Enterprise Products

ENTERPRISE PRODUCTS PARTNERS L.P.
ENTERPRISE PRODUCTS HOLDINGS LLC
(General Partner)

ENTERPRISE PRODUCTS OPERATING LLC

May 10, 2024

Return Receipt Requested

New Mexico Environment Department
Air Quality Bureau
525 Camino de los Marquez, Suite 1
Santa Fe, NM 87505-1816

Re: Title V Permit No P130-R4 Title V Significant Modification
Enterprise Field Services, LLC – South Carlsbad Compressor Station
Eddy County, New Mexico

Sir or Madam:

Enterprise Products Operating, LLC (Enterprise) is submitting this Title V significant modification application to the current Title V Permit No. P130-R4 for the South Carlsbad Compressor Station. This application is to account for the modifications under NSR Permit No. 0220-M12, issued on May 16, 2023, and under NSR Permit No. 0220-M12R1, issued on October 30, 2023. In addition to that, this application is to update CAM plan requested by NMED (email dated May, 30, 2023 is included in the application).

Enterprise would like to thank you in advance for your review and concurrence with this submission. If you have questions regarding the information presented in this letter and attachments, please do not hesitate to contact me at (713) 381-5766 or via email at jli@eprod.com or Daniel Bissonnette at (713) 381-3669.

Thank you,
Enterprise Field Services, LLC

Jing Li
Staff Environmental Engineer

Daniel Bissonnette
Supervisor, Environmental

/sed
Enclosure

Li, Jing

From: Kuhn, Julia, ENV <Julia.Kuhn@env.nm.gov>
Sent: Tuesday, May 30, 2023 12:30 PM
To: Li, Jing
Cc: Owens, Melinda, ENV
Subject: [EXTERNAL] TV Renewal P130R4 - Enterprise Products Operating, LLC - South Carlsbad Compressor Station

[Use caution with links/attachments]

Good morning, Jing Li,

It just came to our attention that the revised CAM Plan for the dehydrator/Condenser/BTEX Buster is not stringent enough, using only dehy parameters and not control device indicators. AQB will issue the TV Renewal permit in a timely manner, however, the current CAM plan in the TV Renewal P130R4 must be revised once you submit your TV modification to incorporate the recently issued NSR permit 0220M12, within the next year.

Let me know if you have any questions.

Regards,

Julia Kuhn M.S.
Permitting - Major Sources
New Mexico Environmental Department
Air Quality Bureau
525 Camino de los Marquez, Suite 1
Santa Fe, NM 87505
505-629-2893
Julia.Kuhn@env.nm.gov
https://urldefense.com/v3/__http://www.env.nm.gov__;!!AT8jIA!4LBXOZ_k295lf0LHCU1T6bi95aH-fApfTO6i7D3W275-EdTYHyHdkjEWCHLcbfHDcDVWnpQWge1xLczhNg$

Air Permit Application
Compliance History Disclosure Form

Pursuant to Subsection 74-2-7(S) of the New Mexico Air Quality Control Act ("AQCA"), NMSA §§ 74-2-1 to -17, the New Mexico Environment Department ("Department") may deny any permit application or revoke any permit issued pursuant to the AQCA if, within ten years immediately preceding the date of submission of the permit application, the applicant met any one of the criteria outlined below. In order for the Department to deem an air permit application administratively complete, or issue an air permit for those permits without an administrative completeness determination process, the applicant must complete this Compliance History Disclosure Form as specified in Subsection 74-2-7(P). An existing permit holder (permit issued prior to June 18, 2021) shall provide this Compliance History Disclosure Form to the Department upon request.

Permittee/Applicant Company Name		**Expected Application Submittal Date**
Enterprise Field Services, LLC		April 19, 2024
Permittee/Company Contact	**Phone**	**Email**
Jing Li	(713) 381-5766	JLi@eprod.com

Within the 10 years preceding the expected date of submittal of the application, has the permittee or applicant:		
1	Knowingly misrepresented a material fact in an application for a permit?	☐ Yes ☒ No
2	Refused to disclose information required by the provisions of the New Mexico Air Quality Control Act?	☐ Yes ☒ No
3	Been convicted of a felony related to environmental crime in any court of any state or the United States?	☐ Yes ☒ No
4	Been convicted of a crime defined by state or federal statute as involving or being in restraint of trade, price fixing, bribery, or fraud in any court of any state or the United States?	☐ Yes ☒ No
5a	Constructed or operated any facility for which a permit was sought, including the current facility, without the required air quality permit(s) under 20.2.70 NMAC, 20.2.72 NMAC, 20.2.74 NMAC, 20.2.79 NMAC, or 20.2.84 NMAC?	☐ Yes ☒ No
5b	If "No" to question 5a, go to question 6. If "Yes" to question 5a, state whether each facility that was constructed or operated without the required air quality permit met at least one of the following exceptions: a. The unpermitted facility was discovered after acquisition during a timely environmental audit that was authorized by the Department; or b. The operator of the facility estimated that the facility's emissions would not require an air permit, **and** the operator applied for an air permit within 30 calendar days of discovering that an air permit was required for the facility.	☐ Yes ☐ No
6	Had any permit revoked or permanently suspended for cause under the environmental laws of any state or the United States?	☐ Yes ☒ No
7	For each "yes" answer, please provide an explanation and documentation.	

Mail Application To:		**For Department use only:**
New Mexico Environment Department Air Quality Bureau Permits Section 525 Camino de los Marquez, Suite 1 Santa Fe, New Mexico, 87505 Phone: (505) 476-4300 Fax: (505) 476-4375 www.env.nm.gov/aqb		

Universal Air Quality Permit Application

Use this application for NOI, NSR, or Title V sources.

Use this application for: the initial application, modifications, technical revisions, and renewals. For technical revisions, complete Sections, 1-A, 1-B, 2-E, 3, 9 and any other sections that are relevant to the requested action; coordination with the Air Quality Bureau permit staff prior to submittal is encouraged to clarify submittal requirements and to determine if more or less than these sections of the application are needed. Use this application for streamline permits as well.

This application is submitted as (check all that apply): ☐ Request for a No Permit Required Determination (no fee)
☐ **Updating** an application currently under NMED review. Include this page and all pages that are being updated (no fee required).
Construction Status: ☐ Not Constructed ☒ Existing Permitted (or NOI) Facility ☐ Existing Non-permitted (or NOI) Facility
Minor Source: ☐ NOI 20.2.73 NMAC ☐ 20.2.72 NMAC application or revision ☐ 20.2.72.300 NMAC Streamline application
Title V Source: ☐ Title V (new) ☐ Title V renewal ☐ TV minor mod. ☒ TV significant mod. ☐ TV Acid Rain: ☐ New ☐ Renewal
PSD Major Source: ☐ PSD major source (new) ☐ Minor Modification to a PSD source ☐ a PSD major modification

Acknowledgements:

☒ I acknowledge that a pre-application meeting is available to me upon request. ☒ Title V Operating, Title IV Acid Rain, and NPR applications have no fees.

☐ $500 NSR application Filing Fee enclosed OR ☐ The full permit fee associated with 10 fee points (required w/ streamline applications).

☐ Check No.: _____ in the amount of _____.

☒ I acknowledge the required submittal format for the hard copy application is printed double sided 'head-to-toe', 2-hole punched (except the Sect. 2 landscape tables is printed 'head-to-head'), numbered tab separators. Incl. a copy of the check on a separate page.

☒ I acknowledge there is an annual fee for permits in addition to the permit review fee: www.env.nm.gov/air-quality/permit-fees-2/.

☐ This facility qualifies for the small business fee reduction per 20.2.75.11.C. NMAC. The full $500.00 filing fee is included with this application and I understand the fee reduction will be calculated in the balance due invoice. The Small Business Certification Form has been previously submitted or is included with this application. (Small Business Environmental Assistance Program Information: www.env.nm.gov/air-quality/small-biz-eap-2/.)

Citation: Please provide the **low level citation** under which this application is being submitted: **20.2.70.404.C.(1)(a) NMAC**
(e.g. application for a new minor source would be 20.2.72.200.A NMAC, one example for a Technical Permit Revision is 20.2.72.219.B.1.b NMAC, a Title V acid rain application would be: 20.2.70.200.C NMAC)

Section 1 – Facility Information

Section 1-A: Company Information

		AI # if known: 218	Updating Permit/NOI #: P130-R4
1	Facility Name: South Carlsbad Compressor Station	Plant primary SIC Code (4 digits): 1311	
		Plant NAIC code (6 digits): 211130	
a	Facility Street Address (If no facility street address, provide directions from a prominent landmark): From Loving, NM follow US-285 north 2.5 miles to Roberson Road West. Follow Roberson Road West 1.0 mile to the facility.		
2	Plant Operator Company Name: Enterprise Products Operating, LLC	Phone/Fax: (713) 381-6595 / (713) 381-6811	
a	Plant Operator Address: PO Box 4324, Houston, TX 77210-4324		

b	Plant Operator's New Mexico Corporate ID or Tax ID: 3289188	
3	Plant Owner(s) name(s): Enterprise Field Services, LLC	Phone/Fax: (713) 381-6500 / (713) 381-6811
a	Plant Owner(s) Mailing Address(s): PO Box 4324, Houston, TX 77210-4324	
4	Bill To (Company): Enterprise Field Services, LLC	Phone/Fax: (713) 381-6595 / (713) 381-6811
a	Mailing Address: PO Box 4324, Houston, TX 77210-4324	E-mail: environmental@eprod.com
5	☒ Preparer: Jing Li ☐ Consultant:	Phone/Fax: (713) 381-5766 / (713) 759-3931
a	Mailing Address: PO Box 4324, Houston, TX 77210-4324	E-mail: jli@eprod.com
6	Plant Operator Contact: Daryl Arredondo	Phone/Fax: (575) 628-6819
a	Address: PO Box 4324, Houston, TX 77210-4324	E-mail: ddarredondo@eprod.com
7	Air Permit Contact: Jing Li	Title: Senior Environmental Engineer
a	E-mail: jli@eprod.com	Phone/Fax: (713) 381-5766 / (713) 759-3931
b	Mailing Address: PO Box 4324, Houston, TX 77210-4324	
c	The designated Air permit Contact will receive all official correspondence (i.e. letters, permits) from the Air Quality Bureau.	

