is allowed for up to 52 hours per year, based on a rolling 12-month average. Any new, modified, reconstructed, or relocated stationary diesel engine placed into service on or after October 1, 2001, is ineligible for this exemption. For the purposes of this subparagraph, the terms "modification" and "reconstruction" have the meanings defined in §116.10 of this title (relating to General Definitions) and 40 CFR §60.15 (December 16, 1975), respectively, and the term "relocated" means to newly install at an account, as defined in §101.1 of this title (relating to Definitions), a used engine from anywhere outside that account;

(F) engines used in response to and during the existence of any officially declared disaster or state of emergency;

(G) engines used directly and exclusively by the owner or operator for agricultural operations necessary for the growing of crops or raising of fowl or animals;

(H) diesel engines placed into service before October 1, 2001, that:

(i) operate less than 100 hours per year, based on a rolling 12-month average; and

(ii) have not been modified, reconstructed, or relocated on or after October 1, 2001. For the purposes of this clause, the terms "modification" and "reconstruction" have the meanings defined in §116.10 of this title and 40 CFR §60.15 (December 16, 1975), respectively, and the term "relocated" means to newly install at an account, as defined in §101.1 of this title, a used engine from anywhere outside that account; and

(I) new, modified, reconstructed, or relocated stationary diesel engines placed into service on or after October 1, 2001, that:

(i) operate less than 100 hours per year, based on a rolling 12-month average, in other than emergency situations; and

(ii) meet the corresponding emission standard for non-road engines listed in 40 CFR §89.112(a), Table 1 (October 23, 1998) and in effect at the time of installation, modification, reconstruction, or relocation. For the purposes of this subparagraph, the terms "modification" and "reconstruction" have the meanings defined in §116.10 of this title and 40 CFR §60.15 (December 16, 1975), respectively, and the term "relocated" means to newly install at an account, as defined in §101. of this title, a used engine from anywhere outside that account; and

(3) stationary gas turbines rated at less than 1.0 MW with initial start of operation on or before October 1, 2001.

Stone Creek does not qualify for any of these exemptions.

(b) At any stationary source of nitrogen oxides that is not subject to Chapter 101, Subchapter H, Division 3 of this title (relating to Mass Emissions Cap and Trade Program), the following are exempt from the requirements of this division, except for the totalizing fuel flow requirements of §117.2035(a) and (d) and §117.2045(a)(1) of this title:

(1) any boiler or process heater with a maximum rated capacity greater than 2.0 MMBtu/hr and less than 5.0 MMBtu/hr that has an annual heat input less than or equal to 1.8 (109) British thermal units (Btu) per calendar year; and

(2) any boiler or process heater with a maximum rated capacity equal to or greater than 5.0 MMBtu/hr that has an annual heat input less than or equal to 9.0 (109) Btu per calendar year.

Stone Creek is subject to Chapter 101, Subchapter H, Division 3 of this title, and therefore, does not qualify for this exemption.

4.4.3 §117.2010 – Emissions Specifications

(a) For sources that are subject to Chapter 101, Subchapter H, Division 3 of this title (relating to Mass Emissions Cap and Trade Program), the NO_x emission rate values used to determine allocations for Chapter 101, Subchapter H, Division 3 of this title must be the lower of any applicable permit limit in a permit issued before January 2, 2001; any permit issued on or after January 2, 2001, that the owner or operator submitted an application determined to be administratively complete by the executive director before January 2, 2001; any limit in a permit by rule under which construction commenced by January 2, 2001; or the emission specifications in subsection (c) of this section. The averaging time must be as specified in Chapter 101, Subchapter H, Division 3 of this title.

The Project is subject to Chapter 101, Subchapter H, Division 3 of this title and will start construction after January 2, 2001. Therefore, Stone Creek will be required to comply with subsection (c) of this section.

(b) The following NO_X emission specifications must be used in conjunction with subsection (a) of this section to determine allocations for Chapter 101, Subchapter H, Division 3 of this title, or in conjunction with subsection (b) of this section to establish unit-by-unit emission specifications, as appropriate:

(5) from stationary gas turbines (including duct burners), 0.15 lb/MMBtu; and

The engines proposed for Stone Creek are stationary gas turbines and will meet the emission standard requirement presented above.

(i) No person shall allow the discharge into the atmosphere from any unit subject to NO_x emission specifications in subsection (c) of this section, emissions in excess of the following, except as provided in §117.2025 of this title (relating to Alternative Case Specific Specifications):

(1) CO, 400 parts per million volume (ppmv) at 3.0 percent oxygen (O_2), dry basis (or alternatively, 3.0 grams per horsepower-hour (g/hp-hr) for stationary internal combustion engines):

(A) on a rolling 24-hour averaging period, for units equipped with a continuous emission monitoring system (CEMS) or a predictive emission monitoring system (PEMS) for CO; and
(B) on a one-hour average, for units not equipped with CEMS or PEMS for CO; and

(2) for units that inject urea or ammonia into the exhaust stream for NO_x control, ammonia emissions of 10 ppmv at 3.0 percent O_2, dry, for boilers and process heaters; 15 percent O_2, dry, for stationary gas turbines (including duct burners used in turbine exhaust ducts) and gas fired lean-burn engines; and 3.0 percent O_2, dry, for all other units, based on:

(A) a block one-hour averaging period for units not equipped with a CEMS or PEMS for ammonia; or
(B) a rolling 24-hour averaging period for units equipped with CEMS or PEMS for ammonia.

Stone Creek will comply with the applicable emission specifications.

4.4.4 §117D Division 1 – Additional Requirements.

Sections 117.2030, 117. 2035 and 117.2040 outline the operating, monitoring/testing and recordkeeping/reporting requirements for units subject to this subchapter. Stone Creek will comply with applicable requirements under these sections.

4.5 EMERGENCY ENGINE PERMIT BY RULE

Internal combustion engines and gas turbine driven compressors, electric generator sets, and water pumps, used only for portable, emergency, and/or standby services are permitted by rule if they meet the conditions under 30 TAC Section 106.511 and the general conditions under 30 TAC Section 106.4. The Project meets the general requirements under Section 106.4 and the applicable requirements under Section 106.51 as described below:

- The engine will only be used for emergency services: and
- The operating hours will be limited to less than 10 percent of normal annual operating hours.

4.6 ADDITIONAL TCEQ REGULATIONS

In addition to regulations already discussed in preceding sections, state regulations that could also apply to the Project are listed in Table 4.

Table 4. Other Applicable TCEQ Regulations

Rule	Description
30 TAC Chapter 101	General Air Quality Rules
30 TAC Chapter 111	Control of Air Pollution from Visible Emissions and Particulate Matter
30 TAC Chapter 115	Control of Air Pollution from Volatile Organic Compounds
30 TAC Chapter 116	Control of Air Pollution by Permits for New Construction or Modification
30 TAC Chapter 117	Control of Air Pollution from Nitrogen Compounds
30 TAC Chapter 118	Control of Air Pollution Episodes

FIGURES

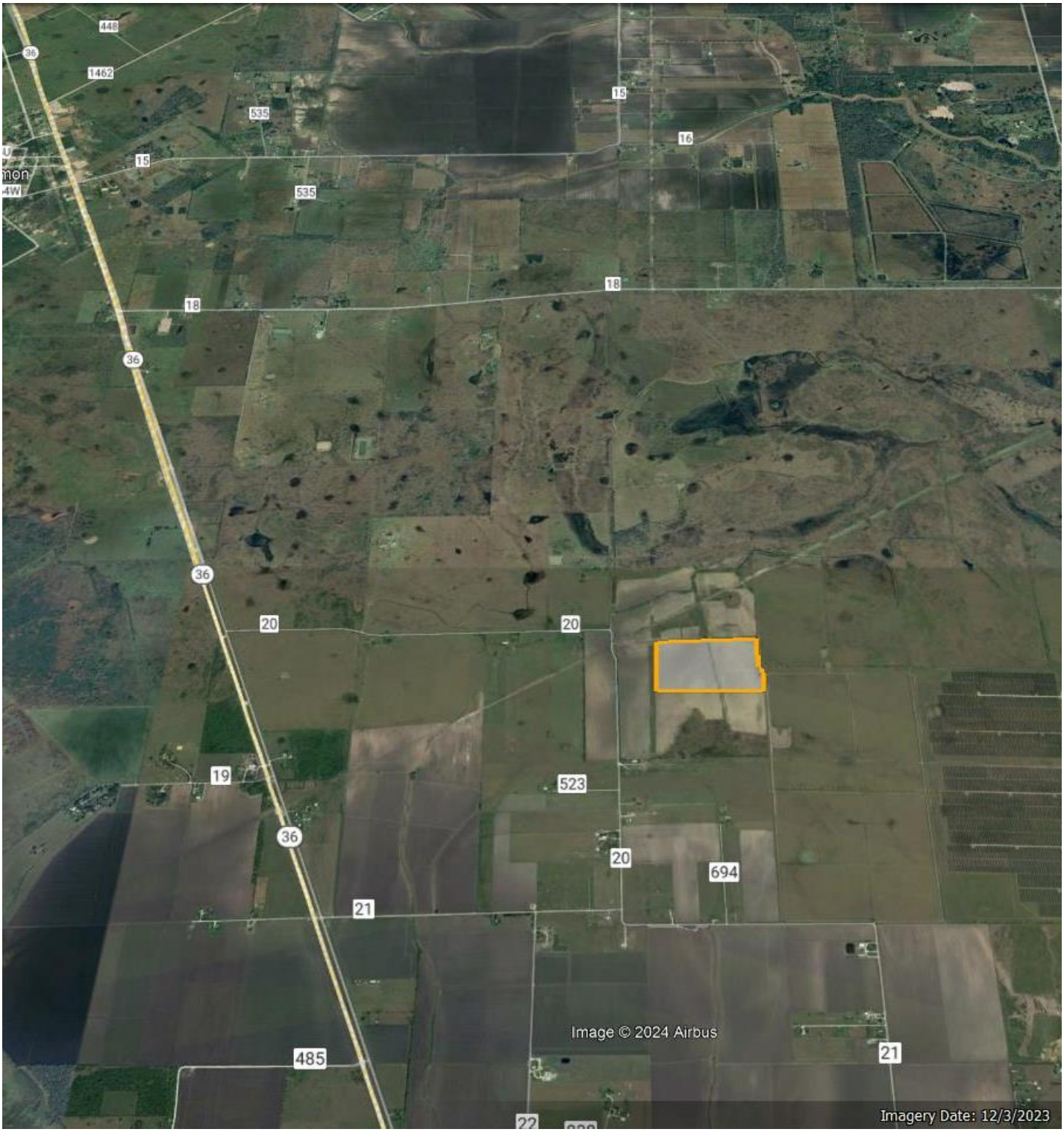
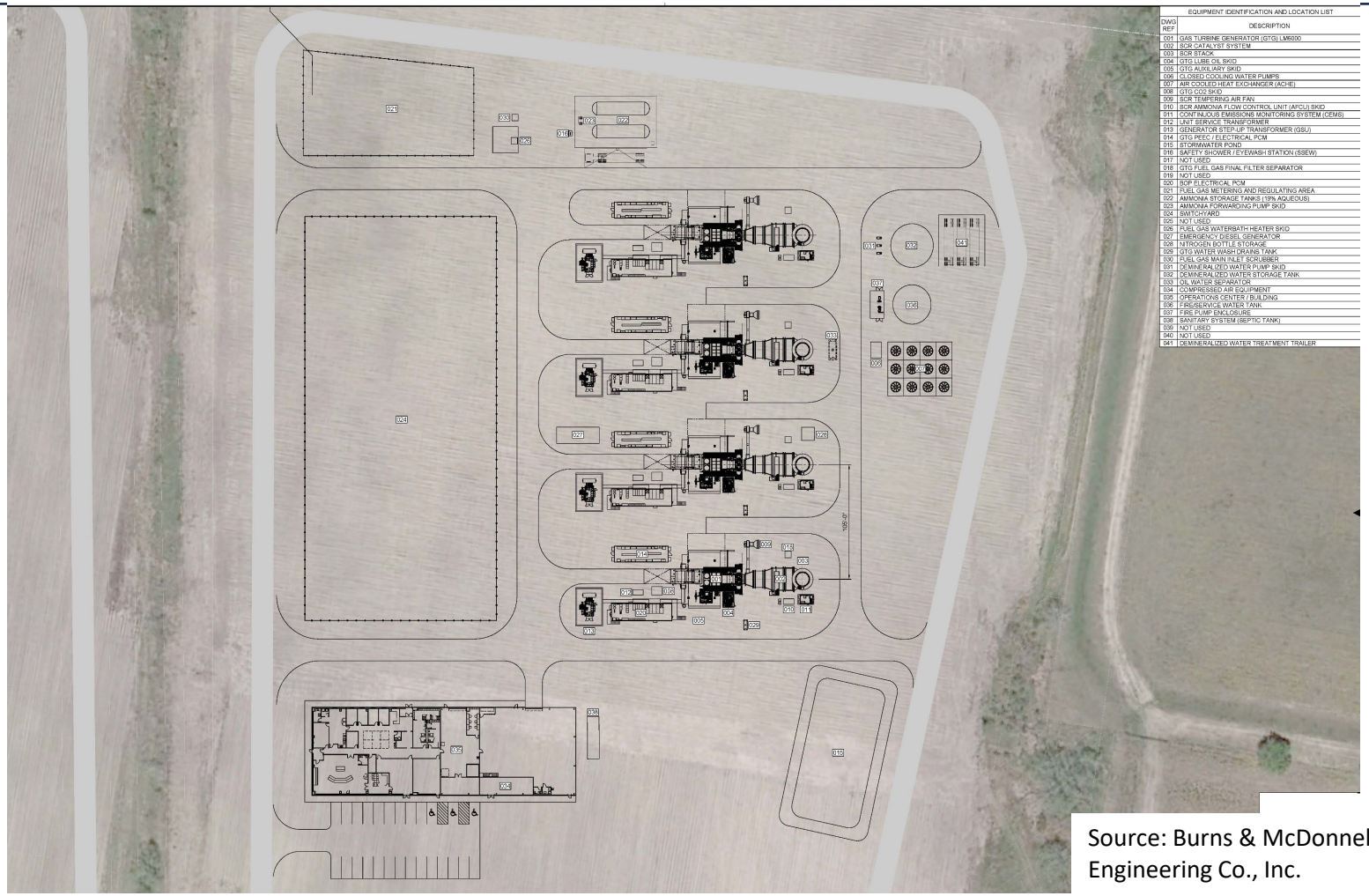


FIGURE 1

PROJECT LOCATION – AERIAL MAP

HALEY ALDRICH



Source: Burns & McDonnell Engineering Co., Inc.

FIGURE 2

PLOT PLAN

HALEY ALDRICH

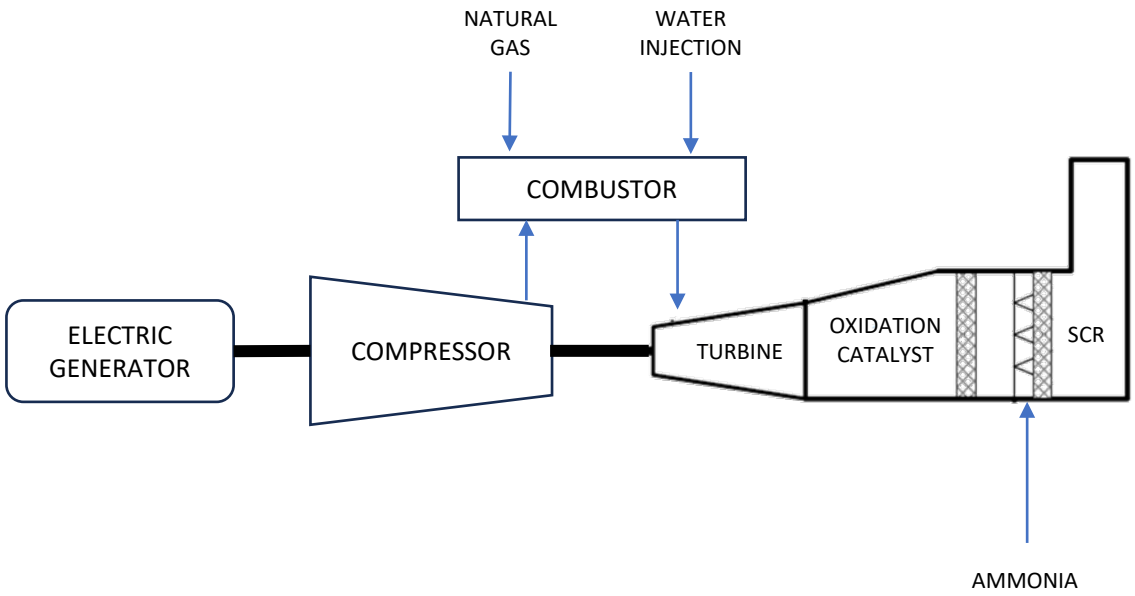


FIGURE 3

PROCESS FLOW DIAGRAM

HALEY ALDRICH

APPENDIX A
TCEQ Permit Application Forms

TCEQ Use Only

TCEQ Core Data Form

For detailed instructions on completing this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission (*If other is checked please describe in space provided.*)

☒ New Permit, Registration or Authorization (*Core Data Form should be submitted with the program application.*)

☐ Renewal *(Core Data Form should be submitted with the renewal form)* ☐ Other

2. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	**3. Regulated Entity Reference Number** *(if issued)*
CN		**RN**

SECTION II: Customer Information

4. General Customer Information	**5. Effective Date for Customer Information Updates** (mm/dd/yyyy)	12/27/2023

☒ New Customer ☐ Update to Customer Information ☐ Change in Regulated Entity Ownership
☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).