Section 1-B: Current Facility Status

1.a	Has this facility already been constructed? ☒ Yes ☐ No	1.b If yes to question 1.a, is it currently operating in New Mexico? ☒ Yes ☐ No
2	If yes to question 1.a, was the existing facility subject to a Notice of Intent (NOI) (20.2.73 NMAC) before submittal of this application? ☐ Yes ☒ No	If yes to question 1.a, was the existing facility subject to a construction permit (20.2.72 NMAC) before submittal of this application? ☒ Yes ☐ No
3	Is the facility currently shut down? ☐ Yes ☒ No	If yes, give month and year of shut down (MM/YY): N/A
4	Was this facility constructed before 8/31/1972 and continuously operated since 1972? ☒ Yes ☐ No	
5	If Yes to question 3, has this facility been modified (see 20.2.72.7.P NMAC) or the capacity increased since 8/31/1972? ☒ Yes ☐ No ☐ N/A	
6	Does this facility have a Title V operating permit (20.2.70 NMAC)? ☒ Yes ☐ No	If yes, the permit No. is: P130-R4
7	Has this facility been issued a No Permit Required (NPR)? ☐ Yes ☒ No	If yes, the NPR No. is: N/A
8	Has this facility been issued a Notice of Intent (NOI)? ☐ Yes ☒ No	If yes, the NOI No. is: N/A
9	Does this facility have a construction permit (20.2.72/20.2.74 NMAC)? ☒ Yes ☐ No	If yes, the permit No. is: 0220-M12R1
10	Is this facility registered under a General permit (GCP-1, GCP-2, etc.)? ☐ Yes ☒ No	If yes, the register No. is: N/A

Section 1-C: Facility Input Capacity & Production Rate

1	What is the facility's maximum input capacity, specify units (reference here and list capacities in Section 20, if more room is required)			
a	Current	Hourly: 8.33 MMscf	Daily: 200 MMscf	Annually: 73 Bscf
b	Proposed	Hourly: 12.5 MMscf	Daily: 300 MMscf	Annually: 109.5 MMscf
2	What is the facility's maximum production rate, specify units (reference here and list capacities in Section 20, if more room is required)			
a	Current	Hourly: 8.33 MMscf	Daily: 200 MMscf	Annually: 73 Bscf
b	Proposed	Hourly: 12.5 MMscf	Daily: 300 MMscf	Annually: 109.5 MMscf

Section 1-D: Facility Location Information

1	Latitude (decimal degrees): 32.313828	Longitude (decimal degrees): -104.137132	County: Eddy	Elevation (ft): 3,065
2	UTM Zone: ☐ 12 or ☒ 13	Datum: ☐ NAD 83 ☒ WGS 84		
a	UTM E (in meters, to nearest 10 meters): 581,225 m E	UTM N (in meters, to nearest 10 meters): 3,575,549 m N		
3	Name and zip code of nearest New Mexico town: Loving, NM 88256			
4	Detailed Driving Instructions from nearest NM town (attach a road map if necessary): From Loving, NM follow US-285 north 2.5 miles to Roberson Road West. Follow Roberson Road West 1.0 mile to the facility.			
5	The facility is 2.8 miles northwest of Loving, NM.			
6	Land Status of facility (check one): ☒ Private ☐ Indian/Pueblo ☐ Government ☐ BLM ☐ Forest Service ☐ Military			
7	List all municipalities, Indian tribes, and counties within a ten (10) mile radius (20.2.72.203.B.2 NMAC) of the property on which the facility is proposed to be constructed or operated: **Municipalities:** Carlsbad, Loving, Malaga; **Indian Tribes:** None; **Counties:** Eddy			
8	**20.2.72** NMAC applications **only**: Will the property on which the facility is proposed to be constructed or operated be closer than 50 km (31 miles) to other states, Bernalillo County, or a Class I area (see www.env.nm.gov/air-quality/modeling-publications/)? ☒ Yes ☐ No (20.2.72.206.A.7 NMAC) If yes, list all with corresponding distances in kilometers: **States:** Texas – 34.7 km; **Class 1 Areas:** Carlsbad Caverns National park – 26.1 km			
9	Name nearest Class I area: Carlsbad Caverns National Park			
10	Shortest distance (in km) from facility boundary to the boundary of the nearest Class I area (to the nearest 10 meters): 26.1 km			
11	Distance (meters) from the perimeter of the Area of Operations (AO is defined as the plant site inclusive of all disturbed lands, including mining overburden removal areas) to nearest residence, school or occupied structure: 582.2 m			
12	Method(s) used to delineate the Restricted Area: Fencing, gates, and signage "**Restricted Area**" is an area to which public entry is effectively precluded. Effective barriers include continuous fencing, continuous walls, or other continuous barriers approved by the Department, such as rugged physical terrain with steep grade that would require special equipment to traverse. If a large property is completely enclosed by fencing, a restricted area within the property may be identified with signage only. Public roads cannot be part of a Restricted Area.			
13	Does the owner/operator intend to operate this source as a portable stationary source as defined in 20.2.72.7.X NMAC? ☐ Yes ☒ No A portable stationary source is not a mobile source, such as an automobile, but a source that can be installed permanently at one location or that can be re-installed at various locations, such as a hot mix asphalt plant that is moved to different job sites.			
14	Will this facility operate in conjunction with other air regulated parties on the same property? ☒ No ☐ Yes If yes, what is the name and permit number (if known) of the other facility?			

Section 1-E: Proposed Operating Schedule (The 1-E.1 & 1-E.2 operating schedules may become conditions in the permit.)

1	Facility **maximum** operating ($\frac{hours}{day}$): 24	($\frac{days}{week}$): 7	($\frac{weeks}{year}$): 52	($\frac{hours}{year}$): 8760	
2	Facility's maximum daily operating schedule (if less than 24 $\frac{hours}{day}$)? Start: N/A	☐AM ☐PM	End: N/A	☐AM ☐PM	
3	Month and year of anticipated start of construction: Upon receipt of permit.				
4	Month and year of anticipated construction completion: N/A				
5	Month and year of anticipated startup of new or modified facility: N/A				
6	Will this facility operate at this site for more than one year? ☒ Yes ☐ No				

Section 1-F: Other Facility Information

1	Are there any current Notice of Violations (NOV), compliance orders, or any other compliance or enforcement issues related to this facility? ☐ Yes ☒ No If yes, specify: N/A		
a	If yes, NOV date or description of issue: N/A		NOV Tracking No: N/A
b	Is this application in response to any issue listed in 1-F, 1 or 1a above? ☐ Yes ☒ No If Yes, provide the 1c & 1d info below: N/A		
c	Document Title: N/A	Date: N/A	Requirement # (or page # and paragraph #): N/A
d	Provide the required text to be inserted in this permit: N/A		
2	Is air quality dispersion modeling or modeling waiver being submitted with this application? ☐ Yes ☒ No		
3	Does this facility require an "Air Toxics" permit under 20.2.72.400 NMAC & 20.2.72.502, Tables A and/or B? ☐ Yes ☒ No		
4	Will this facility be a source of federal Hazardous Air Pollutants (HAP)? ☒ Yes ☐ No		
a	If Yes, what type of source? ☐ **Major** (☐ ≥10 tpy of any single HAP **OR** ☐ ≥25 tpy of any combination of HAPS) **OR** ☒ **Minor** (☒ <10 tpy of any single HAP **AND** ☒ <25 tpy of any combination of HAPS)		
5	Is any unit exempt under 20.2.72.202.B.3 NMAC? ☐ Yes ☑ No		
a	If yes, include the name of company providing commercial electric power to the facility: N/A Commercial power is purchased from a commercial utility company, which specifically does not include power generated on site for the sole purpose of the user.		

Section 1-G: Streamline Application **(This section applies to 20.2.72.300 NMAC Streamline applications only)**

1	☐ I have filled out Section 18, "Addendum for Streamline Applications."	☒ N/A (This is not a Streamline application.)

Section 1-H: Current Title V Information - Required for all applications from TV Sources

(Title V-source required information for all applications submitted pursuant to 20.2.72 NMAC (Minor Construction Permits), or 20.2.74/20.2.79 NMAC (Major PSD/NNSR applications), and/or 20.2.70 NMAC (Title V))

1	Responsible Official (R.O.) (20.2.70.300.D.2 NMAC): Graham Bacon	Phone: (713) 381-6595
a	R.O. Title: Executive Vice President-EHS&T	R.O. e-mail: environmental@eprod.com
b	R. O. Address: PO Box 4324, Houston, TX 77210-4324	
2	Alternate Responsible Official (20.2.70.300.D.2 NMAC): Bradley J. Cooley	Phone: (713) 381-6595
a	A. R.O. Title: Senior Director	A. R.O. e-mail: environmental@eprod.com
b	A. R. O. Address: PO Box 4324, Houston, TX 77210-4324	
3	Company's Corporate or Partnership Relationship to any other Air Quality Permittee (List the names of any companies that have operating (20.2.70 NMAC) permits and with whom the applicant for this permit has a corporate or partnership relationship): Enterprise Field Services, LLC and Enterprise Products Operating, LLC	
4	Name of Parent Company ("Parent Company" means the primary name of the organization that owns the company to be permitted wholly or in part.): 1100 Louisiana St., Houston, TX 77002	
a	Address of Parent Company: N/A	
5	Names of Subsidiary Companies ("Subsidiary Companies" means organizations, branches, divisions or subsidiaries, which are owned, wholly or in part, by the company to be permitted.): N/A	
6	Telephone numbers & names of the owners' agents and site contacts familiar with plant operations: Daryl Arredondo (575) 628-6819 / Jing Li (713) 381-5766 / (713) 759-3931	

7	Affected Programs to include Other States, local air pollution control programs (i.e. Bernalillo) and Indian tribes: Will the property on which the facility is proposed to be constructed or operated be closer than 80 km (50 miles) from other states, local pollution control programs, and Indian tribes and pueblos (20.2.70.402.A.2 and 20.2.70.7.B)? If yes, state which ones and provide the distances in kilometers: (~34.7 km)

Section 1-I – Submittal Requirements

Each 20.2.73 NMAC (**NOI**), a 20.2.70 NMAC (**Title V**), a 20.2.72 NMAC (**NSR** minor source), or 20.2.74 NMAC (**PSD**) application package shall consist of the following:

Hard Copy Submittal Requirements:

1) One hard copy **original signed and notarized application package** **printed double sided** **'head-to-toe'** **2-hole punched** as we bind the document on top, not on the side; except Section 2 (landscape tables), which should be head-to-head. Please use **numbered tab separators** in the hard copy submittal(s) as this facilitates the review process. For NOI submittals only, hard copies of UA1, Tables 2A, 2D & 2F, Section 3 and the signed Certification Page are required. Please include a copy of the check on a separate page.

2) If the application is for a minor NSR, PSD, NNSR, or Title V application, include one working hard **copy** for Department use. This copy should be printed in book form, 3-hole punched, and **must be double sided**. Note that this is in addition to the head-to-to 2-hole punched copy required in 1) above. Minor NSR Technical Permit revisions (20.2.72.219.B NMAC) only need to fill out Sections 1-A, 1-B, 3, and should fill out those portions of other Section(s) relevant to the technical permit revision. TV Minor Modifications need only fill out Sections 1-A, 1-B, 1-H, 3, and those portions of other Section(s) relevant to the minor modification. NMED may require additional portions of the application to be submitted, as needed.

3) The entire NOI or Permit application package, including the full modeling study, should be submitted electronically. Electronic files for applications for NOIs, any type of General Construction Permit (GCP), or technical revisions to NSRs must be submitted with compact disk (CD) or digital versatile disc (DVD). For these permit application submittals, **two** CD copies are required (in sleeves, not crystal cases, please), with additional CD copies as specified below. NOI applications require only a single CD submittal. Electronic files for other New Source Review (construction) permits/permit modifications or Title V permits/permit modifications can be submitted on CD/DVD or sent through AQB's secure file transfer service.

Electronic files sent by (check one):

☒ CD/DVD attached to paper application

☐ Secure electronic transfer. Air Permit Contact Name: Jing Li, Email: jli@eprod.com, Phone number: (713) 381-5766.

a. If the file transfer service is chosen by the applicant, after receipt of the application, the Bureau will email the applicant with instructions for submitting the electronic files through a secure file transfer service. Submission of the electronic files through the file transfer service needs to be completed within 3 business days after the invitation is received, so the applicant should ensure that the files are ready when sending the hard copy of the application. The applicant will not need a password to complete the transfer. **Do not use the file transfer service for NOIs, any type of GCP, or technical revisions to NSR permits.**

4) Optionally, the applicant may submit the files with the application on compact disk (CD) or digital versatile disc (DVD) following the instructions above and the instructions in 5 for applications subject to PSD review.

5) If **air dispersion modeling** is required by the application type, include the **NMED Modeling Waiver** and/or electronic air dispersion modeling report, input, and output files. The dispersion modeling ***summary report only*** should be submitted as hard copy(ies) unless otherwise indicated by the Bureau.

6) If the applicant submits the electronic files on CD and the application is subject to PSD review under 20.2.74 NMAC (PSD) or NNSR under 20.2.79 NMC include,
   a. one additional CD copy for US EPA,
   b. one additional CD copy for each federal land manager affected (NPS, USFS, FWS, USDI) and,
   c. one additional CD copy for each affected regulatory agency other than the Air Quality Bureau.

   If the application is submitted electronically through the secure file transfer service, these extra CDs do not need to be submitted.

Electronic Submittal Requirements [in addition to the required hard copy(ies)]:

1) All required electronic documents shall be submitted as 2 separate CDs or submitted through the AQB secure file transfer service. Submit a single PDF document of the entire application as submitted and the individual documents comprising the application.
2) The documents should also be submitted in Microsoft Office compatible file format (Word, Excel, etc.) allowing us to access the text and formulas in the documents (copy & paste). Any documents that cannot be submitted in a Microsoft Office compatible format shall be saved as a PDF file from within the electronic document that created the file. If you are unable to provide Microsoft office compatible electronic files or internally generated PDF files of files (items that were not created electronically: i.e. brochures, maps, graphics, etc,), submit these items in hard copy format. We must be able to review the formulas and inputs that calculated the emissions.
3) It is preferred that this application form be submitted as 4 electronic files (3 MSWord docs: Universal Application section 1 [UA1], Universal Application section 3-19 [UA3], and Universal Application 4, the modeling report [UA4]) and 1 Excel file of the tables (Universal Application section 2 [UA2]). Please include as many of the 3-19 Sections as practical in a single MS Word electronic document. Create separate electronic file(s) if a single file becomes too large or if portions must be saved in a file format other than MS Word.
4) The electronic file names shall be a maximum of 25 characters long (including spaces, if any). The format of the electronic Universal Application shall be in the format: “A-3423-FacilityName”. The “A” distinguishes the file as an application submittal, as opposed to other documents the Department itself puts into the database. Thus, all electronic application submittals should begin with “A-”. Modifications to existing facilities should use the core permit number (i.e. ‘3423’) the Department assigned to the facility as the next 4 digits. Use ‘XXXX’ for new facility applications. The format of any separate electronic submittals (additional submittals such as non-Word attachments, re-submittals, application updates) and Section document shall be in the format: “A-3423-9-description”, where “9” stands for the section # (in this case Section 9-Public Notice). Please refrain, as much as possible, from submitting any scanned documents as this file format is extremely large, which uses up too much storage capacity in our database. Please take the time to fill out the header information throughout all submittals as this will identify any loose pages, including the Application Date (date submitted) & Revision number (0 for original, 1, 2, etc.; which will help keep track of subsequent partial update(s) to the original submittal. Do not use special symbols (#, @, etc.) in file names. The footer information should not be modified by the applicant.

Table of Contents

Table 2-A: Regulated Emission Sources

Unit and stack numbering must correspond throughout the application package. If applying for a NOI under 20.2.73 NMAC, equipment exemptions under 2.72.202 NMAC do not apply.

Unit Number[1]	Source Description	Make	Model #	Serial #	Manufacturer's Rated Capacity[3] (Specify Units)	Requested Permitted Capacity[3] (Specify Units)	Date of Manufacture[2] / Date of Construction/ Reconstruction[2]	Controlled by Unit # / Emissions vented to Stack #	Source Classi-fication Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
1	Natural Gas Turbine	Solar Centaur	T-4702	OHD10-C-7915	4700 hp	4328 hp	9/1/2004 3/24/2010	N/A 1	20200201	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	N/A	N/A
C9101	Compressor						Unknown < 8/23/2011	N/A N/A		☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	N/A	N/A
2	Natural Gas Turbine	Solar Centaur	T-4702	OHE12-C-7057	4700 hp	4328 hp	9/1/2004 8/31/2013	N/A 2	20200201	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
C9102	Compressor						Unknown < 8/23/2011	N/A N/A		☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
5	Natural Gas Turbine	Solar Centaur	T40-4700S	OHL20-C1803	4700 hp	4329 hp	12/18/2000 < 8/23/2011	N/A N/A	20200201	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
C9103	Compressor						N/A N/A	N/A N/A		☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
6	Compressor Engine	Caterpillar	G3608A4	XH701915	2500 hp	2500 hp	TBD TBD	CAT-6 6	20200254	☐ Existing (unchanged) ☐ To be Removed ☑ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
7	Compressor Engine	Caterpillar	G3608A4	XH701920	2500 hp	2500 hp	TBD TBD	CAT-7 7	20200254	☐ Existing (unchanged) ☐ To be Removed ☑ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
8	Compressor Engine	Caterpillar	G3608A4	XH701923	2500 hp	2500 hp	TBD TBD	CAT-8 8	20200254	☐ Existing (unchanged) ☐ To be Removed ☑ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
9	Compressor Engine	Caterpillar	G3608A4	TBD	2500 hp	2500 hp	TBD TBD	CAT-9 9	20200254	☐ Existing (unchanged) ☐ To be Removed ☑ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
10	Compressor Engine	Caterpillar	G3608A4	TBD	2500 hp	2500 hp	TBD TBD	CAT-10 10	20200254	☐ Existing (unchanged) ☐ To be Removed ☑ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
3a	Gylcol Dehydrator Still Vent	Gas Tech	Unknown	Unknown	200 MMscf/day	200 MMscf/day	1/1/1999 Unknown	3a 3b	31000302	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	N/A	N/A
3b	Glycol Dehydrator Reboiler	Gas Tech	Unknown	Unknown	3.0 MMBtu/hr	3.0 MMBtu/hr	1/1/1999 Unknown	3b 3b	31000302	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	N/A	N/A
T-007	Slop Tank	Unknown	Unknown	N/A	400 bbl	400 bbl	2023 Unknown	N/A N/A	40400315	☐ Existing (unchanged) ☐ To be Removed ☑ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
T-008	Stabilized Condensate Tank	Unknown	Unknown	N/A	300 bbl	300 bbl	2013 Unknown	N/A N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A

Table 2-A: Regulated Emission Sources

Unit and stack numbering must correspond throughout the application package. If applying for a NOI under 20.2.73 NMAC, equipment exemptions under 2.72.202 NMAC do not apply.

Unit Number[1]	Source Description	Make	Model #	Serial #	Manufact-urer's Rated Capacity[3] (Specify Units)	Requested Permitted Capacity[3] (Specify Units)	Date of Manufacture[2] Date of Construction/ Reconstruction[2]	Controlled by Unit # Emissions vented to Stack #	Source Classi-fication Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
T-009	Stabilized Condensate Tank	Unknown	Unknown	N/A	300 bbl	300 bbl	< 8/23/2011 < 8/23/2011	N/A N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
T-011	Stabilized Condensate Tank	Unknown	Unknown	N/A	300 bbl	300 bbl	12/1/2006 Unknown	N/A N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
T-012	Stabilized Condensate Tank	Unknown	Unknown	N/A	300 bbl	300 bbl	12/1/2006 Unknown	N/A N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
ECD	Enclosed Combustion Device	SpiralX	TBD	TBD	6.50 MMscf/yr	6.50 MMscf/yr	TBD TBD	N/A ECD	30600904	☐ Existing (unchanged) ☐ To be Removed ☑ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
Flare	Process Flare	Unknown	Unknown	N/A	72 Mscf/hr	72 Mscf/hr	Unknown 12/1/2006	N/A Flare	31000215	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	N/A	N/A
VENT (SSM)	Vent for Startup, Shutdown and Blowdown	N/A	N/A	N/A	N/A	N/A	Unknown Unknown	N/A N/A	31000299	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
F-001	Fugitives	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	31088811	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	N/A	N/A
Flare (SSM)	SSM Flare	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	31000215	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
LOAD	Truck Loading Emission	N/A	N/A	N/A	69,350 bbl/yr	69,350 bbl/yr	N/A N/A	N/A N/A	31000199	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
Haul	Haul Road Emission	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	31088811	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
MALF	Malfunction Emissions	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	31088811	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	N/A	N/A

1 Unit numbers must correspond to unit numbers in the previous permit unless a complete cross reference table of all units in both permits is provided.
2 Specify dates required to determine regulatory applicability.
3 To properly account for power conversion efficiencies, generator set rated capacity shall be reported as the rated capacity of the engine in horsepower, not the kilowatt capacity of the generator set.
4 "4SLB" means four stroke lean burn engine, "4SRB" means four stroke rich burn engine, "2SLB" means two stroke lean burn engine, "CI" means compression ignition, and "SI" means spark ignition

Table 2-B: Insignificant Activities[1] (20.2.70 NMAC) OR Exempted Equipment (20.2.72 NMAC)

All 20.2.70 NMAC (Title V) applications must list all Insignificant Activities in this table. All 20.2.72 NMAC applications must list Exempted Equipment in this table. If equipment listed on this table is exempt under 20.2.72.202.B.5, include emissions calculations and emissions totals for 202.B.5 "similar functions" units, operations, and activities in Section 6, Calculations. Equipment and activities exempted under 20.2.72.202 NMAC may not necessarily be Insignificant under 20.2.70 NMAC (and vice versa). Unit & stack numbering must be consistent throughout the application package. Per Exemptions Policy 02-012.00 (see http://www.env.nm.gov/aqb/permit/aqb_pol.html), 20.2.72.202.B NMAC Exemptions do not apply, but 20.2.72.202.A NMAC exemptions do apply to NOI facilities under 20.2.73 NMAC. List 20.2.72.301.D.4 NMAC Auxiliary Equipment for Streamline applications in Table 2-A. The List of Insignificant Activities (for TV) can be found online at https://www.env.nm.gov/wp-content/uploads/sites/2/2017/10/InsignificantListTitleV.pdf. TV sources may elect to enter both TV Insignificant Activities and Part 72 Exemptions on this form.