6. Customer Legal Name *(If an individual, print last name first: eg: Doe, John)*	*If new Customer, enter previous Customer below:*
Stone Creek Peaker LLC	

7. TX SOS/CPA Filing Number	**8. TX State Tax ID** (11 digits)	**9. Federal Tax ID** (9 digits)	**10. DUNS Number** *(if applicable)*
805365092	32093109240	93-4942919	

11. Type of Customer:	☒ Corporation	☐ Individual	Partnership: ☐ General ☐ Limited
Government: ☐ City ☐ County ☐ Federal ☐ Local ☐ State ☐ Other		☐ Sole Proprietorship	☐ Other:

12. Number of Employees	**13. Independently Owned and Operated?**
☒ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher	☐ **Yes** ☒ **No**

14. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check one of the following*

☐ Owner ☐ Operator ☒ Owner & Operator
☐ Occupational Licensee ☐ Responsible Party ☐ VCP/BSA Applicant ☐ Other:

15. Mailing Address:	155 Federal Street							
	17th Floor							
	City	Boston	**State**	MA	**ZIP**	02110	**ZIP + 4**	

16. Country Mailing Information *(if outside USA)*	**17. E-Mail Address** *(if applicable)*

18. Telephone Number	**19. Extension or Code**	**20. Fax Number** *(if applicable)*

(617) 456-2200		(617) 456-2201

SECTION III: Regulated Entity Information

21. General Regulated Entity Information *(If 'New Regulated Entity" is selected, a new permit application is also required.)*

☒ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information

The Regulated Entity Name submitted may be updated, in order to meet TCEQ Core Data Standards (removal of organizational endings such as Inc, LP, or LLC).

22. Regulated Entity Name *(Enter name of the site where the regulated action is taking place.)*

Stone Creek Peaker LLC

23. Street Address of the Regulated Entity: ***(No PO Boxes)***								
	City		**State**		**ZIP**		**ZIP + 4**	
24. County								

If no Street Address is provided, fields 25-28 are required.

25. Description to Physical Location:	FROM TX36 GO E ON CR20 FOR APPROXIMATELY 1.35 MI				
26. Nearest City			**State**	**Nearest ZIP Code**	
Damon			TX	77430	

Latitude/Longitude are required and may be added/updated to meet TCEQ Core Data Standards. (Geocoding of the Physical Address may be used to supply coordinates where none have been provided or to gain accuracy).

27. Latitude (N) In Decimal:	29.251792		**28. Longitude (W) In Decimal:**	-95.681316	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds

29. Primary SIC Code (4 digits)	**30. Secondary SIC Code** (4 digits)	**31. Primary NAICS Code** (5 or 6 digits)	**32. Secondary NAICS Code** (5 or 6 digits)
4911	N/A	221112	N/A

33. What is the Primary Business of this entity? *(Do not repeat the SIC or NAICS description.)*

Electric power generation in TX

34. Mailing Address:	**155 Federal Street**							
	17th Floor							
	City	**Boston**	**State**	**MA**	**ZIP**	**2110**	**ZIP + 4**	**1727**
35. E-Mail Address:	**kkekeisen@advanced-power.com**							

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(617) 456-2200	**N/A**	**(617) 456-2201**

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☐ Edwards Aquifer	☐ Emissions Inventory Air	☐ Industrial Hazardous Waste
☐ Municipal Solid Waste	☐ New Source Review Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS
☐ Sludge	☐ Storm Water	☐ Title V Air	☐ Tires	☐ Used Oil
☐ Voluntary Cleanup	☐ Wastewater	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:

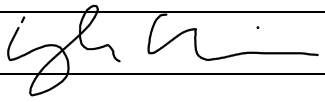
SECTION IV: Preparer Information

40. Name:	Kyle Kekeisen	**41. Title:**	Vice President

42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(857 **)** 210-3650	N/A	**(** 617 **)** 456-2201	kkekeisen@advanced-power.com

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	Stone Creek Peaker LLC	**Job Title:**	Vice President		
Name *(In Print):*	Kyle Kekeisen			**Phone:**	**(** 857 **)** 210- **3650**
Signature:				**Date:**	3/6/2024

Form PI-1S
Registrations for Air Standard Permit
(Page 1)
Texas Commission on Environmental Quality

I. Registrant Information
A. Company or Other Legal Customer Name:
Stone Creek Peaker LLC
B. Company Official Contact Information (☒ Mr. ☐ Mrs. ☐ Ms. ☐ Other:)_____
Name: Kyle Kekeisen
Title: Vice President
Mailing Address: 155 Federal Street
City: Boston
State: MA
ZIP Code: 02110
Telephone No.: 857-210-3650
Fax No.: 617-456-2201
Email Address: kkekeisen@advanced-power.com
All permit correspondence will be sent via email. KK
C. Technical Contact Information (☒ Mr. ☐ Mrs. ☐ Ms. ☐ Other:)_____
Name: Lynn Gresock
Title: Principal Consultant
Company Name: Haley & Aldrich, Inc.
Mailing Address: 3 Bedford Farms Road, Suite 301
City: Bedford
State: New Hampshire
ZIP Code: 03110
Telephone No.: 603-391-3325
Fax No.:
Email Address: lgresock@haleyaldrich.com
II. Facility and Site Information
A. Name and Type of Facility
Facility Name: Stone Creek Peaker
Type of Facility: ☒ Permanent ☐ Temporary

Form PI-1S
Registrations for Air Standard Permit
(Page 2)
Texas Commission on Environmental Quality

II. Facility and Site Information *(continued)*
For portable units, please provide the serial number of the equipment being authorized below.
Serial No(s):
B. Facility Location Information
Street Address:
If there is no street address, provide written driving directions to the site and provide the closest city or town, county, and ZIP code for the site (attach description if additional space is needed).
FROM TX36 GO E ON CR20 FOR APPROXIMATELY 1.35 MI
City: Damon (Unincorporated)
County: Brazoria
ZIP Code: 77430
C. Core Data Form (**required** for Standard Permits 6006, 6007, and 6013).
Is the Core Data Form (TCEQ Form 10400) attached? ☒ Yes ☐ No
Customer Reference Number (CN):
Regulated Entity Number (RN):
D. TCEQ Account Identification Number (if known):
E. Type of Action
☒ Initial Application ☐ Change to Registration ☐ Renewal ☐ Renewal Certification
For Change to Registration, Renewal, or Renewal Certification actions provide the following:
Registration Number:
Expiration Date:
F. Standard Permit Claimed: 6005 - Electric Generating Unit
G. Previous Standard Exemption or PBR Registration Number:
Is this authorization for a change to an existing facility previously authorized under a standard exemption or PBR? ☐ Yes ☒ No
If "Yes," enter previous standard exemption number(s) and PBR registration number(s) and associated effective date in the spaces provided below.

Form PI-1S
Registrations for Air Standard Permit
(Page 3)
Texas Commission on Environmental Quality

II. Facility and Site Information *(continued)*
H. Other Facilities at this Site Authorized by Standard Exemption, PBR, or Standard Permit
Are there any other facilities at this site that are authorized by an Air Standard Exemption, PBR, or Standard Permit? ☒ Yes ☐ No
If "Yes," enter standard exemption number(s), PBR registration number(s), and Standard Permit registration number(s), and associated effective date in the spaces provided below.
Standard Exemption, PBR Registration, and Standard Permit Registration Number(s) and Effective Date(s)
Section 106.511 - Portable and Emergency Engines and Turbines
I. Other Air Preconstruction Permits
Are there any other air preconstruction permits at this site? ☐ Yes ☒ No
If "Yes," enter permit number(s) in the spaces provided below.
J. Affected Air Preconstruction Permits
Does the standard permit directly affect any permitted facility? ☐ Yes ☒ No
If "Yes," enter permit number(s) in the spaces provided below.
K. Federal Operating Permit (FOP) Requirements
Is this facility located at a site that is required to obtain a FOP pursuant to 30 TAC Chapter 122? ☐ Yes ☒ No ☐ To Be Determined
Check the requirements of 30 TAC Chapter 122 that will be triggered if this standard permit is approved (*check all that apply).*
☐ Initial Application for a FOP ☐ Significant Revision for a SOP ☐ Minor Revision for a SOP
☐ Operational Flexibility/Off Permit Notification for a SOP ☐ Revision for a GOP
☐ To be Determined ☐ None
Identify the type(s) of FOP issued and/or FOP application(s) submitted/pending for the site. *(check all that apply)*
☐ SOP ☐ GOP ☐ GOP application/revision (submitted or under APD review) ☒ N/A
☐ SOP application/revision (submitted or under APD review)

Form PI-1S
Registrations for Air Standard Permit
(Page 4)
Texas Commission on Environmental Quality

III. Fee Information ***(go to www.tceq.texas.gov/epay to pay online)***	
A. Fee Amount: 900	
B. Voucher number from ePay: Paid in STEERS at time of submittal	
IV. Public Notice *(if applicable)*	
A. Responsible Person (☐ Mr. ☐ Mrs. ☐ Ms. ☐ Other:)_____	
Name:	
Title:	
Company:	
Mailing Address:	
City:	
State:	
ZIP Code:	
Telephone No.:	
Fax No.:	
Email Address:	
B. Technical Contact (☐ Mr. ☐ Mrs. ☐ Ms. ☐ Other):_____	
Name:	
Title:	
Company:	
Mailing Address:	
City:	
State:	
ZIP Code:	
Telephone No.:	
Fax No.:	
Email Address:	
C. Bilingual Notice	
Is a bilingual program required by the Texas Education Code in the School District?	☐ Yes ☐ No
Are the children who attend either the elementary school or the middle school closest to your facility eligible to be enrolled in a bilingual program provided by the district?	☐ Yes ☐ No

IV.	**Public Notice *(continued)*** *(if applicable) (continued)*	
If "Yes," list which language(s) are required by the bilingual program below?		
D.	Small Business Classification and Alternate Public Notice	
Does this company (including parent companies and subsidiary companies) have fewer than 100 employees or less than $6 million in annual gross receipts?		☐ Yes ☐ No
Is the site a major source under 30 TAC Chapter 122, Federal Operating Permit Program?		☐ Yes ☐ No
Are the site emissions of any individual regulated air contaminant equal to or greater than 50 tpy?		☐ Yes ☐ No
Are the site emissions of all regulated air contaminant combined equal to or greater than 75 tpy?		☐ Yes ☐ No
V.	**Renewal Certification Option**	
A.	Does the permitted facility emit an air contaminant on the Air Pollutant Watch List, and is the permitted facility located in an area on the watch list?	☐ Yes ☐ No
B.	For facilities participating in the Houston/Galveston/Brazoria area (HGB) cap and trade program for highly reactive VOCs (HRVOCs), do the HRVOCs need to be speciated on the maximum allowable emission rates table (MAERT)?	☐ Yes ☐ No
C.	Does the company and/or site have an unsatisfactory compliance history?	☐ Yes ☐ No
D.	Are there any applications currently under review for this standard permit registration?	☐ Yes ☐ No
E.	Are scheduled maintenance, startup, or shutdown emissions required to be included in the standard permit registration at this time?	☐ Yes ☐ No
F.	Are any of the following actions being requested at the time of renewal:	☐ Yes ☐ No
1.	Are there any facilities that have been permanently shutdown that are proposed to be removed from the standard permit registration?	☐ Yes ☐ No
2.	Do changes need to be made to the standard permit registration in order to remain in compliance?	☐ Yes ☐ No
3.	Are sources or facilities that have always been present and represented, but never identified in the standard permit registration, proposed to be included with this renewal?	☐ Yes ☐ No
4.	Are there any changes to the current emission rates table being proposed?	☐ Yes ☐ No
*Note: If answers to all of the questions in Section V. Renewal Certification Option are "No," use the certification option and skip to Section VII. of this form. If the answers to any of the questions in Section V. Renewal Certification Option are "Yes," the certification option **cannot** be used.*		
*If notice is applicable and comments are received in response to the public notice, the application does not qualify for the renewal certification option.		

Form PI-1S
Registrations for Air Standard Permit
(Page 6)
Texas Commission on Environmental Quality

VI. Technical Information Including State and Federal Regulatory Requirements	
Place a check next to the appropriate box to indicate what you have included in your submittal. *Note: Any technical or essential information needed to confirm that facilities are meeting the requirements of the standard permit must be provided. Not providing key information could result in an automatic deficiency and voiding of the project*.	
A. Standard Permit requirements (Checklists are optional; however, your review will go faster if you provide applicable checklists.)	
Did you demonstrate that the general requirements in 30 TAC Sections 116.610 and 116.615 are met?	☒ Yes ☐ No
Did you demonstrate that the individual requirements of the specific standard permit are met?	☒ Yes ☐ No
B. Confidential Information (All pages properly marked "CONFIDENTIAL").	☒ Yes ☐ No
C. Process Flow Diagram.	☒ Yes ☐ No
D. Process Description.	☒ Yes ☐ No
E. Maximum Emissions Data and Calculations.	☒ Yes ☐ No
F. Plot Plan.	☒ Yes ☐ No
G. Projected Start Of Construction Date, Start Of Operation Date, and Length of Time at Site:	☒ Yes ☐ No
Projected Start of Construction (provide date): 06/01/2025	
Projected Start of Operation (provide date): 06/01/2027	
Length of Time at the Site: Permanent	
VII. Delinquent Fees and Penalties	
This form **will not be processed** until all delinquent fees and/or penalties owed to the TCEQ or the Office of the Attorney General on behalf of the TCEQ are paid in accordance with the Delinquent Fee and Penalty Protocol. For more information regarding Delinquent Fees and Penalties, go to the TCEQ website at: www.tceq.texas.gov/agency/financial/fees/delin/index.html.	

VIII. Signature Requirements
The signature below confirms that I have knowledge of the facts included in this application and that these facts are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project for which application is made will not in any way violate any provision of the Texas Water Code (TWC), Chapter 7; the Texas Health and Safety Code, Chapter 382, the Texas Clean Air Act (TCAA) the air quality rules of the Texas Commission on Environmental Quality; or any local governmental ordinance or resolution enacted pursuant to the TCAA. I further state that I understand my signature indicates that this application meets all applicable nonattainment, prevention of significant deterioration, or major source of hazardous air pollutant permitting requirements. The signature further signifies awareness that intentionally or knowingly making or causing to be made false material statements or representations in the application is a criminal offense subject to criminal penalties.
Name (printed): Kyle Kekeisen
Signature (original signature required):
Date: 05/01/2024
IX. Copies of the Registration
The PI-1S application must be submitted through ePermits. No additional copies need to be sent to the Regional Office or local Air Pollution Control Program(s). The link to ePermits can be found here: www3.tceq.texas.gov/steers/.

Reset Form Print Form

APPENDIX B
Emission Calculations

OPERATING ASSUMPTIONS		
Number of CTGs	4	
Assumed Operating Hours/CTG (divided equally)	2400	27%
Total Operating Hours	**9600**	

Annual Emission Rate Summary (TPY) [ALL UNITS]						Facility	NNSR
Pollutant	HAZARDOUS AIR POLLUTANT (HAP)?	AEPCO	GE PCSPRINT	GE PF1SPRINT	Other Sources	Wide PTE (TPY)	Major Source Threshold (TPY)
Particulate Matter (PM_{10})	*no*	19.1	1.4	23.04	0.41	23.45	
Particulate Matter ($PM_{2.5}$)	*no*	19.1	19.2	23.04	0.41	23.45	
Sulfur Oxides (SO_x)	*no*	2.3	0.2	0.24	0.0012	2.28	
Nitrogen Oxides (NO_x)	*no*	22.9	21.3	23.90	1.06	24.96	25
Carbon Monoxide (CO)	*no*	18.8	26.3	26.81	0.58	27.39	
Volatile Organic Compound (VOC)	*no*	3.3	13.1	6.56	0.59	13.65	25
Sulfuric Acid Mist (SAM)	*no*	1.537	0.130	0.162	0.0004	1.54	
Lead	*yes*	0.0	0.0	0.0	0.0	0.00	
Carbon Dioxide (CO2)	*no*	265,520	259,056	297,072	116	297,188	
Greenhouse Gas (CO_2e)	*no*	265,799	259,311	297,363.54	57.97	297,422	
Ammonia	*no*	31.0	15.98	16.94	4.18	35.22	
Total HAPs	*n/a*	1.26	1.28	1.36		1.36	
Largest Individual HAP	*n/a*	0.51	0.52	0.56		0.56	

65 annual number of SU/SD events for each turbine (estimated assuming 4 hr steady state operation for each start)

Maximum Hourly Emission Rate (lb/hr) [Steady State - PER UNIT]					Max
Pollutant	HAZARDOUS AIR POLLUTANT (HAP)?	AEPCO	GE PCSPRINT	GE PF1SPRINT	Hourly (lb/hr)
Particulate Matter (PM_{10})	*no*	4.08	4.00	4.80	4.80
Particulate Matter ($PM_{2.5}$)	*no*	4.08	4.00	4.80	4.80
Sulfur Oxides (SO_x)	*no*	0.48	0.05	0.05	0.48
Nitrogen Oxides (NO_x)	*no*	4.37	4.50	4.77	4.77
Carbon Monoxide (CO)	*no*	2.66	4.87	4.65	4.87
Volatile Organic Compound (VOC)	*no*	0.75	3.07	1.40	3.07
Sulfuric Acid Mist (SAM)	*no*	0.32	0.03	0.034	0.32
Lead	*yes*	0.0	0.00	0.00	0.00
Carbon Dioxide (CO2)	*no*	55,767	60,900	64,720	64,720
Greenhouse Gas (CO_2e)	*no*	55,826	60,960	64,784	64,784
Ammonia	*no*	6.47	3.33	3.53	6.47
Total HAPs	*n/a*	0.26	0.27	0.28	0.28
Largest Individual HAP	*n/a*	0.11	0.11	0.12	0.12

Maximum Hourly Emission Rate (lb/hr) [SU/SD - PER UNIT]					Max
Pollutant	HAZARDOUS AIR POLLUTANT (HAP)?	AEPCO	GE PCSPRINT	GE PF1SPRINT	Hourly (lb/hr)
Particulate Matter (PM_{10})	*no*	5.03	5.04	5.44	5.44
Particulate Matter ($PM_{2.5}$)	*no*	5.03	5.04	5.44	5.44
Sulfur Oxides (SO_x)[A]	*no*	NA	NA	NA	NA
Nitrogen Oxides (NO_x)	*no*	30.17	29.99	30.28	30.28
Carbon Monoxide (CO)	*no*	55.82	56.66	56.72	56.72
Volatile Organic Compound (VOC)	*no*	4.80	5.86	5.17	5.86
Sulfuric Acid Mist (SAM)[A]	*no*	NA	NA	NA	NA

SINGLE COMBUSTION TURBINE

This spreadsheet calculates emissions from a single turbine.

CRITERIA POLLUTANTS

Pollutant	Hourly Emissions (lb/hr)		Hours of Operation 2,400	Steady State and SUSD Operations		
	Maximum	ISO - Case 2 (59 F)	Annual Emissions at ISO Conditions (tpy)	Annual Emissions from SUSD (tpy)	Annual Emissions from Steady State (tpy)	Annual Emissions with SUSD and Normal Operation (tpy)
Particulate Matter (PM_{10})	4.08	3.99	4.79	0.36	4.43	**4.79**
Particulate Matter ($PM_{2.5}$)	4.08	3.99	4.79	0.36	4.43	**4.79**
Sulfur Oxides (SO_x)	0.48	0.47	0.57		0.57	**0.57**
Nitrogen Oxides (NO_x)	4.37	4.34	5.21	0.91	4.82	**5.73**
Carbon Monoxide (CO)	2.66	2.64	3.17	1.77	2.93	**4.70**
Total Volatile Organic Compounds (VOC)	0.75	0.60	0.72	0.15	0.67	**0.82**
Sulfuric acid mist (SAM)	0.32	0.32	0.38	NA	NA	**0.38**

GREENHOUSE GASES (GHG)

Pollutant	Hourly Emissions (lb/hr)		Hours of Operation 2,400	Steady State and SUSD Operations		
	Maximum	ISO - Case 2 (59 F)	Annual Emissions at ISO Conditions (tpy)	Annual Emissions from SUSD (tpy)	Annual Emissions from Steady State (tpy)	Annual Emissions with SUSD and Normal Operation (tpy)
CO_2	55,767	55,317	**66,380**	NA	NA	**66,380**
N_2O	0.11	0.11	**0.13**	NA	NA	**0**
CH_4	1.07	1.06	**1.27**	NA	NA	**1**
CO_2e	55,825.9	55,374.7	**66,450**	NA	NA	**66,450**

Notes:

(1) ISO Conditions are considered to be Case 25 and Case 26 (65°F/100% load, without and with duct burning)

lbs = pounds

hr = hours

SUSD = Startup and Shut Down

HAP

Air Toxic Pollutant (not all HAPs)	Emissions Without Duct Burning		Hours of Operation 2400	HAP Speciation	
	Maximum	ISO - Case 2 (59 F)	HAP Annual Emissions at ISO Conditions (tpy)	HAP? (0 = no; 1 = yes)	Air Toxics Total Annual Emissions at ISO Conditions (tpy)
1,3-Butadiene	2.09E-04	2.07E-04	**2.51E-04**	1	0.000
Acetaldehyde	1.95E-02	1.92E-02	**2.34E-02**	1	0.023
Acrolein	3.12E-03	3.08E-03	**3.74E-03**	1	0.004
Ammonia	6.47E+00	6.20E+00	**0.00E+00**	0	7.759
Benzene	5.84E-03	5.77E-03	**7.01E-03**	1	0.007
Butane	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Ethane	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Ethylbenzene	1.56E-02	1.54E-02	**1.87E-02**	1	0.019
Formaldehyde (MACT Limit for CTG)	1.07E-01	1.06E-01	**1.29E-01**	1	0.129
Hexane	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Naphthalene	6.33E-04	6.25E-04	**7.60E-04**	1	0.001
PAH	1.07E-03	1.06E-03	**1.29E-03**	1	0.001
Pentane	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Propane	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Propylene Oxide	1.41E-02	1.39E-02	**1.69E-02**	1	0.017
Toluene	6.33E-02	6.25E-02	**7.60E-02**	1	0.076
Xylene (Total)	3.12E-02	3.08E-02	**3.74E-02**	1	0.037
Arsenic	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Barium	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Beryllium	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Cadmium	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Chromium	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Cobalt	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Lead	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Manganese	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Mercury	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Molybdenum	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Nickel	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Selenium	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Copper	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Vanadium	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Zinc	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
MAXIMUM INDIVIDUAL HAP	**1.07E-01**		**0.129**		
TOTAL HAPS	**2.62E-01**		**0.314**		

AEPCO Turbine Emissions Data for Operating Scenarios					
CASE #		1	2	3	
% Load		100%	100%	100%	
Ambient Dry Bulb Temperature	°F	40	59	100	
Altitude	ft	50	50	50	
Relative Humidity	%	60	60	33	
Inlet Conditioning Fogging		OFF	ON	ON	
Exhaust (stack) Flow	acfm	604436	585639	498653	
Exhaust (Stack) temperature	°F	839	844	865	
NO2/Nox Ratio		0.40	0.30	0.25	
Engine Exhaust Flange Emissions (per engine)					
NOx	ppm	25	25	25	
	lb/hr	43.718	43.380	41.799	
CO	ppm	89	59	59	
	lb/hr	94.735	62.317	60.046	
VOC	ppm	2.46	2	2	
	lb/hr	1.50	1.21	1.16	
CO2	lb/hr	55,767	55,317	53,137	
SO2	lb/hr	0.48	0.47	0.46	
PM	lb/hr	3.595	3.448	3.383	
Stack Emissions (per engine)					**MAXIMUMS**
NOx	ppm	2.5	2.5	2.5	
	lb/hr	4.372	4.338	4.180	**4.372**
CO	ppm	2.5	2.5	2.5	
	lb/hr	2.662	2.641	2.544	**2.662**
VOC	ppm	1.23	1	1	
	lb/hr	0.748	0.604	0.582	**0.748**
CO2	lb/hr	55,767	55,317	53,137	**55767.198**
SO2	lb/hr	0.48	0.47	0.46	**0.479**
PM	lb/hr	4.075	3.988	3.88	**4.075**
NH3	ppm	10	10	10	
	lb/hr	6.466	6.203	6.179	**6.466**
H2SO4 (see H2SO4 estimates tab)	**lb/hr**	**0.323**	**0.320**	**0.309**	**0.323**
NOx Emission Rate	**lb/MW hr**	**0.085**	**0.086**	**0.093**	
HAP and Air Toxic Emissions (lb/hr)					
	CASE	**1**	**2**	**3**	
Sources: CTG - AP-42 Chapter 3.1 unless otherwise noted	**CTG EF (lb/MMBtu)**	**40 F**	**59 F**	**100 F**	
methane (CH_4)	0.0022	1.071	1.057	0.961	**1.07E+00**
nitrous oxide (N_2O)	0.00022	0.107	0.106	0.096	**1.07E-01**
1,3-Butadiene	0.00000043	0.000	0.000	0.000	**2.09E-04**
Acetaldehyde	0.00004	0.019	0.019	0.017	**1.95E-02**
Acrolein	0.0000064	0.003	0.003	0.003	**3.12E-03**
Ammonia	NA	6.466	6.203	6.179	**6.47E+00**
Benzene	0.000012	0.006	0.006	0.005	**5.84E-03**
Butane		0.000	0.000	0.000	**0.00E+00**
Ethane		0.000	0.000	0.000	**0.00E+00**
Ethylbenzene	0.000032	0.016	0.015	0.014	**1.56E-02**
Formaldehyde (MACT Limit for CTG)	0.00022	0.107	0.106	0.096	**1.07E-01**
Hexane		0.000	0.000	0.000	**0.00E+00**
Naphthalene	0.0000013	0.001	0.001	0.001	**6.33E-04**
PAH	0.0000022	0.001	0.001	0.001	**1.07E-03**
Pentane		0.000	0.000	0.000	**0.00E+00**
Propane		0.000	0.000	0.000	**0.00E+00**
Propylene Oxide	0.000029	0.014	0.014	0.013	**1.41E-02**
Toluene	0.00013	0.063	0.062	0.057	**6.33E-02**
Xylene (Total)	0.000064	0.031	0.031	0.028	**3.12E-02**
Arsenic		0.000	0.000	0.000	**0.00E+00**
Barium		0.000	0.000	0.000	**0.00E+00**
Beryllium		0.000	0.000	0.000	**0.00E+00**
Cadmium		0.000	0.000	0.000	**0.00E+00**
Chromium		0.000	0.000	0.000	**0.00E+00**
Cobalt		0.000	0.000	0.000	**0.00E+00**
Lead		0.000	0.000	0.000	**0.00E+00**
Manganese		0.000	0.000	0.000	**0.00E+00**
Mercury		0.000	0.000	0.000	**0.00E+00**
Molybdenum		0.000	0.000	0.000	**0.00E+00**
Nickel		0.000	0.000	0.000	**0.00E+00**
Selenium		0.000	0.000	0.000	**0.00E+00**
Copper		0.000	0.000	0.000	**0.00E+00**
Vanadium		0.000	0.000	0.000	**0.00E+00**
Zinc		0.000	0.000	0.000	**0.00E+00**

Mode	Events/year	Time (min) per event	Min Downtime before or after Event (hr)	Total Time per event (hr)	Total Pounds Per Event				Total Tons Per Year from SU/SD			
					NOx	CO	VOC	PM	NOx	CO	VOC	PM
Startup:	65	30	1	1.50	20.00	39.00	3.00	2.04	0.650	1.268	0.098	0.066
Shutdown:	65	15	1	1.25	8.00	15.50	1.50	1.00	0.260	0.504	0.049	0.033
	Total Time (hr)	**48.8**							**0.91**	**1.77**	**0.15**	**0.10**

Hourly Maximum Emissions (assumes 1 SU and 1 SD in an hour)

Mode	Events/year	Time (min) per event	Min Downtime before or after Event (hr)	Total Time per event (hr)	SU/SD Max Emissions during an hour (lbs)				Steady State Emissions during an hour (lbs) (ISO)			
					NOx	CO	VOC	PM	NOx	CO	VOC	PM
Startup:	65	30	1	1.50	20.00	39.00	3.00	2.04	1.085	0.660	0.151	0.997
Shutdown:	65	15	1	1.25	8.00	15.50	1.50	1.00	1.085	0.660	0.151	0.997
	Total Time (hr)	**48.8**		**178.8**				**Maximum Hourly Emissions**	**30.17**	**55.82**	**4.80**	**5.03**

Mode	Events/year	Time (min) per event	Min Downtime before or after Event (hr)	Total Time per event (hr)	SU/SD Average Hourly Emissions ((lb/hr)				Steady State Hourly Emissions (lb/hr) (ISO)			
					NOx	CO	VOC	PM	NOx	CO	VOC	PM
Startup:	65	30	1	1.50	13.33	26.00	2.00	1.36	4.338	2.641	0.604	3.988
Shutdown:	65	15	1	1.25	6.40	12.40	1.20	0.80	4.338	2.641	0.604	3.988
	Total Time (hr)	**48.8**		**178.8**					**8.68**	**5.28**	**1.21**	**7.98**

Annual Average Emissions

SU/SD hrs per year 0.0 w/o downtime
SU/SD hrs per year 178.8 with downtime

Mode	Events/year	Total Time per event (hr) (no downtime)	Annual Hours for SU/SD Events (with downtime)	SU/SD lb per yr (during SU/SD event hours including downtime)				ISO Steady State (lb/yr) (during SU/SD event hours including downtime)				Worst Case Annual Emissions During SU_SD Event Hours (lb/yr) (including downtime)			
				NOx	CO	VOC	PM	NOx	CO	VOC	PM	NOx	CO	VOC	PM
Startup:	65		97.5	1300	2535	195	132	423	257	59	389	1300	2535	195	389
Shutdown:	65		81.3	520	1008	98	65	352	215	49	324	520	1008	98	324
	TOTALS		**178.8**												
SU_SD Event Hours (inc. downtime) (tpy)			178.8									0.9	1.8	0.1	0.4
Steady State Operation Hours (tpy)			2221.3									4.8	2.9	0.7	4.4
TOTAL			2400.0									**5.7**	**4.7**	**0.8**	**4.8**

Notes

A) For pollutants that are self-correcting hourly emissions are during normal operation, for non self correcting pollutants, emissions are during SU/SD event.

B) Incorporates SU/SD emissions for those pollutants that are not self-correcting as indicated with orange shading.

C) Max Hourly Emissions During SU/SD event incorporates assumes steady state operation for the remainder of the hour.

SINGLE COMBUSTION TURBINE

This spreadsheet calculates emissions from a single turbine.