Unit Number	Source Description	Manufacturer	Model No.	Max Capacity	List Specific 20.2.72.202 NMAC Exemption (e.g. 20.2.72.202.B.5)	Date of Manufacture /Reconstruction[2]	For Each Piece of Equipment, Check Onc
			Serial No.	Capacity Units	Insignificant Activity citation (e.g. IA List Item #1.a)	Date of Installation /Construction[2]	
T-001	Lube Oil Tank	N/A	N/A	24	20.2.72.202.B(2)(a) NMAC	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	bbl	IA List Item #5	Unknown	
T-002	Methanol Tank	N/A	N/A	210	20.2.72.202.B(2)(a) NMAC	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	bbl	IA List Item #5	Unknown	
T-003	Triethylene Glycol Tank	N/A	N/A	210	20.2.72.202.B(2)(a) NMAC	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	bbl	IA List Item #5	Unknown	
T-004	Used Oil Tank	N/A	N/A	210	20.2.72.202.B(2)(a) NMAC	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	bbl	IA List Item #5	Unknown	
T-005	Used Oil Tank	N/A	N/A	210	20.2.72.202.B(2)(a) NMAC	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	bbl	IA List Item #5	Unknown	
T-006	Slop Tank	N/A	N/A	TBD	20.2.72.202.B(5) NMAC	N/A	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	TBD	IA List Item #1.a.	N/A	
LOAD_SLOP	Slop Tank	N/A	N/A	TBD	20.2.72.202.B(5) NMAC	N/A	☐ Existing (unchanged) ☐ To be Removed ☑ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	TBD	IA List Item #1.a.	N/A	
Unload	Chemical Unloading	N/A	N/A	TBD	20.2.72.202.B(5) NMAC	N/A	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	TBD	IA List Item #1.a.	N/A	
GC-1	Gas Chromatograph	Daniel	700	350	20.2.72.202.B(5) NMAC	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	cc/min	IA List Item #1.a.	Unknown	
GC-2	Gas Chromatograph	ABB	NGC 8206	820	20.2.72.202.B(5) NMAC	Unknown	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			Unknown	cc/min	IA List Item #1.a.	Unknown	
Pigging	Pig Receiver and Launcher Emissions	N/A	N/A	280	20.2.72.202.B(5) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	scf/event	Insignificant Activity #1a	TBD	
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced

[1] Insignificant activities exempted due to size or production rate are defined in 20.2.70.300.D.6, 20.2.70.7.Q NMAC, and the NMED/AQB List of Insignificant Activities, dated September 15, 2008. Emissions from these insignificant activities do not need to be reported, unless specifically requested.

[2] Specify date(s) required to determine regulatory applicability.

Table 2-C: Emissions Control Equipment

Unit and stack numbering must correspond throughout the application package. Only list control equipment for TAPs if the TAP's maximum uncontrolled emissions rate is over its respective threshold as listed in 20.2.72 NMAC, Subpart V, Tables A and B. In accordance with 20.2.72.203.A(3) and (8) NMAC, 20.2.70.300.D(5)(b) and (e) NMAC, and 20.2.73.200.B(7) NMAC, the permittee shall report all control devices and list each pollutant controlled by the control device regardless if the applicant takes credit for the reduction in emissions.

Control Equipment Unit No.	Control Equipment Description	Date Installed	Controlled Pollutant(s)	Controlling Emissions for Unit Number(s)[1]	Efficiency (% Control by Weight)	Method used to Estimate Efficiency
Flare	Condensate Stabilizer Flare	Unknown	VOCs & HAPs	Condensate Stabilizer	98%	Engineering Estimate
3b	Glycol Dehydrator Reboiler	Unknown	VOCs & HAPs	3a	98%	Engineering Estimate
5	SoloNOx	TBD	NO_X	5	25 ppm	Manufacturers Spec.
CAT-6 through CAT-10	Catalyst	TBD	CO, VOC, HAPs	6-10	76% CO 0% VOC 75% HCHO	Manufacturers Spec.
ECD	Glycol Still Vent and Flash Combustor	TBD	VOCs & HAPS	3a	98%	Manufacturers Spec.

[1] List each control device on a separate line. For each control device, list all emission units controlled by the control device.

Table 2-D: Maximum Emissions (under normal operating conditions)

☐ **This Table was intentionally left blank because it would be identical to Table 2-E.**

Maximum Emissions are the emissions at maximum capacity and prior to (in the absence of) pollution control, emission-reducing process equipment, or any other emission reduction. Calculate the hourly emissions using the worst case hourly emissions for each pollutant. For each pollutant, calculate the annual emissions as if the facility were operating at maximum plant capacity without pollution controls for 8760 hours per year, unless otherwise approved by the Department. List Hazardous Air Pollutants (HAP) & Toxic Air Pollutants (TAPs) in Table 2-I. Unit & stack numbering must be consistent throughout the application package. Fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or 1.41E-4).

Unit No.	NOx		CO		VOC		SOx		PM[1]		PM10[1]		PM2.5[1]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1	27.00	90.82	7.40	11.25	0.77	3.37	0.50	2.21	0.63	2.78	0.63	2.78	0.63	2.78	2.52E-04	1.10E-03	-	-
2	27.00	90.82	7.40	11.25	0.77	3.37	0.50	2.21	0.63	2.78	0.63	2.78	0.63	2.78	2.52E-04	1.10E-03	-	-
5	4.43	19.40	5.89	25.78	1.40	6.15	0.48	2.10	0.27	1.16	0.27	1.16	0.27	1.16	2.39E-04	1.05E-03	-	-
6	1.65	7.24	13.78	60.35	1.49	6.52	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04	-	-
7	1.65	7.24	13.78	60.35	1.49	6.52	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04	-	-
8	1.65	7.24	13.78	60.35	1.49	6.52	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04	-	-
9	1.65	7.24	13.78	60.35	1.49	6.52	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04	-	-
10	1.65	7.24	13.78	60.35	1.49	6.52	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04	-	-
3a	-	-	-	-	73.65	322.57	-	-	-	-	-	-	-	-	0.041	0.18	-	-
3b	0.29	1.29	0.25	1.08	0.016	0.071	0.036	0.16	0.022	0.098	0.022	0.098	0.022	0.098	8.93E-04	3.91E-03	-	-
T-007	-	-	-	-	*	0.67	-	-	-	-	-	-	-	-	-	-	-	-
T-008	-	-	-	-	*	18.85	-	-	-	-	-	-	-	-	-	-	-	-
T-009																		
T-011																		
T-012																		
F-001	-	-	-	-	*	44.88	-	-	-	-	-	-	-	-	-	-	-	-
LOAD	-	-	-	-	*	9.82	-	-	-	-	-	-	-	-	-	-	-	-
ECD	0.012	0.052	9.88E-03	0.043	-	-	6.59E-05	2.89E-04	-	-	-	-	-	-	3.50E-05	1.53E-04	-	-
Flare (Process)	7.79	2.82	62.84	22.65	61.88	22.28	0.11	0.46	-	-	-	-	-	-	0.056	0.020	-	-
MALF	15.52	6.00	125.32	10.00	138.01	10.00	0.11	10.00	-	-	-	-	-	-	0.056	2.00	-	-
Totals	90.31	247.41	277.99	383.81	283.93	474.63	3.07	22.99	2.41	10.57	2.41	10.57	2.41	10.57	0.16	2.21	-	-

[1]**Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5. Particulate matter (PM) is not subject to an ambient air quality standard, but PM is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

Table 2-E: Requested Allowable Emissions

Unit & stack numbering must be consistent throughout the application package. Fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or 1.41E^{-4}).

Unit No.	NOx		CO		VOC		SOx		PM[1]		PM10[1]		PM2.5[1]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1	27.00	90.82	7.40	11.25	0.77	3.37	0.50	2.21	0.63	2.78	0.63	2.78	0.63	2.78	2.52E-04	1.10E-03	-	-
2	27.00	90.82	7.40	11.25	0.77	3.37	0.50	2.21	0.63	2.78	0.63	2.78	0.63	2.78	2.52E-04	1.10E-03	-	-
5	4.43	19.40	5.89	25.78	1.40	6.15	0.48	2.10	0.27	1.16	0.27	1.16	0.27	1.16	2.39E-04	1.05E-03	-	-
6	1.65	7.24	3.31	14.48	3.86	16.90	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04	-	-
7	1.65	7.24	3.31	14.48	3.86	16.90	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04	-	-
8	1.65	7.24	3.31	14.48	3.86	16.90	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04	-	-
9	1.65	7.24	3.31	14.48	3.86	16.90	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04	-	-
10	1.65	7.24	3.31	14.48	3.86	16.90	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04	-	-
3a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3b	0.29	1.29	0.25	1.08	0.016	0.071	0.036	0.16	0.022	0.098	0.022	0.098	0.022	0.098	8.93E-04	3.91E-03	-	-
T-007	-	-	-	-	*	0.67	-	-	-	-	-	-	-	-	-	-	-	-
T-008 T-009 T-011 T-012	-	-	-	-	*	18.85	-	-	-	-	-	-	-	-	-	-	-	-
F-001	-	-	-	-	*	44.88	-	-	-	-	-	-	-	-	-	-	-	-
LOAD	-	-	-	-	*	9.82	-	-	-	-	-	-	-	-	-	-	-	-
ECD	0.15	0.65	0.13	0.55	0.86	3.79	0.07	0.29	5.10E-03	0.02	5.10E-03	0.02	5.10E-03	0.02	7.61E-04	3.33E-03	-	-
Flare (Process)	7.79	2.82	62.84	22.65	61.88	22.28	0.11	0.46	-	-	-	-	-	-	0.056	0.020	-	-
MALF	15.52	6.00	125.32	10.00	138.01	10.00	0.11	10.00	-	-	-	-	-	-	0.056	2.00	-	-
Totals	90.45	248.01	225.75	154.98	223.00	207.75	3.14	23.29	2.42	10.59	2.42	10.59	2.42	10.59	0.12	2.03	-	-

[1] **Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5. Particulate matter (PM) is not subject to an ambient air quality standard, but it is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

Table 2-F: Additional Emissions during Startup, Shutdown, and Routine Maintenance (SSM)

☐ This table is intentionally left blank since all emissions at this facility due to routine or predictable startup, shutdown, or scehduled maintenance are no higher than those listed in Table 2-E and a malfunction emission limit is not already permitted or requested. If you are required to report GHG emissions as described in Section 6a, include any GHG emissions during Startup, Shutdown, and/or Scheduled Maintenance (SSM) in Table 2-P. Provide an explanations of SSM emissions in Section 6 and 6a.