CRITERIA POLLUTANTS

Pollutant	Hourly Emissions (lb/hr)		Hours of Operation 2,400	Steady State and SUSD Operations		
	Maximum	ISO - Case 2 (59 F)	Annual Emissions at ISO Conditions (tpy)	Annual Emissions from SUSD (tpy)	Annual Emissions from Steady State (tpy)	Annual Emissions with SUSD and Normal Operation (tpy)
Particulate Matter (PM_{10})	4.00	4.00	4.80	0.36	4.44	**0.4**
Particulate Matter ($PM_{2.5}$)	4.00	4.00	4.80	0.36	4.44	**4.8**
Sulfur Oxides (SO_x)	0.05	0.04	0.05		0.05	**0.048**
Nitrogen Oxides (NO_x)	4.50	3.98	4.78	0.91	4.42	**5.3**
Carbon Monoxide (CO)	4.87	4.32	5.18	1.77	4.80	**6.6**
Total Volatile Organic Compounds (VOC)	3.07	2.72	3.26	0.24	3.02	**3.3**
Sulfuric acid mist (SAM)	0.034	0.027	0.032	NA	NA	**0.03**

GREENHOUSE GASES (GHG)

Pollutant	Hourly Emissions (lb/hr)		Hours of Operation 2,400	Steady State and SUSD Operations		
	Maximum	ISO - Case 2 (59 F)	Annual Emissions at ISO Conditions (tpy)	Annual Emissions from SUSD (tpy)	Annual Emissions from Steady State (tpy)	Annual Emissions with SUSD and Normal Operation (tpy)
CO_2	60,900	53,970	**64,764**	NA	NA	**64,764**
N_2O	0.11	0.10	**0.12**	NA	NA	**0**
CH_4	1.09	0.97	**1.16**	NA	NA	**1**
CO_2e	60,959.9	54,023.1	**64,828**	NA	NA	**64,828**

Notes:

(1) ISO Conditions are considered to be Case 25 and Case 26 (65°F/100% load, without and with duct burning)

lbs = pounds

hr = hours

SUSD = Startup and Shut Down

HAP

Air Toxic Pollutant (not all HAPs)	Emissions Without Duct Burning		Hours of Operation 2400	HAP Speciation	
	Maximum	ISO - Case 2 (59 F)	HAP Annual Emissions at ISO Conditions (tpy)	HAP? (0 = no; 1 = yes)	Air Toxics Total Annual Emissions at ISO Conditions (tpy)
1,3-Butadiene	2.14E-04	1.89E-04	**2.56E-04**	1	0.000
Acetaldehyde	1.99E-02	1.76E-02	**2.39E-02**	1	0.024
Acrolein	3.18E-03	2.82E-03	**3.82E-03**	1	0.004
Ammonia	3.33E+00	2.95E+00	**0.00E+00**	0	3.996
Benzene	5.96E-03	5.28E-03	**7.16E-03**	1	0.007
Butane	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Ethane	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Ethylbenzene	1.59E-02	1.41E-02	**1.91E-02**	1	0.019
Formaldehyde (MACT Limit for CTG)	1.09E-01	9.69E-02	**1.31E-01**	1	0.131
Hexane	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Naphthalene	6.46E-04	5.72E-04	**7.75E-04**	1	0.001
PAH	1.09E-03	9.69E-04	**1.31E-03**	1	0.001
Pentane	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Propane	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Propylene Oxide	1.44E-02	1.28E-02	**1.73E-02**	1	0.017
Toluene	6.46E-02	5.72E-02	**7.75E-02**	1	0.078
Xylene (Total)	3.18E-02	2.82E-02	**3.82E-02**	1	0.038
Arsenic	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Barium	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Beryllium	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Cadmium	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Chromium	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Cobalt	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Lead	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Manganese	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Mercury	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Molybdenum	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Nickel	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Selenium	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Copper	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Vanadium	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Zinc	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
MAXIMUM INDIVIDUAL HAP	**1.09E-01**		**0.131**		
TOTAL HAPS	**2.67E-01**		**0.320**		

Emission Report

Estimated Emissions NOT FOR GUARANTEE: USE FOR STUDY ONLY

Emissions Estimates
Project: AP Texas
IPS Number: 1652340
Application Engineer: HL

Operating Point		**1**	**2**	**3**	
Heat Balance name		Case 1 LM6000	Case 2 LM6000	Case 3 LM6000	
Heat Balance description		PC SPRINT	PC SPRINT	PC SPRINT	
Heat Balance description		1 - VIGV	1 - VIGV	1 - VIGV	
Ambient Conditions					
Ambient Temperature	°F	40.0	59.0	100.0	
Ambient Pressure	psia	14.696	14.696	14.696	
Ambient Relative Humidity	%	60	60	60	
Gas Turbine					
GT Fuel Type		Gas 1	Gas 1	Gas 1	
Number of Gas Turbines operating per Block					
GT load fraction	%	100	100	100	
Gas turbine water injection flow rate	klb/h	24.7	20.6	11.5	
Abatement Status					
CO Catalyst Operating status		Operating	Operating	Operating	
SCR Operating status		Operating	Operating	Operating	
GT Fuel					
Gas Turbine fuel HHV	Btu/lb	23595	23595	23595	
Gas Turbine gas fuel molecular weight	lb/lbmole	16.68	16.68	16.68	
Gas Turbine sulfur ppm (by mass)	ppm	0.921	0.921	0.921	
Gas Turbine fuel sulfur, grains/100 SCF (@60F)	grain/100SCF	0.02833	0.02833	0.02833	
GT Heat Cons (HHV), with permitting margin	MMBtu/h	497.0	440.3	337.4	
GT Exhaust Emissions (per GT)					
NOx Volume fraction, dry, at 15 % O2	ppm	25.0	25.0	25.0	
NOx mass flow rate (as NO2)	lb/h	44.95	39.81	30.50	
CO Volume fraction, dry, at 15 % O2	ppm	89.0	89.0	89.0	
CO mass flow rate	lb/h	97.44	86.29	66.10	
UHC Volume fraction, dry, at 15 % O2	ppm	35.0	35.0	35.0	
UHC mass flow rate (as methane)	lb/h	21.95	19.44	14.89	
VOC Volume fraction, dry, at 15 % O2	ppm	7.0	7.0	7.0	
VOC mass flow rate (as methane)	lb/h	4.39	3.89	2.98	
SOx Volume fraction, dry, at 15 % O2	ppm	0.0	0.0	0.0	
SOx mass flow rate (as SO2)	lb/h	0.05	0.04	0.03	
Filterable Particulates	lb/h	3	3	3	
Total Particulates	lb/h	4	4	4	
Stack Exit Exhaust gas (per unit)					
Stack N2 mole fraction	-	0.7245	0.7248	0.7111	
Stack O2 mole fraction	-	0.1304	0.1337	0.1327	
Stack AR mole fraction	-	0.0088	0.0088	0.0086	
Stack H2O mole fraction	-	0.1036	0.1016	0.1178	
Stack CO2 mole fraction	-	0.0325	0.0309	0.0296	
	-				
Stack Molecular Weight	lb/lbmole	28.12	28.13	27.94	
Stack Temperature	°F	834.1	827.1	877.7	
Stack Mass flow, including Permitting Margin, per stack	lb/h	1139086	1063284	845757	
Margined exhaust vol flow (incl. permitting margin)	Mft3/h	38.3	35.5	29.6	
Stack Exit Emissions (per unit)					MAXIMUMS
NOx Volume fraction, dry, at 15 % O2	ppm	2.5	2.5	2.5	
NOx mass flow rate (as NO2)	lb/h	4.50	3.98	3.05	4.50
CO Volume fraction, dry, at 15 % O2	ppm	4.45	4.45	4.45	
CO mass flow rate	lb/h	4.87	4.32	3.31	4.87
VOC Volume fraction, dry, at 15 % O2	ppm	4.9	4.9	4.9	
VOC mass flow rate (as methane)	lb/h	3.07	2.72	2.09	3.07
NH3 Volume fraction, dry, at 15 % O2	ppm	5	5	5	
NH3 mass flow rate	lb/h	3.33	2.95	2.26	3.33
SOx Volume fraction, dry, at 15 % O2	ppm	0.0186	0.0186	0.0186	
SOx mass flow rate (as SO2)	lb/h	0.05	0.04	0.03	0.05
Filterable Particulates	lb/h	3	3	3	3
Total Particulates	lb/h	4	4	4	4
Stack CO2 mass flow rate, including Permitting margin	lb/h	60900	53970	41360	60900
H2SO4 EMISSIONS	LB/HR	0.034	0.027	0.020	0.033741966
NOx Emission Rate	**lb/MW hr**	**0.090**	**0.080**	**0.076**	

HAP and Air Toxic Emissions (lb/hr)

	CASE	1	2	3	
Sources: CTG - AP-42 Chapter 3.1 unless otherwise noted	**CTG EF (lb/MMBtu)**	**40 F**	**59 F**	**100 F**	
methane (CH_4)	0.0022	1.093	0.969	0.742	**1.09E+00**
nitrous oxide (N_2O)	0.00022	0.109	0.097	0.074	**1.09E-01**
1,3-Butadiene	0.00000043	0.000	0.000	0.000	**2.14E-04**
Acetaldehyde	0.00004	0.020	0.018	0.013	**1.99E-02**
Acrolein	0.0000064	0.003	0.003	0.002	**3.18E-03**
Ammonia	NA	3.330	2.950	2.260	**3.33E+00**
Benzene	0.000012	0.006	0.005	0.004	**5.96E-03**
Butane		0.000	0.000	0.000	**0.00E+00**
Ethane		0.000	0.000	0.000	**0.00E+00**
Ethylbenzene	0.000032	0.016	0.014	0.011	**1.59E-02**
Formaldehyde (MACT Limit for CTG)	0.00022	0.109	0.097	0.074	**1.09E-01**
Hexane		0.000	0.000	0.000	**0.00E+00**
Naphthalene	0.0000013	0.001	0.001	0.000	**6.46E-04**
PAH	0.0000022	0.001	0.001	0.001	**1.09E-03**
Pentane		0.000	0.000	0.000	**0.00E+00**
Propane		0.000	0.000	0.000	**0.00E+00**
Propylene Oxide	0.000029	0.014	0.013	0.010	**1.44E-02**
Toluene	0.00013	0.065	0.057	0.044	**6.46E-02**
Xylene (Total)	0.000064	0.032	0.028	0.022	**3.18E-02**
Arsenic		0.000	0.000	0.000	**0.00E+00**
Barium		0.000	0.000	0.000	**0.00E+00**
Beryllium		0.000	0.000	0.000	**0.00E+00**
Cadmium		0.000	0.000	0.000	**0.00E+00**
Chromium		0.000	0.000	0.000	**0.00E+00**
Cobalt		0.000	0.000	0.000	**0.00E+00**
Lead		0.000	0.000	0.000	**0.00E+00**
Manganese		0.000	0.000	0.000	**0.00E+00**
Mercury		0.000	0.000	0.000	**0.00E+00**
Molybdenum		0.000	0.000	0.000	**0.00E+00**
Nickel		0.000	0.000	0.000	**0.00E+00**
Selenium		0.000	0.000	0.000	**0.00E+00**
Copper		0.000	0.000	0.000	**0.00E+00**
Vanadium		0.000	0.000	0.000	**0.00E+00**
Zinc		0.000	0.000	0.000	**0.00E+00**

Mode	Events/year	Time (min) per event	Min Downtime before or after Event (hr)	Total Time per event (hr)	Total Pounds Per Event				Total Tons Per Year from SU/SD			
					NOx	CO	VOC	PM	NOx	CO	VOC	PM
Startup:	65	30	1	1.50	20.00	39.00	3.00	2.04	0.650	1.268	0.098	0.066
Shutdown:	65	15	1	1.25	8.00	15.50	1.50	1.00	0.260	0.504	0.049	0.033
	Total Time (hr)	**48.8**							**0.91**	**1.77**	**0.15**	**0.10**

Hourly Maximum Emissions (assumes 1 SU and 1 SD in an hour)

Mode	Events/year	Time (min) per event	Min Downtime before or after Event (hr)	Total Time per event (hr)	SU/SD Max Emissions during an hour (lbs)				Steady State Emissions during an hour (lbs) (ISO)			
					NOx	CO	VOC	PM	NOx	CO	VOC	PM
Startup:	65	30	1	1.50	20.00	39.00	3.00	2.04	0.995	1.080	0.680	1.000
Shutdown:	65	15	1	1.25	8.00	15.50	1.50	1.00	0.995	1.080	0.680	1.000
	Total Time (hr)	**48.8**		**178.8**				**Maximum Hourly Emissions**	**29.99**	**56.66**	**5.86**	**5.04**

Mode	Events/year	Time (min) per event	Min Downtime before or after Event (hr)	Total Time per event (hr)	SU/SD Average Hourly Emissions ((lb/hr)				Steady State Hourly Emissions (lb/hr) (ISO)			
					NOx	CO	VOC	PM	NOx	CO	VOC	PM
Startup:	65	30	1	1.50	13.33	26.00	2.00	1.36	3.980	4.320	2.720	4.000
Shutdown:	65	15	1	1.25	6.40	12.40	1.20	0.80	3.980	4.320	2.720	4.000
	Total Time (hr)	**48.8**		**178.8**					**7.96**	**8.64**	**5.44**	**8.00**

Annual Average Emissions

Mode	Events/year	Total Time per event (hr) (no downtime)	Annual Hours for SU/SD Events (with downtime)	SU/SD lb per yr (during SU/SD event hours including downtime)				Iso Steady State (lb/yr) (during SU/SD event hours including downtime)				Worst Case Annual Emissions During SU_SD Event Hours (lb/yr) (including downtime)			
				NOx	CO	VOC	PM	NOx	CO	VOC	PM	NOx	CO	VOC	PM
Startup:	65		97.5	1300	2535	195	132	388	421	265	390	1300	2535	265	390
Shutdown:	65		81.3	520	1008	98	65	323	351	221	325	520	1008	221	325
	TOTALS		**178.8**												
SU_SD Event Hours (inc. downtime) (tpy)			178.8									0.9	1.8	0.2	0.4
Steady State Operation Hours (tpy)			2221.3									4.4	4.8	3.0	4.4
TOTAL			2400.0									**5.3**	**6.6**	**3.3**	**4.8**

Notes

A) For pollutants that are self-correcting hourly emissions are during normal operation, for non self correcting pollutants, emissions are during SU/SD event.

B) Incorporates SU/SD emissions for those pollutants that are not self-correcting as indicated with orange shading.

C) Max Hourly Emissions During SU/SD event incorporates assumes steady state operation for the remainder of the hour.

SINGLE COMBUSTION TURBINE

This spreadsheet calculates emissions from a single turbine.

CRITERIA POLLUTANTS

Pollutant	Hourly Emissions (lb/hr)		Hours of Operation 2,400	Steady State and SUSD Operations		
	Maximum	ISO - Case 2 (59 F)	Annual Emissions at ISO Conditions (tpy)	Annual Emissions from SUSD (tpy)	Annual Emissions from Steady State (tpy)	Annual Emissions with SUSD and Normal Operation (tpy)
Particulate Matter (PM_{10})	4.80	4.80	5.76	0.43	5.33	**5.8**
Particulate Matter ($PM_{2.5}$)	4.80	4.80	5.76	0.43	5.33	**5.8**
Sulfur Oxides (SO_x)	0.05	0.05	0.06	NA	NA	**0.1**
Nitrogen Oxides (NO_x)	4.77	4.56	5.47	0.91	5.06	**6.0**
Carbon Monoxide (CO)	4.65	4.44	5.33	1.77	4.93	**6.7**
Total Volatile Organic Compounds (VOC)	1.40	1.34	1.61	0.15	1.49	**1.6**
Sulfuric acid mist (SAM)	0.03	0.03	0.040	NA	NA	**0.04**

GREENHOUSE GASES (GHG)

Pollutant	Hourly Emissions (lb/hr)		Hours of Operation 2,400	Steady State and SUSD Operations		
	Maximum	ISO - Case 2 (59 F)	Annual Emissions at ISO Conditions (tpy)	Annual Emissions from SUSD (tpy)	Annual Emissions from Steady State (tpy)	Annual Emissions with SUSD and Normal Operation (tpy)
CO_2	64,720	61,890	**74,268**	NA	NA	**74,268**
N_2O	0.12	0.11	**0.13**	NA	NA	**0**
CH_4	1.16	1.11	**1.33**	NA	NA	**1**
CO_2e	64,783.5	61,950.7	**74,341**	NA	NA	**74,341**

Notes:

(1) ISO Conditions are considered to be Case 25 and Case 26 (65°F/100% load, without and with duct burning)

lbs = pounds

hr = hours

SUSD = Startup and Shut Down

HAP

Air Toxic Pollutant (not all HAPs)	Emissions Without Duct Burning		Hours of Operation 2400	HAP Speciation	
	Maximum	ISO - Case 2 (59 F)	HAP Annual Emissions at ISO Conditions (tpy)	HAP? (0 = no; 1 = yes)	Air Toxics Total Annual Emissions at ISO Conditions (tpy)
1,3-Butadiene	2.27E-04	2.17E-04	**2.72E-04**	1	0.000
Acetaldehyde	2.11E-02	2.02E-02	**2.53E-02**	1	0.025
Acrolein	3.37E-03	3.22E-03	**4.05E-03**	1	0.004
Ammonia	3.53E+00	3.38E+00	**0.00E+00**	0	4.236
Benzene	6.32E-03	6.05E-03	**7.59E-03**	1	0.008
Butane	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Ethane	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Ethylbenzene	1.69E-02	1.61E-02	**2.02E-02**	1	0.020
Formaldehyde (MACT Limit for CTG)	1.16E-01	1.11E-01	**1.39E-01**	1	0.139
Hexane	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Naphthalene	6.85E-04	6.55E-04	**8.22E-04**	1	0.001
PAH	1.16E-03	1.11E-03	**1.39E-03**	1	0.001
Pentane	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Propane	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Propylene Oxide	1.53E-02	1.46E-02	**1.83E-02**	1	0.018
Toluene	6.85E-02	6.55E-02	**8.22E-02**	1	0.082
Xylene (Total)	3.37E-02	3.22E-02	**4.05E-02**	1	0.040
Arsenic	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Barium	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Beryllium	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Cadmium	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Chromium	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Cobalt	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Lead	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Manganese	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Mercury	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Molybdenum	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Nickel	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Selenium	0.00E+00	0.00E+00	**0.00E+00**	1	0.000
Copper	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Vanadium	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
Zinc	0.00E+00	0.00E+00	**0.00E+00**	0	0.000
MAXIMUM INDIVIDUAL HAP	**1.16E-01**		**0.139**		
TOTAL HAPS	**2.83E-01**		**0.340**		

Emission Report

Estimated Emissions NOT FOR GUARANTEE: USE FOR STUDY ONLY

Emissions Estimates
Project: AP Texas
IPS Number: 1652340
Application Engineer: HL

Operating Point		**1**	**2**	**3**	
Heat Balance name		Case 1	Case 2	Case 3	
Heat Balance description		LM6000 PF1 SPRINT	LM6000 PF1 SPRINT	LM6000 PF1 SPRINT	
Heat Balance description		2 - Airless Gas	2 - Airless Gas	2 - Airless Gas	
Ambient Conditions					
Ambient Temperature	°F	40.0	59.0	100.0	
Ambient Pressure	psia	14.696	14.696	14.696	
Ambient Relative Humidity	%	60	60	60	
Gas Turbine					
GT Fuel Type		Gas 1	Gas 1	Gas 1	
					497461.25
GT load fraction	%	100	100	100	
Gas turbine water injection flow rate	klb/h	0.0	0.0	0.0	
Abatement Status					
CO Catalyst Operating status		Operating	Operating	Operating	
SCR Operating status		Operating	Operating	Operating	
GT Fuel					
Gas Turbine fuel HHV	Btu/lb	23595	23595	23595	
Gas Turbine gas fuel molecular weight	lb/lbmole	16.68	16.68	16.68	
Gas Turbine fuel HHV	Btu/scf	1037.06	1037.06	1037.06	
Gas Turbine sulfur ppm (by mass)	ppm	0.921	0.921	0.921	
Gas Turbine fuel sulfur, grains/100 SCF (@60F)	grain/100SCF	0.02833	0.02833	0.02833	
GT Heat Cons (HHV), with permitting margin	MMBtu/h	526.8	503.8	408.8	
GT Exhaust Emissions (per GT)					
NOx Volume fraction, dry, at 15 % O2	ppm	25.0	25.0	25.0	
NOx mass flow rate (as NO2)	lb/h	47.69	45.61	37.01	
CO Volume fraction, dry, at 15 % O2	ppm	25.0	25.0	25.0	
CO mass flow rate	lb/h	29.03	27.77	22.53	
UHC Volume fraction, dry, at 15 % O2	ppm	15.0	15.0	15.0	
UHC mass flow rate (as methane)	lb/h	9.98	9.54	7.74	
VOC Volume fraction, dry, at 15 % O2	ppm	3.0	3.0	3.0	
VOC mass flow rate (as methane)	lb/h	2.00	1.91	1.55	
SOx Volume fraction, dry, at 15 % O2	ppm	0.0	0.0	0.0	
SOx mass flow rate (as SO2)	lb/h	0.05	0.05	0.04	
Filterable Particulates	lb/h	3.6	3.6	3.6	
Total Particulates	lb/h	4.8	4.8	4.8	
Stack Exit Exhaust gas (per unit)					
Stack N2 mole fraction	-	0.7518	0.7477	0.7258	
Stack O2 mole fraction	-	0.1367	0.1352	0.1313	
Stack AR mole fraction	-	0.0091	0.0090	0.0088	
Stack H2O mole fraction	-	0.0692	0.0747	0.1017	
Stack CO2 mole fraction	-	0.0331	0.0333	0.0323	
	-				
Stack Molecular Weight	lb/lbmole	28.50	28.44	28.14	
Stack Temperature	°F	908.2	935.8	975.3	
Stack Mass flow, including Permitting Margin, per stack	lb/h	1205449	1143374	947306	
Margined exhaust vol flow (incl. permitting margin)	Mft3/h	42.2	41.0	35.3	
Stack Exit Emissions (per unit)					**MAXIMUMS**
NOx Volume fraction, dry, at 15 % O2	ppm	2.5	2.5	2.5	
NOx mass flow rate (as NO2)	lb/h	4.77	4.56	3.70	**4.77**
CO Volume fraction, dry, at 15 % O2	ppm	4	4	4	
CO mass flow rate	lb/h	4.65	4.44	3.61	**4.65**
VOC Volume fraction, dry, at 15 % O2	ppm	2.1	2.1	2.1	
VOC mass flow rate (as methane)	lb/h	1.40	1.34	1.08	**1.4**
NH3 Volume fraction, dry, at 15 % O2	ppm	5	5	5	
NH3 mass flow rate	lb/h	3.53	3.38	2.74	**3.53**
SOx Volume fraction, dry, at 15 % O2	ppm	0.0186	0.0186	0.0186	
SOx mass flow rate (as SO2)	lb/h	0.05	0.05	0.04	**0.05**
Filterable Particulates	lb/h	3.6	3.6	3.6	**3.6**
Total Particulates	lb/h	4.8	4.8	4.8	**4.8**
Stack CO2 mass flow rate, including Permitting margin	lb/h	64720	61890	50220	**64720**
H2SO4 EMISSIONS	**LB/HR**	**0.034**	**0.034**	**0.027**	**0.033741966**
NOx Emission Rate	**lb/MW hr**	**0.086**	**0.080**	**0.075**	

HAP and Air Toxic Emissions (lb/hr)

	CASE	**0**	**0**	**0**	
Sources: CTG - AP-42 Chapter 3.1 unless otherwise noted	**CTG EF (lb/MMBtu)**	**40 F**	**59 F**	**100 F**	
methane (CH_4)	0.0022	1.159	1.108	0.899	**1.16E+00**
nitrous oxide (N_2O)	0.00022	0.116	0.111	0.090	**1.16E-01**
1,3-Butadiene	0.00000043	0.000	0.000	0.000	**2.27E-04**
Acetaldehyde	0.00004	0.021	0.020	0.016	**2.11E-02**
Acrolein	0.0000064	0.003	0.003	0.003	**3.37E-03**
Ammonia	NA	3.530	3.380	2.740	**3.53E+00**
Benzene	0.000012	0.006	0.006	0.005	**6.32E-03**
Butane		0.000	0.000	0.000	**0.00E+00**
Ethane		0.000	0.000	0.000	**0.00E+00**
Ethylbenzene	0.000032	0.017	0.016	0.013	**1.69E-02**
Formaldehyde (MACT Limit for CTG)	0.00022	0.116	0.111	0.090	**1.16E-01**
Hexane		0.000	0.000	0.000	**0.00E+00**
Naphthalene	0.0000013	0.001	0.001	0.001	**6.85E-04**
PAH	0.0000022	0.001	0.001	0.001	**1.16E-03**
Pentane		0.000	0.000	0.000	**0.00E+00**
Propane		0.000	0.000	0.000	**0.00E+00**
Propylene Oxide	0.000029	0.015	0.015	0.012	**1.53E-02**
Toluene	0.00013	0.068	0.065	0.053	**6.85E-02**
Xylene (Total)	0.000064	0.034	0.032	0.026	**3.37E-02**
Arsenic		0.000	0.000	0.000	**0.00E+00**
Barium		0.000	0.000	0.000	**0.00E+00**
Beryllium		0.000	0.000	0.000	**0.00E+00**
Cadmium		0.000	0.000	0.000	**0.00E+00**
Chromium		0.000	0.000	0.000	**0.00E+00**
Cobalt		0.000	0.000	0.000	**0.00E+00**
Lead		0.000	0.000	0.000	**0.00E+00**
Manganese		0.000	0.000	0.000	**0.00E+00**
Mercury		0.000	0.000	0.000	**0.00E+00**
Molybdenum		0.000	0.000	0.000	**0.00E+00**
Nickel		0.000	0.000	0.000	**0.00E+00**
Selenium		0.000	0.000	0.000	**0.00E+00**
Copper		0.000	0.000	0.000	**0.00E+00**
Vanadium		0.000	0.000	0.000	**0.00E+00**
Zinc		0.000	0.000	0.000	**0.00E+00**

Mode	Events/year	Time (min) per event	Min Downtime before or after Event (hr)	Total Time per event (hr)	Total Pounds Per Event				Total Tons Per Year from SU/SD			
					NOx	CO	VOC	PM	NOx	CO	VOC	PM
Startup:	65	30	1	1.50	20.00	39.00	3.00	2.04	0.650	1.268	0.098	0.066
Shutdown:	65	15	1	1.25	8.00	15.50	1.50	1.00	0.260	0.504	0.049	0.033
	Total Time (hr)	**48.8**							**0.91**	**1.77**	**0.15**	**0.10**

Hourly Maximum Emissions (assumes 1 SU and 1 SD in an hour)

Mode	Events/year	Time (min) per event	Min Downtime before or after Event (hr)	Total Time per event (hr)	SU/SD Max Emissions during an hour (lbs)				Steady State Emissions during an hour (lbs) (ISO)			
					NOx	CO	VOC	PM	NOx	CO	VOC	PM
Startup:	65	30	1	1.50	20.00	39.00	3.00	2.04	1.140	1.110	0.335	1.200
Shutdown:	65	15	1	1.25	8.00	15.50	1.50	1.00	1.140	1.110	0.335	1.200
	Total Time (hr)	**48.8**		**178.8**				**Maximum Hourly Emissions**	**30.28**	**56.72**	**5.17**	**5.44**

Hourly Average Emissions (includes downtime between events)

Mode	Events/year	Time (min) per event	Min Downtime before or after Event (hr)	Total Time per event (hr)	SU/SD Average Hourly Emissions ((lb/hr)				Steady State Hourly Emissions (lb/hr) (ISO)			
					NOx	CO	VOC	PM	NOx	CO	VOC	PM
Startup:	65	30	1	1.50	13.33	26.00	2.00	1.36	4.560	4.440	1.340	4.800
Shutdown:	65	15	1	1.25	6.40	12.40	1.20	0.80	4.560	4.440	1.340	4.800
	Total Time (hr)	**48.8**		**178.8**					**9.12**	**8.88**	**2.68**	**9.60**

Annual Average Emissions

Mode	Events/year	Total Time per event (hr) (no downtime)	Annual Hours for SU/SD Events (with downtime)	SU/SD lb per yr (during SU/SD event hours including downtime)				Iso Steady State (lb/yr) (during SU/SD event hours including downtime)				Worst Case Annual Emissions During SU_SD Event Hours (lb/yr) (including downtime)			
				NOx	CO	VOC	PM	NOx	CO	VOC	PM	NOx	CO	VOC	PM
Startup:	65		97.5	1300	2535	195	132	445	433	131	468	1300	2535	195	468
Shutdown:	65		81.3	520	1008	98	65	371	361	109	390	520	1008	109	390
	TOTALS		**178.8**												
SU_SD Event Hours (inc. downtime) (tpy)			178.8									0.9	1.8	0.2	0.4
Steady State Operation Hours (tpy)			2221.3									5.1	4.9	1.5	5.3
TOTAL			2400.0									**6.0**	**6.7**	**1.6**	**5.8**

Notes

A) For pollutants that are self-correcting hourly emissions are during normal operation, for non self correcting pollutants, emissions are during SU/SD event.

B) Incorporates SU/SD emissions for those pollutants that are not self-correcting as indicated with orange shading.

C) Max Hourly Emissions During SU/SD event incorporates assumes steady state operation for the remainder of the hour.

Emergency Diesel Generator Emission Calculations						
Annual operation of emergency generator will be limited to 100 non-emergency hours per year.						
Pollutant	**Annual Operation (hrs/yr)**	**Engine Size (HP)**	**Emission Factor [1] (lbs/HP-hr)**	**Emissions (Potential to Emit)**		
				Average [2] (lbs/hr)	**Maximum[3] (lbs/hr)**	**Annual [4] (tons/yr)**
Particulate Matter (PM_{10})	100	2,012	0.000331	0.665	0.665	0.033
Particulate Matter ($PM_{2.5}$)	100	2,012	0.000331	0.665	0.665	0.033
Sulfur Oxides (SO_x)	100	2,012	0.000012	0.024	0.024	0.001
Nitrogen Oxides (NO_x)[5]	100	2,012	0.010582	21.286	21.286	1.064
Carbon Monoxide (CO)	100	2,012	0.005754	11.574	11.574	0.579
Total Volatile Organic Compounds (VOC)[5]	100	2,012	0.000705	1.419	1.419	0.071
Sulfuric Acid Mist (as H_2SO_4)	100	2,012	0.000004	0.007	0.007	0.00037
1,3-Butadiene	100	2,012	0.00E+00	0.000	0.000	0.000
Acenaphthene	100	2,012	3.32E-08	6.68E-05	6.68E-05	3.34E-06
Acenaphthylene	100	2,012	6.55E-08	1.3E-04	1.3E-04	6.6E-06
Acetaldehyde	100	2,012	1.79E-07	3.6E-04	3.6E-04	1.80E-05
Acrolein	100	2,012	5.59E-08	1.1E-04	1.1E-04	5.62E-06
Anthracene	100	2,012	8.72E-09	1.8E-05	1.8E-05	8.77E-07
Benz(a)anthracene	100	2,012	4.41E-09	8.9E-06	8.9E-06	4.44E-07
Benzene	100	2,012	5.50E-06	0.011	0.011	5.54E-04
Benzo(a)pyrene	100	2,012	1.82E-09	0.000	0.000	1.83E-07
Benzo(b)fluoranthene	100	2,012	7.87E-09	1.6E-05	1.6E-05	7.92E-07
Benzo(g,h,i)perylene	100	2,012	3.94E-09	7.9E-06	7.9E-06	3.97E-07
Benzo(k)fluoranthene	100	2,012	1.55E-09	3.1E-06	3.1E-06	1.56E-07
Chrysene	100	2,012	1.09E-08	2.2E-05	2.2E-05	1.09E-06
Dibenzo(a,h)anthracene	100	2,012	2.45E-09	4.9E-06	4.9E-06	2.47E-07
Fluoranthene	100	2,012	2.86E-08	5.7E-05	5.7E-05	2.87E-06
Fluorene	100	2,012	9.08E-08	1.8E-04	1.8E-04	9.13E-06
Formaldehyde	100	2,012	5.60E-07	0.001	0.001	5.63E-05
Indeno(1,2,3-cd)pyrene	100	2,012	2.94E-09	5.9E-06	5.9E-06	2.95E-07
Naphthalene	100	2,012	9.22E-07	0.002	0.002	9.27E-05
Phenanathrene	100	2,012	2.89E-07	5.8E-04	5.8E-04	2.91E-05
Propylene	100	2,012	1.98E-05	0.040	0.040	1.99E-03
Pyrene	100	2,012	2.63E-08	5.3E-05	5.3E-05	2.65E-06
Toluene	100	2,012	1.99E-06	0.004	0.004	2.00E-04
Xylene (mixed isomers)	100	2,012	1.37E-06	0.003	0.003	1.38E-04
Carbon Dioxide (CO_2 or CO_2e)	100	2,012	1.16E+00	2,324.066	2324.066	116.203
Methane (CH_4)	100	2,012	4.69E-05	0.094	0.094	0.005
Nitrous Oxide (N_2O)	100	2,012	9.37E-06	0.019	0.019	0.001
CO_2e	100	2,012	--	1159.34	1159.34	57.97