All applications for facilities that have emissions during routine our predictable startup, shutdown or scheduled maintenance (SSM)[1], including NOI applications, must include in this table the Maximum Emissions during routine or predictable startup, shutdown and scheduled maintenance (20.2.7 NMAC, 20.2.72.203.A.3 NMAC, 20.2.73.200.D.2 NMAC). In Section 6 and 6a, provide emissions calculations for all SSM emissions reported in this table. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (https://www.env.nm.gov/aqb/permit/aqb_pol.html) for more detailed instructions. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or 1.41E-4).

Unit No.	NOx		CO		VOC		SOx		PM[2]		PM10[2]		PM2.5[2]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
Flare (SSM)	7.73	0.20	62.48	1.62	76.13	1.98	-	-	-	-	-	-	-	-	-	-	-	-
Vent (SSM)	-	-	-	-	*	26.81	-	-	-	-	-	-	-	-	*	0.10	-	-
MALF	15.52	7.00	125.32	10.00	138.01	10.00	0.11	10.00	-	-	-	-	-	-	0.056	2.00	-	-
Totals	23.25	7.20	187.79	11.62	214.14	38.79	0.11	10.00	-	-	-	-	-	-	0.056	2.10	-	-

[1] **For instance**, if the short term steady-state Table 2-E emissions are 5 lb/hr and the SSM rate is 12 lb/hr, enter 7 lb/hr in this table. If the annual steady-state Table 2-E emissions are 21.9 TPY, and the number of scheduled SSM events result in annual emissions of 31.9 TPY, enter 10.0 TPY in the table below.

[2] **Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5. Particulate matter (PM) is not subject to an ambient air quality standard, but it is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

Table 2-G: Stack Exit and Fugitive Emission Rates for Special Stacks

☑ I have elected to leave this table blank because this facility does not have any stacks/vents that split emissions from a single source or combine emissions from more than one source listed in table 2-A. Additionally, the emission rates of all stacks match the Requested allowable emission rates stated in Table 2-E.

Use this table to list stack emissions (requested allowable) from split and combined stacks. List Toxic Air Pollutants (TAPs) and Hazardous Air Pollutants (HAPs) in Table 2-I. List all fugitives that are associated with the normal, routine, and non-emergency operation of the facility. Unit and stack numbering must correspond throughout the application package. Refer to Table 2-E for instructions on use of the "-" symbol and on significant figures.

Stack No.	Serving Unit Number(s) from Table 2-A	NOx		CO		VOC		SOx		PM		PM10		PM2.5		☐ H_2S or ☐Lead	
		lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
Totals:																	

Table 2-H: Stack Exit Conditions

Unit and stack numbering must correspond throughout the application package. Include the stack exit conditions for each unit that emits from a stack, including blowdown venting parameters and tank emissions. If the facility has multiple operating scenarios, complete a separate Table 2-H for each scenario and, for each, type scenario name here:

Stack Number	Serving Unit Number(s) from Table 2-A	Orientation (H-Horizontal V=Vertical)	Rain Caps (Yes or No)	Height Above Ground (ft)	Temp. (F)	Flow Rate		Moisture by Volume (%)	Velocity (ft/sec)	Inside Diameter (ft)
						(acfs)	(dscfs)			
1	1	V	No	25	907	1542	-	N/A	177.00	3.30
2	2	V	No	25	907	1542	-	N/A	177.00	3.30
5	5	V	No	25	907	1542	-	N/A	177.00	3.30
6	6	V	No	29	833	16069	-	N/A	85.30	2.00
7	7	V	No	29	833	16069	-	N/A	85.30	2.00
8	8	V	No	29	833	16069	-	N/A	85.30	2.00
9	9	V	No	28.5	833	16069	-	N/A	85.30	2.00
10	10	V	No	28.5	833	16069	-	N/A	85.30	2.00
Flare	Flare	V	No	65	1832	421	-	N/A	65.60	2.90
3b	3b	V	No	35	800	23.98	-	N/A	17.3	1.33
ECD	ECD	V	No	11.99	650	10.72	-	N/A	0.67	4.50

Table 2-I: Stack Exit and Fugitive Emission Rates for HAPs and TAPs

In the table below, report the Potential to Emit for each HAP from each regulated emission unit listed in Table 2-A, only if the entire facility emits the HAP at a rate greater than or equal to one (1) ton per year For each such emission unit, HAPs shall be reported to the nearest 0.1 tpy. Each facility-wide Individual HAP total and the facility-wide Total HAPs shall be the sum of all HAP sources calculated to the nearest 0.1 ton per year. Per 20.2.72.403.A.1 NMAC, facilities not exempt [see 20.2.72.402.C NMAC] from TAP permitting shall report each TAP that has an uncontrolled emission rate in excess of its pounds per hour screening level specified in 20.2.72.502 NMAC. TAPs shall be reported using one more significant figure than the number of significant figures shown in the pound per hour threshold corresponding to the substance. Use the HAP nomenclature as it appears in Section 112 (b) of the 1990 CAAA and the TAP nomenclature as it listed in 20.2.72.502 NMAC. Include tank-flashing emissions estimates of HAPs in this table. For each HAP or TAP listed, fill all cells in this table with the emission numbers or a "-" symbol. A “-” symbol indicates that emissions of this pollutant are not expected or the pollutant is emitted in a quantity less than the threshold amounts described above.

Stack No.	Unit No.(s)	Total HAPs		Formaldehyde ☑ HAP or ☐ TAP		Acetaldehyde ☑ HAP or ☐ TAP		Benzene ☑ HAP or ☐ TAP		Toluene ☑ HAP or ☐ TAP		Xylenes ☑ HAP or ☐ TAP		n-Hexane ☑ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP	
		lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1	1	0.33	1.45	0.13	0.59	0.14	0.60	4.27E-03	0.019	3.26E-03	0.014	9.89E-03	0.043	0.012	0.052		
2	2	0.33	1.45	0.13	0.59	0.14	0.60	4.27E-03	0.019	3.26E-03	0.014	9.89E-03	0.043	0.012	0.052		
5	5	0.038	0.17	0.029	0.13	1.61E-03	7.04E-03	4.82E-04	2.11E-03	5.23E-03	0.023	2.57E-03	0.011	-	-		
6	6	0.38	1.67	0.22	0.97	0.14	0.63	7.53E-03	0.033	6.98E-03	0.031	3.15E-03	0.014	-	-		
7	7	0.38	1.67	0.22	0.97	0.14	0.63	7.53E-03	0.033	6.98E-03	0.031	3.15E-03	0.014	-	-		
8	8	0.38	1.67	0.22	0.97	0.14	0.63	7.53E-03	0.033	6.98E-03	0.031	3.15E-03	0.014	-	-		
9	9	0.38	1.67	0.22	0.97	0.14	0.63	7.53E-03	0.033	6.98E-03	0.031	3.15E-03	0.014	-	-		
10	10	0.38	1.67	0.22	0.97	0.14	0.63	7.53E-03	0.033	6.98E-03	0.031	3.15E-03	0.014	-	-		
3a	3a	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
3b	3b	0.022	0.095	1.26E-03	5.50E-03	1.10E-03	4.80E-03	1.12E-03	4.90E-03	1.53E-03	6.70E-03	1.99E-03	8.70E-03	2.10E-03	9.20E-03		
T-007	T-007	*	0.097	-	-	-	-	*	0.058	*	0.017	*	1.95E-03	*	7.66E-04		
T-008	T-008	*	0.79	-	-	-	-	*	0.086	*	0.031	*	2.72E-03	*	0.67		
T-009	T-009													*			
T-011	T-011													*			
T-012	T-012													*			
F-001	F-001	*	4.47	-	-	-	-	-	-	-	-	-	-	-	-		
LOAD	LOAD	*	0.45	-	-	-	-	*	0.043	*	7.00E-04	*	1.20E-03	*	0.39		
ECD	ECD	0.16	0.70	-	-	-	-	0.084	0.37	0.052	0.23	5.62E-03	0.025	0.018	0.079		
Flare (Process)	Flare (Process)	0.79	0.28	-	-	-	-	-	-	-	-	-	-	7.96E-03	2.07E-04		
Flare (SSM)	Flare (SSM)	7.96E-03	2.07E-04	-	-	-	-	*	0.11	*	0.075	*	0.010	*	0.49		
VENT (SSM)	VENT (SSM)	*	0.69	-	-	-	-	-	-	-	-	-	-	-	-		
Totals:		3.58	18.98	1.40	6.14	0.99	4.35	0.13	0.87	0.10	0.56	0.046	0.22	0.05	1.74		

Table 2-J: Fuel

Specify fuel characteristics and usage. Unit and stack numbering must correspond throughout the application package.