40 CFR 60 part iiii	0.15 g/HP-hr	=	0.000331 lbs/HP-hr
40 CFR 60 part iiii	0.15 g/HP-hr	=	0.000331 lbs/HP-hr
ULSD sulfur content	15 ppm S in Fuel	=	0.000012 lbs/HP-hr
40 CFR 60 part iiii	4.80 g/HP-hr	=	0.010582 lbs/HP-hr
40 CFR 60 part iiii	2.61 g/HP-hr	=	0.005754 lbs/HP-hr
Assumption	0.32 g/HP-hr	=	0.000705 lbs/HP-hr
SO2 to SO3 Conversion	3.72E-06 lbs/HP-hr	=	3.72E-06 lbs/HP-hr
AP-42 (10/96); Tables 3.4-3 and 3.4-4	0.00E+00 lbs/MMBtu	=	0.00E+00lbs/HP-hr
	4.68E-06 lbs/MMBtu	=	3.32E-08lbs/HP-hr
	9.23E-06 lbs/MMBtu	=	6.55E-08lbs/HP-hr
	2.52E-05 lbs/MMBtu	=	1.79E-07lbs/HP-hr
	7.88E-06 lbs/MMBtu	=	5.59E-08lbs/HP-hr
	1.23E-06 lbs/MMBtu	=	8.72E-09lbs/HP-hr
	6.22E-07 lbs/MMBtu	=	4.41E-09lbs/HP-hr
	7.76E-04 lbs/MMBtu	=	5.50E-06lbs/HP-hr
	2.57E-07 lbs/MMBtu	=	1.82E-09lbs/HP-hr
	1.11E-06 lbs/MMBtu	=	7.87E-09lbs/HP-hr
	5.56E-07 lbs/MMBtu	=	3.94E-09lbs/HP-hr
	2.18E-07 lbs/MMBtu	=	1.55E-09lbs/HP-hr
	1.53E-06 lbs/MMBtu	=	1.09E-08lbs/HP-hr
	3.46E-07 lbs/MMBtu	=	2.45E-09lbs/HP-hr
	4.03E-06 lbs/MMBtu	=	2.86E-08lbs/HP-hr
	1.28E-05 lbs/MMBtu	=	9.08E-08lbs/HP-hr
	7.89E-05 lbs/MMBtu	=	5.60E-07lbs/HP-hr
	4.14E-07 lbs/MMBtu	=	2.94E-09lbs/HP-hr
	1.30E-04 lbs/MMBtu	=	9.22E-07lbs/HP-hr
	4.08E-05 lbs/MMBtu	=	2.89E-07lbs/HP-hr
	2.79E-03 lbs/MMBtu	=	1.98E-05lbs/HP-hr
	3.71E-06 lbs/MMBtu	=	2.63E-08lbs/HP-hr
	2.81E-04 lbs/MMBtu	=	1.99E-06lbs/HP-hr
	1.93E-04 lbs/MMBtu	=	1.37E-06lbs/HP-hr
40 CFR 98 Table C-2	7.40E+01 kg/MMBtu	=	1.16E+00lbs/HP-hr
	3.00E-03 kg/MMBtu	=	4.69E-05lbs/HP-hr
	6.00E-04 kg/MMBtu	=	9.37E-06lbs/HP-hr

Notes

(1) Sources:

PM_{10} and CO emission factors based on EPA emission certification for Tier 2 engine

SO_x based use of ULSD

NO_x emission factors based CI ICE Tier 2 Standard for Nox + NMHC

VOC emissions provided by vendor, who used emission factor from AP-42 Table 3.4-1

Spectated organics: AP-42 Emission Factors

CO2, CH_4 and N_2O emission factors based on 40 CFR 98 Table C-2

Sulfuric Acid Mist (as H_2SO_4) emissions based on 10% conversion

lb/MMBtu and kg/MMBtu converted to lb/HP hr assuming ~7090 Btu/hP hr

*(2) Calculated as: Engine Size (HP) **X** Emission Factor (lbs/HP-hr)*

(3) Maximum emissions assumed to same as average emissions

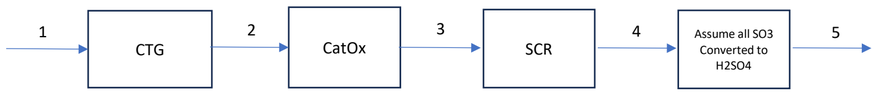
*(4) Calculated as: Emissions (lbs/hr) **X** Annual Operation (hrs/yr) ÷ 2,000 lbs/ton*

(5) NOx emissions are depicted at a rate of 4.8 g/hp-hr for conservative permitting purposes; however, NOx + NMHC emissions from the unit will not exceed 4.8 g/hp-hr, as specified in 40 CFR 60 Subpart IIII.

*(6) CO2e emissions = CO2 Emissions *CO2 GWP + CH4 Emissions * CH4 GWP + N2O Emissions * N2O GWP*

Estimate of Sulfuric Acid Emissions

- 100% of sulfur in fuel converted to SO2
- 5% of sulfur in fuel also converted to SO3
- 40% of remaining SO2 converted to SO3 in CO Catalyst
- 2% of remaining SO2 converted to SO3 in SCR
- All of SO3 emitted as H2SO4



AEPCO

for 1 lb NG

mol/hr	1	2	3	4	5
S	0.01	0	0	0	0
SO2		0.007095	0.004257	0.004172	0.004172
SO3	0	0.000373	0.003212	0.003297	0
lb/hr					
H2SO4					0.323077

23139	Btu/lb HHV
4056.1	MMBtu/hr
5%	mol% Percent sulfur converted to SO3
40%	mol% Percent SO2 converted to SO3 in CatOx
2.00%	mol% Percent SO2 converted to SO3 in SCR
32	lb S/lbmol
64.1	lb SO2/lbmol
80	lb SO3/lbmol
98	lb H2SO4/lbmol

GE PCSPRINT

for 1 lb NG

mol/hr	1	2	3	4	5
S	0.0008	0	0	0	0
SO2		0.000741	0.000445	0.000436	0.000436
SO3	0	3.9E-05	0.000335	0.000344	0
lb/hr					
H2SO4					0.033742

23139	Btu/lb HHV
4056.1	MMBtu/hr
5%	mol% Percent sulfur converted to SO3
40%	mol% Percent SO2 converted to SO3 in CatOx
2.00%	mol% Percent SO2 converted to SO3 in SCR
32	lb S/lbmol
64.1	lb SO2/lbmol
80	lb SO3/lbmol
98	lb H2SO4/lbmol

GE PF1SPRINT

for 1 lb NG

mol/hr	1	2	3	4	5
S	0.0008	0	0	0	0
SO2		0.000741	0.000445	0.000436	0.000436
SO3	0	3.9E-05	0.000335	0.000344	0
lb/hr					
H2SO4					0.033742

23139	Btu/lb HHV
4056.1	MMBtu/hr
5%	mol% Percent sulfur converted to SO3
40%	mol% Percent SO2 converted to SO3 in CatOx
2.00%	mol% Percent SO2 converted to SO3 in SCR
32	lb S/lbmol
64.1	lb SO2/lbmol
80	lb SO3/lbmol
98	lb H2SO4/lbmol

Lube Oil System Vents
Stone Creek

Description	Pollutant	Emissions of Oil Mist (gal/day)	Approx. Density of Lube Oil (lb/gal)	Daily Emission Rate (lb/day)	Hourly Emission Rate (lb/hr)	Operating Days (days/yr)	Annual Emission Rate (tpy)
Combustion Turbines Lube Oil Vents	VOC	0.1	6.90	0.6897	0.02874	365	0.126
	PM/PM10/PM2.5	0.1	6.90	0.6897	0.02874	365	0.126
Generators Lube Oil Vents	VOC	0.1	6.90	0.6900	0.02875	365	0.126
	PM/PM10/PM2.5	0.1	6.90	0.6900	0.02875	365	0.126
Hydraulic Oil	VOC	0.1	6.90	0.6897	0.02874	365	0.126
	PM/PM10/PM2.5	0.1	6.90	0.6897	0.02874	365	0.126
						TOTAL VOC	**0.378**
						TOTAL PM	**0.378**

Oil Mist Emissions based on estimates for a similar facility.
It is assumed that the lube oil systems will be operating continuously.
Hourly rate determined by dividing annual rate by 24 hrs/day.

Natural Gas Purging and Venting Emissions											
Process	Initial Conditions			Final Conditions			Number of Purges per Year		Annual Emissions (cf/yr)	Annual Emissions (lb/yr)	Annual Emissions (tpy)
	Volume (ft^3)	Press. (psig)	Temp. (F)	Press. (psig)	Temp. (F)	Volume^2 (ft^3)					
Fuel Line	90	50	60	0	68	447	120		53,629		
Small Equipment	2	50	60	0	68	10	120		1,192		
					MW	Weight %	**Volume %**	**TOTAL**	54,821		
				16	16	100%	100%	**Methane**	54,821	2,275.31	1.14
				16		100%		**CO2e**			28.4

Notes:

Plping volumes and events per year based on information from a similar facility

GWP for Methane is 25

Inspection, Repair, Replacement, Adjusting, Testing, and Calibration of Analytical Equipment, Process Instruments Including Sight Glasses, Meters, and Gauges
Stone Creek

Step 1. Clingage Loss Calculation:

Variables			Source/Notes/Assumptions
Lc	**Clingage Loss (lb/activity)**	**0.00135**	
$L_c = A_s \times T_f \times D$			
A_s	Surface Area (feet)	0.31	Based on an average size of the equipment.
T_f	Clingage Film Thickness (feet)	8.33E-05	assumption (0.001 inches)
D	Density of Material (lb/feet^3)	52.46	Based on API Power Regression Analysis for a material with a vapor pressure of 0.15 psia.

Step 2. Splash Loading Loss Calculation:

Variables			Source/Notes/Assumptions
L_l Equipment Draining Loading Loss (lb/10^3 gal loaded)		**0.503**	
$L_l = 12.46\left(\frac{SPM_v}{T}\right)$			Based on U.S. EPA AP-42, 5.2 "Transportation and Marketing of Petroleum Liquids" (Equation 1).
S	Loading Loss Factor	1.45	Per. U.S. EPA AP-42 Table 5.2-1, based on splash loading per TCEQ Gudiance.
P	Vapor Pressure of Liquid Loaded (psia)	0.15	Based on representative material.
M_v	Vapor molecular weight (lb/lb-mole)	103	Molecular Weight based on API Power Regression Analysis for a material with a vapor pressure of 0.15 psia.
T	Average daily temperature (°R)	555.00	95°F per TCEQ Guidance.

Variables			Source/Notes/Assumptions
L_D	**Equipment Draining Loading loss (lb/activity)**	**1.16E-07**	
$L_D = L_l V_t$			
L_l	Loading Loss (lb/10^3 gal loaded)	0.503	See calculation above.
V_t	Volume of liquid drained (gallon/activity)	0.0002	Assumed to be 1% of total volume (0.03 gallons) is left in the equipment and drained to pan/enclosed drain.

Step 3. Evaporative Loss Calculation:

Variables			Source/Notes/Assumptions
L_D	**Equipment Draining Loading loss (lb/activity)**	**0.000097**	
$L_E = 7920 * A\left(\frac{P_a M_w}{RT}\right)\frac{D_{i,a}}{Z_2 - Z_1}\ln\left[\frac{1}{(1-y_{c1})}\right] * t$			Ajay Kumar, N.S. Vatcha, and John Schmelzle, "Estimate Emissions From Atomspheric Releases of Hazardous Substances, "Environmental Engineering World, November-December 1996, pages 20-23.
A	Vessel opening area (m^2)	0.07	Area for a 5 gal bucket (~11.75 in. dia.)
P_a	Atmospheric Pressure (Pa)	101,325	
M_w	Molecular weight (kg/kgmol)	103	Molecular Weight based on API Power Regression Analysis for a material with a vapor pressure of 0.15 psia
R	Universal Gas Constant (J/°K-kgmol)	8314	
T	Temperature (°K)	308.3	95°F per TCEQ Guidance.
$D_{i,a}$	Diffusivity of component through air (m^2/s)	6.28E-06	Assumed diffusivity of diesel fuel
Z_2-Z_1	Empty vapor space above liquid level in vessel (m)	0.37	Assumed 5 gal bucket (14.5 in)
y_{c1}	Volume fraction of component in air	0.01	based on vapor pressure and ideal gas law
t	Time that material sits in pan before removed by vacuum truck (hr)	0.25	assumption

Emission Summary		Source/Notes/Assumptions
Total Emissions per activity (lb/activity)	0.00145	Summation of Steps 1 through 3.
Frequency Routine Maintenance Activity (activity/hour)	4	Based on process knowledge and historical information.
Frequency Routine Maintenance Activity (activity/yr)	40	Based on process knowledge and historical information.

Total VOC Emissions	
lb/hr	**ton/yr**
0.0058	2.90E-05

Emission Estimates based on information for a similar facility

Low VP Small Equipment & Fugitive Component Maintenance Emissions (VOC Service)

Step 1. Clingage Loss Calculation:

Variables			Source/Notes/Assumptions
Lc	**Clingage Loss (lb/activity)**	**0.01380**	
$L_c = A_s \times T_f \times D$			
A_s	Surface Area (feet)	3.12	Conservatively based on clingage loss from final 5 ft of pipe section being worked on.
T_f	Clingage Film Thickness (feet)	8.33E-05	assumption (0.001 inches)
D	Density of Material (lb/feet^3)	53.11	Based on diesel fuel

Step 2. Splash Loading Loss Calculation:

Variables			Source/Notes/Assumptions
L_l Equipment Draining Loading Loss (lb/10^3 gal loaded)		**0.042**	
$L_l = 12.46\left(\frac{SPM_v}{T}\right)$			Based on U.S. EPA AP-42, 5.2 "Transportation and Marketing of Petroleum Liquids" (Equation 1).
S	Loading Loss Factor	1.45	Per. U.S. EPA AP-42 Table 5.2-1, based on splash loading per TCEQ Gudiance.
P	Vapor Pressure of Liquid Loaded (psia)	0.01	Based on representative material.
M_v	Vapor molecular weight (lb/lb-mole)	130	Molecular Weight based diesel fuel
T	Average daily temperature (°R)	555.00	95°F per TCEQ Guidance.

Variables			Source/Notes/Assumptions
L_D	**Equipment Draining Loading loss (lb/activity)**	**9.94E-02**	
$L_D = L_l V_t$			
L_l	Loading Loss (lb/10^3 gal loaded)	0.042	See calculation above.
V_t	Volume of liquid drained (gallon/activity)	2.35	Assumed to be 1% of total volume (235 gallons) is left in the equipment and drained to pan/enclosed drain.