Unit No.	Fuel Type (low sulfur Diesel, ultra low sulfur diesel, Natural Gas, Coal, ...)	Fuel Source: purchased commercial, pipeline quality natural gas, residue gas, raw/field natural gas, process gas (e.g. SRU tail gas) or other	Specify Units				
			Lower Heating Value	Hourly Usage	Annual Usage	% Sulfur	% Ash
1	Natural Gas	Pipeline Quality Natural Gas	1,200 Btu/scf	35.3 Mscf	309 MMscf	5%	Negligible
2	Natural Gas	Pipeline Quality Natural Gas	1,200 Btu/scf	35.3 Mscf	309 MMscf	5%	Negligible
3b	Natural Gas	Pipeline Quality Natural Gas	1,200 Btu/scf	2.5 Mscf	21.9 MMscf	5%	Negligible
5	Natural Gas	Pipeline Quality Natural Gas	1,200 Btu/scf	32.4 Mscf	284 MMscf	5%	Negligible
6	Natural Gas	Pipeline Quality Natural Gas	1,200 Btu/scf	18.78 Mscf	164.51 MMscf	5%	Negligible
7	Natural Gas	Pipeline Quality Natural Gas	1,200 Btu/scf	18.78 Mscf	164.51 MMscf	5%	Negligible
8	Natural Gas	Pipeline Quality Natural Gas	1,200 Btu/scf	18.78 Mscf	164.51 MMscf	5%	Negligible
9	Natural Gas	Pipeline Quality Natural Gas	1,200 Btu/scf	18.78 Mscf	164.51 MMscf	5%	Negligible
10	Natural Gas	Pipeline Quality Natural Gas	1,200 Btu/scf	18.78 Mscf	164.51 MMscf	5%	Negligible
Flare (Process)	Natural Gas	Pipeline Quality Natural Gas	1,200 Btu/scf	0.10 Mscf	0.88 MMscf	5%	Negligible
ECD	Natural Gas	Pipeline Quality Natural Gas	1,200 Btu/scf	0.10 Mscf	0.88 MMscf	5%	Negligible

Table 2-K: Liquid Data for Tanks Listed in Table 2-L

For each tank, list the liquid(s) to be stored in each tank. If it is expected that a tank may store a variety of hydrocarbon liquids, enter "mixed hydrocarbons" in the Composition column for that tank and enter the corresponding data of the most volatile liquid to be stored in the tank. If tank is to be used for storage of different materials, list all the materials in the "All Calculations" attachment, run the newest version of TANKS on each, and use the material with the highest emission rate to determine maximum uncontrolled and requested allowable emissions rate. The permit will specify the most volatile category of liquids that may be stored in each tank. Include appropriate tank-flashing modeling input data. Use additional sheets if necessary. Unit and stack numbering must correspond throughout the application package.

Tank No.	SCC Code	Material Name	Composition	Liquid Density (lb/gal)	Vapor Molecular Weight (lb/lb*mol)	Average Storage Conditions		Max Storage Conditions	
						Temperature (°F)	True Vapor Pressure (psia)	Temperature (°F)	True Vapor Pressure (psia)
T-007	40400315	Produced Water	Water and Mixed Hydrocarbons	62.2	38.2	79.2	12.9	79.2	12.9
T-008	40400311	Stabilized Condensate	Mixed Hydrocarbons	Unknown	65	74.1	7.5	87.1	9.4
T-009	40400311	Stabilized Condensate	Mixed Hydrocarbons	Unknown	65	74.1	7.5	87.1	9.4
T-011	40400311	Stabilized Condensate	Mixed Hydrocarbons	Unknown	65	74.1	7.5	87.1	9.4
T-012	40400311	Stabilized Condensate	Mixed Hydrocarbons	Unknown	65	74.1	7.5	87.1	9.4

Table 2-L: Tank Data

Include appropriate tank-flashing modeling input data. Use an addendum to this table for unlisted data categories. Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary. See reference Table 2-L2. Note: 1.00 bbl = 10.159 M3 = 42.0 gal

Tank No.	Date Installed	Materials Stored	Seal Type (refer to Table 2-LR below)	Roof Type (refer to Table 2-LR below)	Capacity		Diameter (M)	Vapor Space (M)	Color (from Table VI-C)		Paint Condition (from Table VI-C)	Annual Throughput (gal/yr)	Turn-overs (per year)
					(bbl)	(M^3)			Roof	Shell			
T-007	2023	Produced Water	N/A	FX	400	64	3.7	6.1	MG	MG	Average	3,459,993	205.95
T-008	2013	Stabilized Condensate	N/A	FX	300	48	3.7	4.6	MG	MG	Good	2,912,700	231.17
T-009	<8/23/2011	Stabilized Condensate	N/A	FX	300	48	3.7	4.6	MG	MG	Good	2,912,700	231.17
T-011	<8/23/2011	Stabilized Condensate	N/A	FX	300	48	3.7	4.6	MG	MG	Good	2,912,700	231.17
T-012	<8/23/2011	Stabilized Condensate	N/A	FX	300	48	3.7	4.6	MG	MG	Good	2,912,700	231.17

Table 2-L2: Liquid Storage Tank Data Codes Reference Table

Roof Type	Seal Type, Welded Tank Seal Type		Seal Type, Riveted Tank Seal Type		Roof, Shell Color	Paint Condition
FX: Fixed Roof	**Mechanical Shoe Seal**	**Liquid-mounted resilient seal**	**Vapor-mounted resilient seal**	**Seal Type**	**WH**: White	Good
IF: Internal Floating Roof	**A**: Primary only	**A**: Primary only	**A**: Primary only	**A**: Mechanical shoe, primary only	**AS**: Aluminum (specular)	Poor
EF: External Floating Roof	**B**: Shoe-mounted secondary	**B**: Weather shield	**B**: Weather shield	**B**: Shoe-mounted secondary	**AD**: Aluminum (diffuse)	
P: Pressure	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**LG**: Light Gray	
					MG: Medium Gray	
					BL: Black	
					OT: Other (specify)	

Note: 1.00 bbl = 0.159 M^3 = 42.0 gal

Table 2-M: Materials Processed and Produced (Use additional sheets as necessary.)

Material Processed				Material Produced			
Description	**Chemical Composition**	**Phase (Gas, Liquid, or Solid)**	**Quantity (specify units)**	**Description**	**Chemical Composition**	**Phase**	**Quantity (specify units)**
Field Natural Gas	Metehane, low concentration VOC's	Gas	300 MMscf/day	Dry Gas	Methane, low concentration VOCs	G	300 MMscf/day
				Produced Water	Water with trace hydrocarbons	L	N/A (not a regulated substance)
				Stabilized Condensate	Heavy hydrocarbons	L	190 bbl/day

Table 2-N: CEM Equipment

Enter Continuous Emissions Measurement (CEM) Data in this table. If CEM data will be used as part of a federally enforceable permit condition, or used to satisfy the requirements of a state or federal regulation, include a copy of the CEM's manufacturer specification sheet in the Information Used to Determine Emissions attachment. Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary.

Stack No.	Pollutant(s)	Manufacturer	Model No.	Serial No.	Sample Frequency	Averaging Time	Range	Sensitivity	Accuracy
N/A - No CEM equipment at this facility.									

Table 2-O: Parametric Emissions Measurement Equipment

Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary.

Unit No.	Parameter/Pollutant Measured	Location of Measurement	Unit of Measure	Acceptable Range	Frequency of Maintenance	Nature of Maintenance	Method of Recording	Averaging Time
N/A - No PEM equipment at this facility.								

Table 2-P: Greenhouse Gas Emissions

Applications submitted under 20.2.70, 20.2.72, & 20.2.74 NMAC are required to complete this Table. Power plants, Title V major sources, and PSD major sources must report and calculate all GHG emissions for each unit. Applicants must report potential emission rates in short tons per year (see Section 6.a for assistance). Include GHG emissions during Startup, Shutdown, and Scheduled Maintenance in this table. For minor source facilities that are not power plants, are not Title V, or are not PSD, there are three options for reporting GHGs 1) report GHGs for each individual piece of equipment; 2) report all GHGs from a group of unit types, for example report all combustion source GHGs as a single unit and all venting GHG as a second separate unit; OR 3) check the following box.

☐ By checking this box, the applicant acknowledges the total CO2e emissions are less than 75,000 tons per year.

		CO_2 ton/yr	N_2O ton/yr	CH_4 ton/yr	SF_6 ton/yr	PFC/HFC ton/yr[2]									Total GHG Mass Basis ton/yr[4]	Total CO_2e ton/yr[5]
Unit No.	GWPs [1]	1	298	25	22,800	footnote 3										
1	mass GHG	21,685.12	0.041	0.41	-	-									21,685.57	
	CO_2e	21,685.12	12.18	10.22	-	-										21,707.51
2	mass GHG	21,685.12	0.041	0.41	-	-									21,685.57	
	CO_2e	21,685.12	12.18	10.22	-	-										21,707.51
5	mass GHG	20,596.87	0.039	0.39	-	-									20,597.29	
	CO_2e	20,596.87	11.57	9.70	-	-										20,618.14
6	mass GHG	8,775.37	0.017	0.17	-	-									8,775.55	
	CO_2e	8,775.37	4.93	4.13	-	-										8,784.43
7	mass GHG	8,775.37	0.017	0.17	-	-									8,775.55	
	CO_2e	8,775.37	4.93	4.13	-	-										8,784.43
8	mass GHG	8,775.37	0.017	0.17	-	-									8,775.55	
	CO_2e	8,775.37	4.93	4.13	-	-										8,784.43
9	mass GHG	8,775.37	0.017	0.17	-	-									8,775.55	
	CO_2e	8,775.37	4.93	4.13	-	-										8,784.43
10	mass GHG	8,775.37	0.017	0.17	-	-									8,775.55	
	CO_2e	8,775.37	4.93	4.13	-	-										8,784.43
3a	mass GHG	-	-	-	-	-									-	
	CO_2e	-	-	-	-	-										-
3b	mass GHG	1,537.07	2.90E-03	0.029	-	-									1,537.10	
	CO_2e	1,537.07	0.86	0.72	-	-										1,538.65
T-007	mass GHG	0.61	-	1.03	-	-									1.64	
	CO_2e	0.61	-	25.75	-	-										26.36
T-008 T-009	mass GHG	9.04E-11	-	8.19E-13	-	-	-	-	-	-	-	-	-	-	9.13E-11	-
T-011 T-012	CO_2e	9.04E-11	-	2.05E-11	-	-	-	-	-	-	-	-	-	-	-	1.11E-10
F-001	mass GHG	-	-	-	-	-									-	
	CO_2e	-	-	-	-	-										-
LOAD	mass GHG	-	-	-	-	-									-	
	CO_2e	-	-	-	-	-										-
ECD	mass GHG	61.48	1.16E-04	1.05	-	-									62.53	
	CO_2e	61.48	0.035	26.22	-	-										87.73
HAUL	mass GHG	-	-	-	-	-									-	
	CO_2e	-	-	-	-	-										-
Flare (process)	mass GHG	61.48	1.16E-04	1.92	-	-									63.40	
	CO_2e	61.48	0.035	47.89	-	-										109.40

Table 2-P: Greenhouse Gas Emissions

Applications submitted under 20.2.70, 20.2.72, & 20.2.74 NMAC are required to complete this Table. Power plants, Title V major sources, and PSD major sources must report and calculate all GHG emissions for each unit. Applicants must report potential emission rates in short tons per year (see Section 6.a for assistance). Include GHG emissions during Startup, Shutdown, and Scheduled Maintenance in this table. For minor source facilities that are not power plants, are not Title V, or are not PSD, there are three options for reporting GHGs 1) report GHGs for each individual piece of equipment; 2) report all GHGs from a group of unit types, for example report all combustion source GHGs as a single unit and all venting GHG as a second separate unit; OR 3) check the following box.