Step 3. Evaporative Loss Calculation:

Variables			Source/Notes/Assumptions
L_D	**Equipment Draining Loading loss (lb/activity)**	**0.000008**	
$L_E = 7920 * A\left(\frac{P_a M_w}{RT}\right)\frac{D_{i,a}}{Z_2 - Z_1}\ln\left[\frac{1}{(1-y_{c1})}\right] * t$			Ajay Kumar, N.S. Vatcha, and John Schmelzle, "Estimate Emissions From Atomspheric Releases of Hazardous Substances, "Environmental Engineering World, November-December 1996, pages 20-23.
A	Vessel opening area (m^2)	0.02	Opening on a tote (~6 in. dia.)
P_a	Atmospheric Pressure (Pa)	101,325	
M_w	Molecular weight (kg/kgmol)	130	Molecular Weight based diesel fuel
R	Universal Gas Constant (J/°K-kgmol)	8314	
T	Temperature (°K)	308	95°F per TCEQ Guidance.
$D_{i,a}$	Diffusivity of component through air (m^2/s)	6.28E-06	Assumed diffusivity of diesel fuel
Z_2-Z_1	Empty vapor space above liquid level in vessel (m)	0.152	Assumed 6 in
y_{c1}	Volume fraction of component in air	0.001	based on vapor pressure and ideal gas law
t	Time vessel remains open to atmosphere	0.25	assumption

Emission Summary		Source/Notes/Assumptions
Total Emissions per activity (lb/activity)	0.11326	Summation of Steps 1 through 3.
Frequency Routine Maintenance Activity (activity/hour)	10	Assumed
Frequency Routine Maintenance Activity (activity/yr)	260	Assumed

Total Emissions	
lb/hr	**ton/yr**
1.133	0.0147

Emission Estimates based on information for a similar facility

ESTIMATE OF TANK EMISSIONS FROM FIXED ROOF TANKS

TANK IDENTIFICATION EG Diesel Tank

TANK CONTENTS Diesel Fuel

EMISSION POINT NUMBER (EPN) EPN-5

	SYMBOL	INPUT	UNITS	
TANK TYPE	-	HORIZONTAL FIXED ROOF	-	
TANK SHELL HEIGHT/LENGTH	L	22.1	FT	*estimate from example generator specification*
TANK DIAMETER	D	6.3	FT	*estimate from example generator specification*
NOMINAL TANK CAPACITY	-	3,050	GAL	*estimate from example generator specification*
ANNUAL NET THROUGHPUT		13,300.0	GAL/YR	*100 hr/yr at max fuel input 133 gal/hr*
SHELL COLOR/SHADE	-	WHITE	-	
SHELL CONDITION	-	AVERAGE	-	
TANK SURFACE SOLAR ABSORPTANCE	α	0.25	-	
DAILY OPERATING SCHEDULE	-	24	HRS/DAY	
ANNUAL OPERATING SCHEDULE	-	365	DAYS/YR	
PRESSURE SETTINGS	P_{BP}	-0.03	PSIG	
VACUUM SETTINGS	P_{BV}	0.03	PSIG	
TANK ABOVE OR UNDERGROUND?	-	ABOVE GROUND	-	
TANK HEATED?	-	AMBIENT	-	
MAXIMUM HOURLY FILLING RATE	FR_M	3050.0	GAL/HR	

METEOROLOGICAL CITY AND STATE	-	HOUSTON, TX	-
HOURLY AVG MIN MBIENT TEMP	T_{AN}	60.1	°F
HOURLY AVG MAX AMBIENT TEMP	T_{AX}	79	°F
AVG WIND SPEED	V	7.4	MI/HR
AVG DAILY TOTAL INSOLATION FACTOR	I	1404	BTU/FT^2/DAY
AVG ATMOSPHERIC PRESSURE	P_A	14.65	LB/IN^2

CHEMICAL (SINGLE COMPONENT)	-	NO. 2 FUEL OIL (DIESEL)	-
IF OTHER - IDENTIFY SURROGATE CHEMICAL			
VAPOR MOLECULAR WEIGHT	M_V	130	LB/LB-MOLE
LIQUID MOLECULAR WEIGHT	M_L	188	LB/LB-MOLE
VAPOR PRESSURE	P_{VA}	0.0095	PSIA
VAPOR PRESSURE EQUATION CONSTANT (A)	A	12.101	P => PSIA
VAPOR PRESSURE EQUATION CONSTANT (B)	B	8907	T => RANKINE
VAPOR PRESSURE EQUATION CONSTANT (C)	C	0.006	LN(BASE E)
LIQUID DENSITY	W_L	7.1	LB/GAL
WORKING LOSS PRODUCT FACTOR	K_p	1	

STANDING STORAGE LOSSES	L_S	**0.93**	LB/YR
WORKING LOSSES	L_W	**0.39**	LB/YR
TOTAL LOSSES	L_T	**1.32**	LB/YR
TOTAL LOSSES	L_T	**0.0007**	TPY
MAX HOURLY LOSSES	L_{MAX}	**0.1718**	LB/HR

CELL COLOR KEY

TBD INPUT

WIP DROPDOWN

WIP LOOKUP TABLE

Table 7.1-6. PAINT SOLAR ABSORPTANCE[a]

Surface Color	Shade or Type	Reflective Condition (see Note 1)		
		New	Average	Aged
White		0.17	0.25	0.34
Aluminum	Specular	0.39	0.44	0.49
Aluminum	Diffuse	0.60	0.64	0.68
Beige/Cream		0.35	0.42	0.49
Black		0.97	0.97	0.97
Brown		0.58	0.62	0.67
Gray	Light	0.54	0.58	0.63
Gray	Medium	0.68	0.71	0.74
Green	Dark	0.89	0.90	0.91
Red	Primer	0.89	0.90	0.91
Rust	red iron oxide	0.38	0.44	0.50
Tan		0.43	0.49	0.55
Aluminum (see Note 2)	mill finish, unpainted	0.10	0.12	0.15

NOTE 1 Reflective condition definitions:

New: For paint, paint still retains the fresh shine of having been recently applied; for mill-finish aluminum, surface is shiny. This was previously labeled "Good."

Average: For paint, paint is in good condition, but the initial shine has faded; for mill-finish aluminum, surface is oxidized but still bright. The value given in each case is the average of the New and the Aged values for that case, and does not represent new data.

Aged: For paint, paint is noticeably faded and dull; for mill-finish aluminum, surface is dull. This was previously labeled "Poor."

NOTE 2 This refers to aluminum as the base metal, rather than aluminum-colored paint.

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Table 7.1-2. PROPERTIES (M_V, M_L, P_{VA}, W_L) OF SELECTED PETROLEUM LIQUIDS

Petroleum Liquid Mixture	Vapor Molecular Weight	Liquid Molecular Weight	Liquid Density	ASTM D86 Distillation Slope	Vapor Pressure Equation Constant	Vapor Pressure Equation Constant	True Vapor Pressure (at 60 °F)
	M_V	M_L	W_L	S	A	B	P_{VA}
	lb/lb-mole	lb/lb-mole	lb/gal	°F/vol %	dimensionless	°R	psia
MIDCONTINENT CRUDE OIL	50	207	7.1	–	Figure 7.1-16	Figure 7.1-16	–
REFINED PETROLEUM STOCKS	–	–	–	–	Figure 7.1-15	Figure 7.1-15	–
MOTOR GASOLINE RVP 13	62	92	5.6	3.0	11.644	5043.6	7.0
MOTOR GASOLINE RVP 10	66	92	5.6	3.0	11.724	5237.3	5.2
MOTOR GASOLINE RVP 7	68	92	5.6	3.0	11.833	5500.6	3.5
LIGHT NAPHTHA RVP 9- 14	–	–	–	3.5	–	–	–
NAPHTHA RVP 2-8	–	–	–	2.5	–	–	–
AVIATION GASOLINE	–	–	–	2.0	–	–	–
JET NAPHTHA (JP-4)	80	120	6.4	–	11.368	5784.3	1.3
JET KEROSENE (JET A)	130	162	7.0	–	12.390	8933.0	0.008
NO. 2 FUEL OIL (DIESEL)	130	188	7.1	–	12.101	8907.0	0.006
NO. 6 FUEL OIL	130	387	7.9	–	10.781	8933.0	0.002
VACUUM RESIDUAL OIL	190	387	7.9	–	10.104	10475.5	0.00004

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Standing losses (lb/yr)	=	$365*V_V*W_V*K_E*K_S$ =	**0.93**
Working losses (lb/yr)	=	$5.614*Q*K_N*K_p*K_B*K_B$ =	**0.39**

	SYMBOL	UNITS	VALUE
TANK SHELL HEIGHT/LENGTH	L	FT	22.08333333
TANK DIAMETER	D	FT	6.3
TANK SHELL RADIUS	R_S	FT	3.15
TANK LIQUID VOLUME		GAL	5149.17
ANNUAL NET THROUGHPUT		GAL/YR	13300
TOTAL ANNUAL TURNOVERS	N	NO/YR	2.58
TANK SURFACE SOLAR ABSORPTANCE	α	-	0.25
ANNUAL OPERATING HOURS		DAYS/YR	8760
PRESSURE SETTINGS	P_{BP}	PSIG	-0.03
VACUUM SETTINGS	P_{BV}	PSIG	0.03
TANK ABOVE OR UNDERGROUND?			ABOVE GROUND
HOURLY AVG MIN AMBIENT TEMP	T_{AN}	°R	519.8
HOURLY AVG MAX AMBIENT TEMP	T_{AX}	°R	538.7
AVG WIND SPEED	V	MI/HR	7.4
AVG DAILY TOTAL INSOLATION FACTOR	I	$BTU/FT^2/DAY$	1404
AVG ATMOSPHERIC PRESSURE	P_A	LB/IN^2	14.65
VAPOR MOLECULAR WEIGHT	M_V	LB/LB-MOLE	130
VAPOR PRESSURE	P_{VA}	PSIA	0.009535533
VAPOR PRESSURE EQUATION CONSTANT	A		12.101
VAPOR PRESSURE EQUATION CONSTANT	B	°R	8907
VAPOR PRESSURE EQUATION CONSTANT	C		0.006
LIQUID DENSITY	W_L	LB/GAL	7.1
WORKING LOSS PRODUCT FACTOR	K_p	-	1
VENT SETTING CORRECTION FACTOR	K_B	-	1
IDEAL GAS CONSTANT	R	$PSIA•FT^3/LB\text{-}MOLE•°R$	10.731
MAXIMUM HOURLY FILLING RATE	FR_M	GAL/HR	3050
IDEAL GAS CONSTANT	R	PSIA•GAL/LB-MOLE•°R	80.273

$$L_{MAX} = \frac{M_V \times P_{VA}}{R \times T} \times FR_M$$

- L_{MAX} (lb/hr) is the maximum potential short term emission rate at worst case conditions (highest liquid surface temperature, vapor pressure, and fill rate).
- M_V (lb/lbmol) is the vapor molecular weight of the VOC.
- P_{VA} (psia) is the vapor pressure of the tank contents at the worst case temperature.
- FR_M (gal/hr) is the maximum filling rate.
- R ((psia × gal)/(lbmol × °R)) is the ideal gas constant (80.273 for the selected units).
- T (Rankine) is the worst case liquid surface temperature. It is TCEQ practice to use either 95°F (554.67°R) or the actual temperature, whichever is higher.

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		FIXED ROOF
		ABOVEGROUND
Q	BBL/YR	316.67
K_N	-	1.00
H_E	FT	4.95
D_E	FT	13.31
T_{AA}	°R	529.25
T_B	°R	530.30
T_V	°R	532.72
T_{LA}	°R	531.64
ΔT_V	°R	20.25
ΔT_A	°R	18.90
ΔP_V	psia	0.00
ΔP_B	psi	0.06
V_V	FT^3	344.20
H_{VO}	FT	2.47
K_E	-	0.034
K_S	-	1.00
P_{VX}	PSIA	0.0112
P_{VN}	PSIA	0.0081
T_{LX}	°R	536.70
T_{LN}	°R	526.57
W_V	LB/FT^3	0.00022
K_p	-	1.00
K_B	-	1.00
TCEQ MAX HOURLY		
T	R	555.00
P_{VA}	psia	0.0193
FR_M	GAL/HR	3050
L_{MAX}	LB/HR	0.17

Fugitive Component Emission Summary
Stone Creek
2024_0327_0230909 FUG WRKB_D.xls

	EPN	Total Emission Rate (hourly lbs/hr) (excluding GHG / Inert / Not a Contaminant)	Total Emission Rate (annual, tpy) (excluding GHG / Inert / Not a Contaminant)	Total VOC Emission Rate (hourly, lbs/hr)	Total VOC Emission Rate (annual, tpy)	Total Inorganic Emission Rate (hourly, lbs/hr)	Total Inorganic Emission Rate (annual, tpy)	Total Exempt Solvent Emission Rate (hourly, lbs/hr)	Total Exempt Solvent Emission Rate (annual, tpy)	Total GHG Emission Rate (tpy, mass basis)	Total GHG Emission Rate (tpy, CO_2e)
Fug (1)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (2)	NH3FUG	0.95	4.18	0.00	0.00	0.95	4.18	0.00	0.00	0.00	0.00
Fug (3)	NGFUG	0.03	0.13	0.03	0.13	0.00	0.00	0.00	0.00	12.18	289.40
Fug (4)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (5)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (6)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (7)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (8)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (9)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (10)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (11)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (12)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (13)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (14)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (15)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (16)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (17)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (18)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (19)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (20)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (21)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (22)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (23)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (24)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fug (25)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		0.98	**4.30**	**0.03**	**0.13**	**0.95**	**4.18**	**0.00**	**0.00**	**12.18**	**289.40**

I. General Information	
Company name	Stone Creek
Permit number	
Source name	SCR Ammonia Fugitive
Emission Point Number (EPN)	NH3FUG
Preparation date	
I acknowledge that I am submitting an authorized TCEQ application workbook and any necessary attachments. Except for inputting the requested data and adjusting row height and column width, I have not changed the TCEQ application workbook in any way, including but not limited to changing formulas, formatting, content, or protections.	**Yes**

II. Industry, Pollutant Type and Emission Factors	
Industry Type (select one before continuing, do not leave blank)	SOCMI w/o Ethylene

III. Control Efficiencies	
Instrument Monitoring LDAR Program (select one, do not leave blank, select None if not applicable)	None
Connector Monitoring LDAR Program (select one, do not leave blank, select None if not applicable)	None
Physical Inspection LDAR Program (select one, do not leave blank, select None if not applicable)	28AVO
Are your facilities subject to fugitive emission monitoring under 30 TAC §§115.324(1)(C) and 354(1)(A) or are you applying reduction credit for process drains?	No
If yes, please select the appropriate control efficiency:	
If yes, provide justification for the selected reduction credit. Note: Facilities subject to fugitive emission monitoring under 30 TAC §§115.324(1)(C) and 354(1)(A) are required to monitor process drains on an annual basis. A 75% reduction credit may be applied for annual monitoring of process drains at a leak threshold of 500 ppmv provided the drain is designed in such a manner that repairs to leaking drains can be achieved. For example, flushing a water seal on a leaking process drain would constitute repair, so a 75% reduction credit may be applied. Similarly, a 95% reduction credit can be applied for quarterly monitoring of drains if repairs to the leaking drains can be completed.	

IV. Emission Rates									
Component	**Service**	**Count**	**Industry Emission Factor**	**Instrument Monitoring LDAR Control Efficiency**	**Connector Monitoring LDAR Control Efficiency**	**Physical Inspection LDAR Control Efficiency**	**Controlled lb/hr**	**Controlled tpy**	
Valves	Gas/Vapor		0.0089	0	0	0.97	0.00	0.00	
Valves	Light Liquid		0.0035	0	0	0.97	0.00	0.00	
Valves-DTM [3]	Gas/Vapor		0.0089	0	0	0	0.00	0.00	
Valves-DTM [3]	Light Liquid	260	0.0035	0	0	0	0.91	3.99	
Valves-DTM(AM) [4]	Gas/Vapor		0.0089	0	0	0.75	0.00	0.00	
Valves-DTM(AM) [4]	Light Liquid		0.0035	0	0	0.75	0.00	0.00	
Valves	Heavy Liquid		0.0007	0	0	0.97	0.00	0.00	
Valves	Ultra Heavy Liquid		0.0007	0	0	0.97	0.00	0.00	
Valves (controlled)	All		0	1	1	1	0.00	0.00	
Pumps	Light Liquid		0.0386	0	0	0.93	0.00	0.00	
Pumps	Heavy Liquid		0.0161	0	0	0.93	0.00	0.00	
Pumps	Ultra Heavy Liquid		0.0161	0	0	0.93	0.00	0.00	
Pumps (controlled)	All	5	0	1	1	1	0.00	0.00	
Flanges/Connectors	Gas/Vapor		0.0029	0	0	0.97	0.00	0.00	
Flanges/Connectors	Light Liquid	640	0.0005	0	0	0.97	0.01	0.04	
Flanges/Connectors-DTM [3]	Gas/Vapor		0.0029	0	0	0	0.00	0.00	
Flanges/Connectors-DTM [3]	Light Liquid		0.0005	0	0	0	0.00	0.00	
Flanges/Connectors-DTM(AM) [4]	Gas/Vapor		0.0029	0	0	0.75	0.00	0.00	
Flanges/Connectors-DTM(AM) [4]	Light Liquid		0.0005	0	0	0.75	0.00	0.00	
Flanges/Connectors	Heavy Liquid		0.00007	0	0	0.97	0.00	0.00	
Flanges/Connectors	Ultra Heavy Liquid		0.00007	0	0	0.97	0.00	0.00	
Flanges/Connectors (controlled)	All		0	1	1	1	0.00	0.00	
Compressors	Gas/Vapor		0.5027	0	0	0.95	0.00	0.00	
Compressors (controlled)	All		0	1	1	1	0.00	0.00	
Relief Valves	Gas/Vapor	5	0.2293	0	0	0.97	0.03	0.15	
Relief Valves	Liquid		0.0035	0	0	0.97	0.00	0.00	
Relief Valves (controlled)	All		0	1	1	1	0.00	0.00	
Open-Ended Lines	All		0.004	0	0	0	0.00	0.00	
Open-Ended Lines (controlled)	All		0	1	1	1	0.00	0.00	
Sampling Connections (hourly) [1]	All		0.033	0	0	0	0.00	N/A	
Sampling Connections (annual) [2]	All		0.033	0	0	0	N/A	0.00	
Process Drains [5]	All		0.07	0	0	0	0.00	0.00	
Agitators	All		0.0386	0	0	0.93	0.00	0.00	
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Total Count, Total Emission Rates (lbs/hr and tpy)							0.95	4.18	

V. Emission Rates - Unique Components	
Are you proposing any components not included in Section IV above?	No
If yes, provide justification for the factors used for these unique components.	