☐ By checking this box, the applicant acknowledges the total CO2e emissions are less than 75,000 tons per year.

		CO_2 ton/yr	**N_2O** ton/yr	**CH_4** ton/yr	**SF_6** ton/yr	**PFC/HFC** ton/yr[2]									**Total GHG** Mass Basis ton/yr[4]	**Total CO_2e** ton/yr[5]
Unit No.	**GWPs [1]**	**1**	**298**	**25**	**22,800**	**footnote 3**										
Flare (process)	**mass GHG**	5,146.41	0.011	8.71	-	-									5,155.13	
	CO_2e	5,146.41	2.74	217.66	-	-										5,366.81
Flare (SSM)	**mass GHG**	6,842.42	0.011	5.02	-	-									6,847.46	
	CO_2e	6,842.42	3.20	125.54	-	-										6,971.17
Vent (SSM)	**mass GHG**	4.00	-	70.00	-	-									74.00	
	CO_2e	4.00	-	1,750.50	-	-										1,754.50
MALF	**mass GHG**	-	-	-	-	-									-	
	CO2e	-	-	-	-	-										-
Total	**mass GHG**	121,497.43	0.23	89.79	-	-									121,587.45	
	CO_2e	121,497.43	67.44	2,245.09	-	-										123,809.96

[1] **GWP** (Global Warming Potential): Applicants must use the most current GWPs codified in Table A-1 of 40 CFR part 98. GWPs are subject to change, therefore, applicants need to check 40 CFR 98 to confirm GWP values.

[2] For **HFCs** or **PFCs** describe the specific HFC or PFC compound and use a separate column for each individual compound.

[3] For each new compound, enter the appropriate GWP for each HFC or PFC compound from Table A-1 in 40 CFR 98.

[4] Green house gas emissions on a **mass basis** is the ton per year green house gas emission before adjustment with its GWP.

[5] **CO_2e** means Carbon Dioxide Equivalent and is calculated by multiplying the TPY mass emissions of the green house gas by its GWP.

Section 3

Application Summary

The **Application Summary** shall include a brief description of the facility and its process, the type of permit application, the applicable regulation (i.e. 20.2.72.200.A.X, or 20.2.73 NMAC) under which the application is being submitted, and any air quality permit numbers associated with this site. If this facility is to be collocated with another facility, provide details of the other facility including permit number(s). In case of a revision or modification to a facility, provide the lowest level regulatory citation (i.e. 20.2.72.219.B.1.d NMAC) under which the revision or modification is being requested. Also describe the proposed changes from the original permit, how the proposed modification will affect the facility's operations and emissions, de-bottlenecking impacts, and changes to the facility's major/minor status (both PSD & Title V).

The **Process Summary** shall include a brief description of the facility and its processes.

Startup, Shutdown, and Maintenance (SSM) routine or predictable emissions: Provide an overview of how SSM emissions are accounted for in this application. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on SSM emissions.

Enterprise Field Services, LLC (Enterprise) is submitting this application and accompanying material pursuant to 20.2.70.404.C.(1)(1) NMAC to apply for a significant modification to the existing Title V major source permit for the South Carlsbad Compressor Station (South Carlsbad). The facility is located approximately 2.8 miles northwest of Loving, NM in Eddy County and is currently operating under Title V Permit No. P130-R4. The facility is currently major with respect to Title V and is minor with respect to PSD and will remain so with this modification.

The Title V Significant Modification will reflect the changes incorporated to NSR 0220-M12 and NSR 0220-M12R1 which include:

- Addition of five (5) CAT G3608A4 2500 hp compressor engines (Units 6, 7, 8, 9 &10);
- Addition of one (1) 400 bbl slop oil storage tank (Unit T-007);
- Addition of slop loading (Unit LOAD_SLOP) (Exempt pursuant to IA List Item #1.a.);
- Addition of one (1) enclosed combustion device (Unit ECD);
- Modification of two (2) Solar Centaur T-4702 natural gas turbines (Units 1 & 2);
- Modification of one (1) 200 MMscf/d glycol dehydrator (Unit 3a);
- Modification of one (1) 72 Mscf/hr process flare (Unit Flare);
- Modification of one (1) 3.0 MMBtu/hr glycol dehydrator reboiler (Unit 3b);
- Modification of facility wide fugitives (Unit F-001); and
- Modification of malfunction emissions (Unit MALF)

The facility is a natural gas compressor station. Gas enters the facility through a separator and is compressed by three gas turbine-driven compressors (Units 1, 2, & 5) and five 4-stroke lean burn compressor engines (Units 6, 7, 8, 9 & 10). After inlet compression, gas is sent to a glycol dehydrator (Unit 3a) and then to a chiller and cold separator, where liquids (primarily water) condense and are removed from the stream. The dry gas stream then goes to a pipeline for transport.

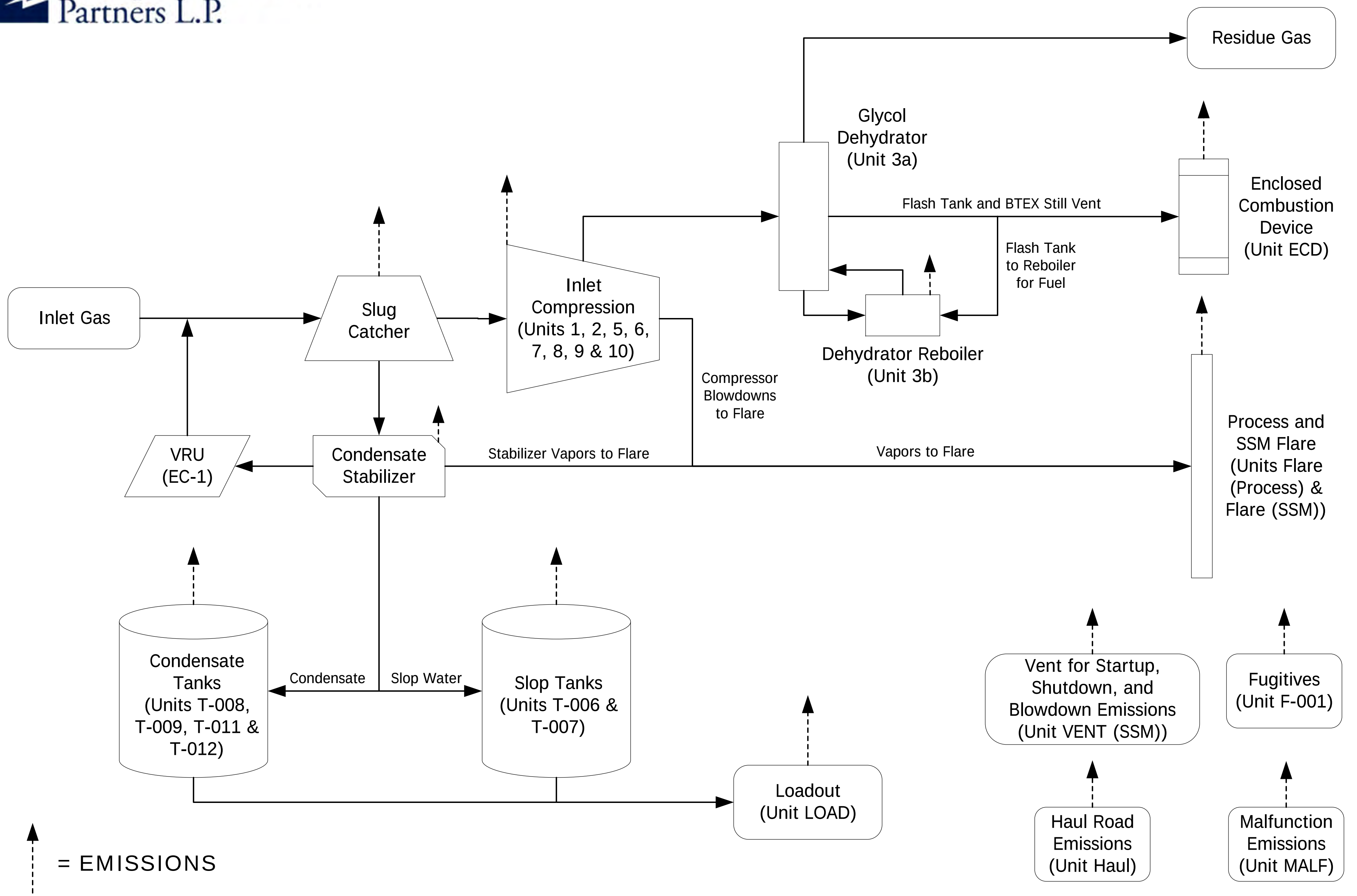
Startup, Shutdown, and Maintenance (SSM) emissions are controlled by the process and SSM flare. This facility is currently permitted to vent VOC emission during SSM events (Unit VENT (SSM)).

Section 4

Process Flow Sheet

A **process flow sheet** and/or block diagram indicating the individual equipment, all emission points and types of control applied to those points. The unit numbering system should be consistent throughout this application.

A process flow sheet is attached on the following page.