Component	Service	Count	Proposed Emission Factor	Proposed Control Efficiency	Controlled lb/hr	Controlled tpy
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
Total Component Count, Total Emission Rate (lbs/hr and tpy)		0			0.00	0.00

VI. Speciation (non-GHG)

CAS #	Chemical Constituent	Other Species?	VOC?	Inorganic?	VOC-Exempt Solvent?	Inert / Not a Contaminant?	Weight Percent	lb/hr	tpy
7664-41-7	ammonia		No	Yes	No	No	100.00%	0.953995	4.1784981
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
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	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
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	No CAS Number Entered		No	No	No	No		0	0
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	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
Total Weight Percent, Hourly Emissions and Annual Emissions (excluding Inert / Not a Contaminant)							100.00%	0.95	4.18

VII. Speciation (GHG)

CAS #	Chemical Constituent Name	Global Warming Potential (GWP)	Weight Percent	Mass Emissions (U.S. tons per year)	CO$_2$e Emissions (U.S. tons per year)
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
Total GHG Emissions (Mass Basis and Carbon dioxide-equivalent Basis)				0	0

VIII - Emission Summary for Worksheet (excludes Inert / Not a Contaminant)	
Total Emissions (excludes GHG / Inert / Not a Contaminant) (lbs/hr)	0.95
Total Emissions (excludes GHG / Inert / Not a Contaminant) (tpy)	4.18
Total Hourly VOC Emissions (lbs/hr)	0.00
Total Annual VOC Emissions (tpy)	0.00
Total Hourly Inorganic Emissions (lbs/hr)	0.95
Total Annual Inorganic Emissions (tpy)	4.18
Total Hourly Exempt Solvent Emissions (lbs/hr)	0.00
Total Annual Exempt Solvent Emissions (tpy)	0.00
Total GHG TPY (mass basis)	0.00
Total GHG TPY (CO_2e)	0.00

I. General Information	
Company name	Stone Creek
Permit number	
Source name	Natural Gas Fugitive
Emission Point Number (EPN)	NGFUG
Preparation date	
I acknowledge that I am submitting an authorized TCEQ application workbook and any necessary attachments. Except for inputting the requested data and adjusting row height and column width, I have not changed the TCEQ application workbook in any way, including but not limited to changing formulas, formatting, content, or protections.	**Yes**

II. Industry, Pollutant Type and Emission Factors	
Industry Type (select one before continuing, do not leave blank)	Oil and Gas Production Operation

III. Control Efficiencies	
Instrument Monitoring LDAR Program (select one, do not leave blank, select None if not applicable)	28VHP
Connector Monitoring LDAR Program (select one, do not leave blank, select None if not applicable)	None
Physical Inspection LDAR Program (select one, do not leave blank, select None if not applicable)	None
Are your facilities subject to fugitive emission monitoring under 30 TAC §§115.324(1)(C) and 354(1)(A) or are you applying reduction credit for process drains?	No
If yes, please select the appropriate control efficiency:	
If yes, provide justification for the selected reduction credit. Note: Facilities subject to fugitive emission monitoring under 30 TAC §§115.324(1)(C) and 354(1)(A) are required to monitor process drains on an annual basis. A 75% reduction credit may be applied for annual monitoring of process drains at a leak threshold of 500 ppmv provided the drain is designed in such a manner that repairs to leaking drains can be achieved. For example, flushing a water seal on a leaking process drain would constitute repair, so a 75% reduction credit may be applied. Similarly, a 95% reduction credit can be applied for quarterly monitoring of drains if repairs to the leaking drains can be completed.	

IV. Emission Rates

Component	Service	Count	Industry Emission Factor	Instrument Monitoring LDAR Control Efficiency	Connector Monitoring LDAR Control Efficiency	Physical Inspection LDAR Control Efficiency	Controlled lb/hr	Controlled tpy
Valves	Gas	719	0.00992	0.97	0	0	0.21	0.94
Valves-DTM [3]	Gas [3]		0.00992	0	0	0	0.00	0.00
Valves-DTM(AM) [4]	Gas [3] [4]		0.00992	0.75	0	0	0.00	0.00
Valves	Heavy Oil <20° API		0.0000185	0	0	0	0.00	0.00
Valves	Light Oil > 20°		0.0055	0.97	0	0	0.00	0.00
Valves-DTM [3]	Light Oil > 20° [3][4]		0.0055	0	0	0	0.00	0.00
Valves-DTM(AM) [4]	Light Oil > 20° [3][4]		0.0055	0.75	0	0	0.00	0.00
Valves	Water/Light Oil		0.000216	0	0	0	0.00	0.00
Valves (controlled)	All		0	1	1	1	0.00	0.00
Pumps	Gas		0.00529	0.85	0	0	0.00	0.00
Pumps	Heavy Oil <20°API		0.00113	0	0	0	0.00	0.00
Pumps	Light Oil >20°		0.02866	0.85	0	0	0.00	0.00
Pumps	Water/Light Oil		0.000052	0	0	0	0.00	0.00
Pumps (controlled)	All		0	1	1	1	0.00	0.00
Flanges	Gas	827	0.00086	0.3	0	0	0.50	2.18
Flanges-DTM [3]	Gas [3]		0.00086	0	0	0	0.00	0.00
Flanges-DTM(AM) [4]	Gas [3] [4]		0.00086	0.75	0	0	0.00	0.00
Flanges	Heavy Oil <20°API		0.00000086	0.3	0	0	0.00	0.00
Flanges	Light Oil >20°		0.000243	0.3	0	0	0.00	0.00
Flanges-DTM [3]	Light Oil > 20° [3][4]		0.000243	0	0	0	0.00	0.00
Flanges-DTM(AM) [4]	Light Oil > 20° [3][4]		0.000243	0.75	0	0	0.00	0.00
Flanges	Water/Light Oil		0.000006	0	0	0	0.00	0.00
Flanges (controlled)	All		0	1	1	1	0.00	0.00
Compressors	Gas		0.0194	0.85	0	0	0.00	0.00
Compressors	Heavy Oil <20°API		0.0000683	0	0	0	0.00	0.00
Compressors	Light Oil >20°		0.0165	0.85	0	0	0.00	0.00
Compressors	Water/Light Oil		0.0309	0	0	0	0.00	0.00
Compressors (controlled)	All		0	1	1	1	0.00	0.00
Relief Valves	Gas	44	0.0194	0.97	0	0	0.03	0.11
Relief Valves	Heavy Oil <20°API		0.0000683	0	0	0	0.00	0.00
Relief Valves	Light Oil >20°		0.0165	0.97	0	0	0.00	0.00
Relief Valves	Water/Light Oil		0.0309	0	0	0	0.00	0.00
Relief Valves (controlled)	All		0	1	1	1	0.00	0.00
Open-Ended Lines	Gas		0.00441	0.97	0	0	0.00	0.00
Open-Ended Lines	Heavy Oil <20°API		0.000309	0.97	0	0	0.00	0.00
Open-Ended Lines	Light Oil >20°		0.00309	0.97	0	0	0.00	0.00
Open-Ended Lines	Water/Light Oil		0.00055	0	0	0	0.00	0.00
Open-Ended Lines (controlled)	All		0	1	1	1	0.00	0.00
Sampling Connections (hourly) [1]	Gas		0.033	0	0	0	0.00	N/A
Sampling Connections (hourly) [1]	Heavy Oil <20°API		0.033	0	0	0	0.00	N/A
Sampling Connections (hourly) [1]	Light Oil >20°		0.033	0	0	0	0.00	N/A
Sampling Connections (hourly) [1]	Water/Light Oil		0.033	0	0	0	0.00	N/A
Sampling Connections (annual) [2]	Gas		0.033	0	0	0	N/A	0.00
Sampling Connections (annual) [2]	Heavy Oil <20°API		0.033	0	0	0	N/A	0.00
Sampling Connections (annual) [2]	Light Oil >20°		0.033	0	0	0	N/A	0.00
Sampling Connections (annual) [2]	Water/Light Oil		0.033	0	0	0	N/A	0.00
Connectors	Gas	299	0.00044	0.3	0	0	0.09	0.40
Connectors-DTM [3]	Gas [3]		0.00044	0	0	0	0.00	0.00
Connectors-DTM (AM) [4]	Gas [3] [4]		0.00044	0.75	0.75	0.75	0.00	0.00
Connectors	Heavy Oil <20°API		0.0000165	0.3	0	0	0.00	0.00
Connectors	Light Oil >20°		0.000463	0.3	0	0	0.00	0.00
Connectors-DTM [3]	Light Oil > 20° [3][4]		0.000463	0	0	0	0.00	0.00
Connectors-DTM (AM) [4]	Light Oil > 20° [3][4]		0.000463	0.75	0.75	0.75	0.00	0.00
Connectors	Water/Light Oil		0.000243	0	0	0	0.00	0.00
Other [10]	Gas	105	0.0194	0	0	0	2.04	8.92
Other [10]	Heavy Oil <20°API		0.0000683	0	0	0	0.00	0.00
Other [10]	Light Oil >20°		0.0165	0	0	0	0.00	0.00
Other [10]	Water/Light Oil		0.0309	0	0	0	0.00	0.00
Process Drains [5]	Gas		0.0194	0	0	0	0.00	0.00
Process Drains [5]	Heavy Oil <20°API		0.0000683	0	0	0	0.00	0.00
Process Drains [5]	Light Oil >20°		0.0165	0	0	0	0.00	0.00
Process Drains [5]	Water/Light Oil		0.0309	0	0	0	0.00	0.00
-	-		-	-	-	-	-	-
-	-		-	-	-	-	-	-
-	-		-	-	-	-	-	-
-	-		-	-	-	-	-	-
-	-		-	-	-	-	-	-
-	-		-	-	-	-	-	-
-	-		-	-	-	-	-	-
-	-		-	-	-	-	-	-
-	-		-	-	-	-	-	-
-	-		-	-	-	-	-	-
-	-		-	-	-	-	-	-
-	-		-	-	-	-	-	-
-	-		-	-	-	-	-	-
Total Count, Total Emission Rates (lbs/hr and tpy)		1994					2.87	12.56

V. Emission Rates - Unique Components	
Are you proposing any components not included in Section IV above?	No
If yes, provide justification for the factors used for these unique components.	

Component	Service	Count	Proposed Emission Factor	Proposed Control Efficiency	Controlled lb/hr	Controlled tpy
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
					0.00	0.00
Total Component Count, Total Emission Rate (lbs/hr and tpy)		0			0.00	0.00

VI. Speciation (non-GHG)

CAS #	Chemical Constituent	Other Species?	VOC?	Inorganic?	VOC-Exempt Solvent?	Inert / Not a Contaminant?	Weight Percent	lb/hr	tpy
N/A	Other (Please Specify):	VOC	Yes	No	No	No	1.00%	0.028665284	0.125553944
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
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	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
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	No CAS Number Entered		No	No	No	No		0	0
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	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
	No CAS Number Entered		No	No	No	No		0	0
Total Weight Percent, Hourly Emissions and Annual Emissions (excluding Inert / Not a Contaminant)							1.00%	0.03	0.13

VII. Speciation (GHG)

CAS #	Chemical Constituent Name	Global Warming Potential (GWP)	Weight Percent	Mass Emissions (U.S. tons per year)	CO_2e Emissions (U.S. tons per year)
74-82-8	Methane	25	92.00%	11.55096284	288.774071
124-38-9	Carbon dioxide	1	5.00%	0.62776972	0.62776972
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
	No CAS Number Entered	No CAS Number Entered		0	-
Total GHG Emissions (Mass Basis and Carbon dioxide-equivalent Basis)				12.17873256	289.4018407

VIII - Emission Summary for Worksheet (excludes Inert / Not a Contaminant)	
Total Emissions (excludes GHG / Inert / Not a Contaminant) (lbs/hr)	0.03
Total Emissions (excludes GHG / Inert / Not a Contaminant) (tpy)	0.13
Total Hourly VOC Emissions (lbs/hr)	0.03
Total Annual VOC Emissions (tpy)	0.13
Total Hourly Inorganic Emissions (lbs/hr)	0.00
Total Annual Inorganic Emissions (tpy)	0.00
Total Hourly Exempt Solvent Emissions (lbs/hr)	0.00
Total Annual Exempt Solvent Emissions (tpy)	0.00
Total GHG TPY (mass basis)	12.18
Total GHG TPY (CO_2e)	289.40

APPENDIX C
TCEQ Table 31

Texas Commission on Environmental Quality
Table 31
Combustion Turbines

Equipment Information	
Manufacturer: General Electric	
Model No.: LM6000	Serial No.: TBD
Emission Point Number (EPN) From Table 1(a): CT1 - CT4	

Turbine Application

☐ Electric Generation ☐ Base Load ☒ Peaking ☐ Load Following ☐ Gas Compression

☐ Other (specify):

Cycle

☒ Simple Cycle 9600 Hours Per Year ☐ Regenerative Cycle ☐ Cogeneration ☐ Combined Cycle

Model represented is based on *(see 30 TAC § 116.116(a)):*

☒ Preliminary Design ☐ Contract Award ☐ Other (specify):

Nominal Power Output at Baseload, ISO: 50 ☒ MW or ☐ hp

Manufacturer's rated gross heat rate at baseload at expected conditions (efficiency in BTU/kW-hr):

~8500 to 9500 Btu/kW hr

Fuel Data

Primary Fuels:

☒ Natural Gas (Sulfur content 0.5 gr S/100 dscf; HHV 1037 Btu/scf)

☐ Process Offgas ☐ Landfill/Digester Gas ☐ Fuel Oil ☐ Refinery Gas

☐ Other (specify):

Backup Fuels:

☒ Not Provided ☐ Process Offgas ☐ Ethane ☐ Fuel Oil ☐ Refinery Gas

☐ Other (specify):

If using fuels other than natural gas, attach fuel analyses, including maximum sulfur content, heating value (specify LHV or HHV) and mole percent of gaseous constituents.

Emissions Data

Attach manufacturer's information showing emissions of NO_X, CO, VOC, SO_X, and PM for each proposed fuel at turbine loads and site ambient temperatures representative of the range of proposed operation. The information must be sufficient to determine maximum hourly and annual emission rates. Annual emissions may be based on a conservatively low approximation of site annual average temperature. Provide emissions in pounds per hour and except for PM, parts per million by volume at actual conditions and corrected to dry, 15% oxygen conditions. In Table 1(a), provide speciation of $PM/PM_{10}/PM_{2.5}$.

Method of Emission Control:

☐ Lean Premix Combustors ☒ Oxidation Catalyst ☒ Water Injection

☐ Low-NO_x Combustors ☒ SCR Catalyst ☐ Steam Injection

☐ Other (specify):

Texas Commission on Environmental Quality
Table 31
Combustion Turbine

Additional Information
On separate sheets attach the following: A. Details regarding principle of operation of emission controls. If add-on equipment is used, provide make and model and manufacturer's information. Example details include: controller input variables and operational algorithms for water or ammonia injection systems, combustion mode versus turbine load for variable mode combustors, etc. B. Stack parameters (not required if represented on Page 2 of Table 1(a)). C. If fired duct burners are used (as often used with a Combined Cycle Heat Recovery Steam Generator), supplementary fuel firing information as specified on Table 6, Boilers and Heaters (TCEQ Form Number 10163).

Save Form Reset Form