Enterprise Field Services, LLC

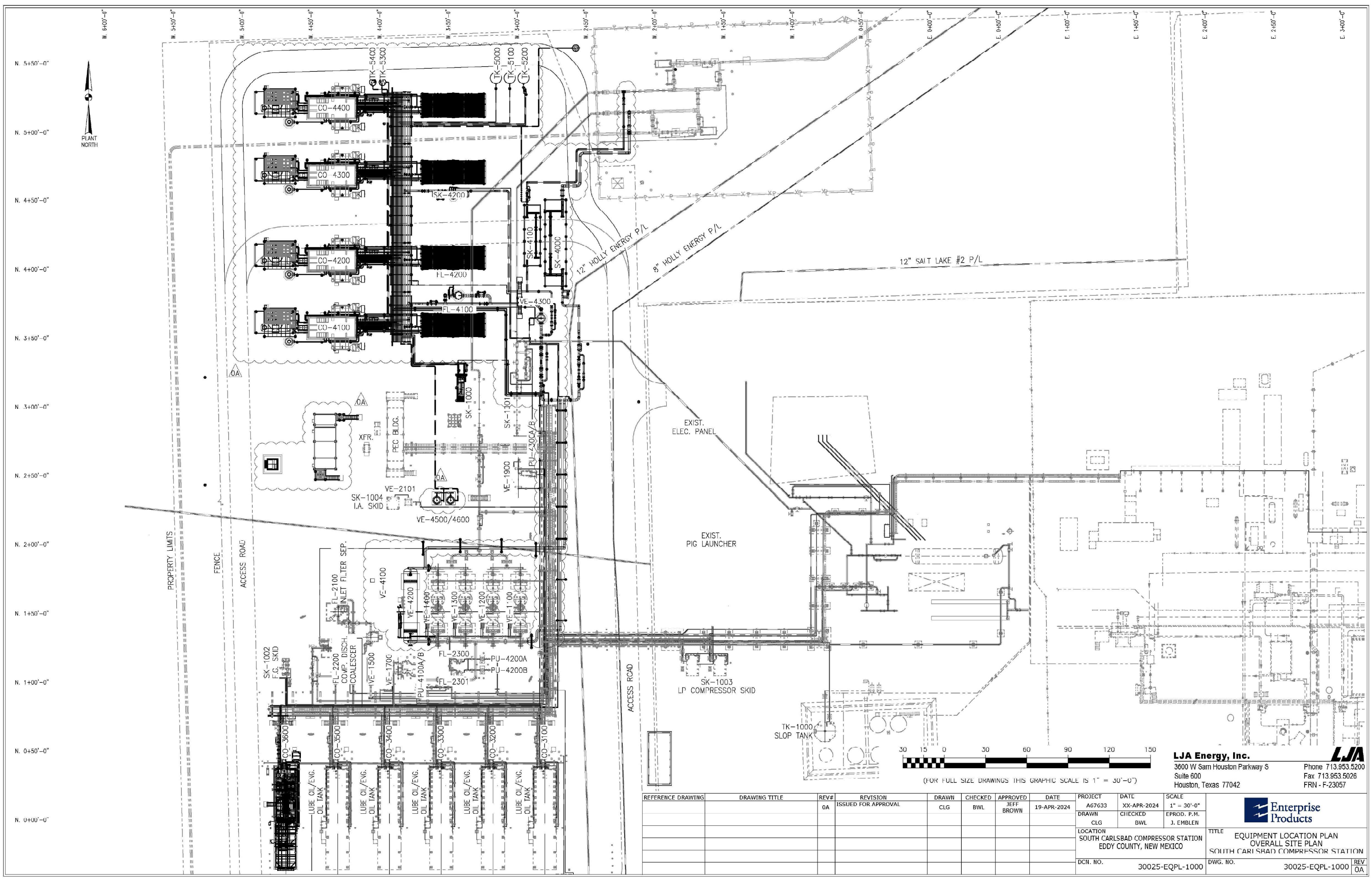
PROCESS FLOW DIAGRAM
South Carlsbad Compressor Station

Section 5

Plot Plan Drawn to Scale

A **plot plan drawn to scale** showing emissions points, roads, structures, tanks, and fences of property owned, leased, or under direct control of the applicant. This plot plan must clearly designate the restricted area as defined in UA1, Section 1-D.12. The unit numbering system should be consistent throughout this application.

A plot plan is attached on the following page.



LJA Energy, Inc.
3600 W Sam Houston Parkway S
Suite 600
Houston, Texas 77042
Phone 713.953.5200
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FRN - F-23057

REFERENCE DRAWING	DRAWING TITLE	REV#	REVISION	DRAWN	CHECKED	APPROVED	DATE
		0A	ISSUED FOR APPROVAL	CLG	BWL	JEFF BROWN	19-APR-2024

PROJECT	DATE	SCALE
A67633	XX-APR-2024	1" = 30'-0"
DRAWN	CHECKED	EPROD. P.M.
CLG	BWL	J. EMBLEN

LOCATION: SOUTH CARLSBAD COMPRESSOR STATION EDDY COUNTY, NEW MEXICO

TITLE: EQUIPMENT LOCATION PLAN OVERALL SITE PLAN SOUTH CARLSBAD COMPRESSOR STATION

DCN. NO. 30025-EQPL-1000

DWG. NO. 30025-EQPL-1000 REV 0A

Section 6

All Calculations

Show all calculations used to determine both the hourly and annual controlled and uncontrolled emission rates. All calculations shall be performed keeping a minimum of three significant figures. Document the source of each emission factor used (if an emission rate is carried forward and not revised, then a statement to that effect is required). If identical units are being permitted and will be subject to the same operating conditions, submit calculations for only one unit and a note specifying what other units to which the calculations apply. All formulas and calculations used to calculate emissions must be submitted. The “Calculations” tab in the UA2 has been provided to allow calculations to be linked to the emissions tables. Add additional “Calc” tabs as needed. If the UA2 or other spread sheets are used, all calculation spread sheet(s) shall be submitted electronically in Microsoft Excel compatible format so that formulas and input values can be checked. Format all spread sheets and calculations such that the reviewer can follow the logic and verify the input values. Define all variables. If calculation spread sheets are not used, provide the original formulas with defined variables. Additionally, provide subsequent formulas showing the input values for each variable in the formula. All calculations, including those calculations are imbedded in the Calc tab of the UA2 portion of the application, the printed Calc tab(s), should be submitted under this section.

Tank Flashing Calculations: The information provided to the AQB shall include a discussion of the method used to estimate tank-flashing emissions, relative thresholds (i.e., NOI, permit, or major source (NSPS, PSD or Title V)), accuracy of the model, the input and output from simulation models and software, all calculations, documentation of any assumptions used, descriptions of sampling methods and conditions, copies of any lab sample analysis. If Hysis is used, all relevant input parameters shall be reported, including separator pressure, gas throughput, and all other relevant parameters necessary for flashing calculation.

SSM Calculations: It is the applicant’s responsibility to provide an estimate of SSM emissions or to provide justification for not doing so. In this Section, provide emissions calculations for Startup, Shutdown, and Routine Maintenance (SSM) emissions listed in the Section 2 SSM and/or Section 22 GHG Tables and the rational for why the others are reported as zero (or left blank in the SSM/GHG Tables). Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on calculating SSM emissions. If SSM emissions are greater than those reported in the Section 2, Requested Allowables Table, modeling may be required to ensure compliance with the standards whether the application is NSR or Title V. Refer to the Modeling Section of this application for more guidance on modeling requirements.

Glycol Dehydrator Calculations: The information provided to the AQB shall include the manufacturer’s maximum design recirculation rate for the glycol pump. If GRI-Glycalc is used, the full input summary report shall be included as well as a copy of the gas analysis that was used.

Road Calculations: Calculate fugitive particulate emissions and enter haul road fugitives in Tables 2-A, 2-D and 2-E for:

1. If you transport raw material, process material and/or product into or out of or within the facility and have PER emissions greater than 0.5 tpy.
2. If you transport raw material, process material and/or product into or out of the facility more frequently than one round trip per day.

Significant Figures:

A. All emissions standards are deemed to have at least two significant figures, but not more than three significant figures.
B. At least 5 significant figures shall be retained in all intermediate calculations.
C. In calculating emissions to determine compliance with an emission standard, the following rounding off procedures shall be used:

(1) If the first digit to be discarded is less than the number 5, the last digit retained shall not be changed;
(2) If the first digit discarded is greater than the number 5, or if it is the number 5 followed by at least one digit other than the number zero, the last figure retained shall be increased by one unit; **and**
(3) If the first digit discarded is exactly the number 5, followed only by zeros, the last digit retained shall be rounded upward if it is an odd number, but no adjustment shall be made if it is an even number.
(4) The final result of the calculation shall be expressed in the units of the standard.

Control Devices: In accordance with 20.2.72.203.A(3) and (8) NMAC, 20.2.70.300.D(5)(b) and (e) NMAC, and 20.2.73.200.B(7) NMAC, the permittee shall report all control devices and list each pollutant controlled by the control device regardless if the applicant takes credit for the reduction in emissions. The applicant can indicate in this section of the application if they chose to not take credit for the reduction in emission rates. For notices of intent submitted under 20.2.73 NMAC, only uncontrolled emission rates can be considered to determine applicability unless the state or federal Acts require the control. This information is necessary to determine if federally enforceable conditions are necessary for the control device, and/or if the control device produces its own regulated pollutants or increases emission rates of other pollutants.

This section contains the following calculations for this facility. Supporting documentation for these calculations can be found in Section 7.

Subsection 1 – Emission calculations for units either added or modified with this application.

Solar Centaur T-4702 turbines (Units 1 & 2)

NO_x and CO emission rates were updated using historical stack test results obtained from 2010 to 2016 stack tests with a safety factor. VOC emission rates are reproduced here from previous applications. SO_2 emissions are based on a conservative fuel sulfur content estimated of 5 gr S/100 scf and 100% conversion of elemental sulfur to SO_2. Particulate emission rates ($PM_{2.5}$, PM_{10}, and TSP) were updated based on Solar Turbines Inc, Product Information Letter 171, refer to Section 7. Total and individual HAP emissions are calculated using GRI-HAPCalc 3.01. Greenhouse gas emissions are estimated using emission factors from 40 CFR 98 Subpart C Tables C-1 and C-2.

Caterpillar G3608 Engines (Units 6, 7, 8, 9, & 10)

NO_X, CO, and VOC emission rates were calculated using manufacturer specifications. SO_2 emissions are based on a conservative fuel sulfur content estimated of 5 gr S/100 scf and 100% conversion of elemental sulfur to SO_2. Particulate ($PM_{2.5}$, PM_{10}, and TSP) and HAP emissions were calculated using AP-42 Table 3.2-2. Greenhouse gas emissions are estimated using emission factors from 40 CFR 98 Subpart C Tables C-1 and C-2.

Glycol Dehydrator and Reboiler (Units 3a & 3b)

Glycol dehydrator emissions were calculated using GRI-GLYCalc and an extended gas analysis. VOC and HAP emissions from the regenerator are controlled with a BTEX condenser then sent to the ECD. Flash tank emissions are primarily controlled by the ECD or sent to the reboiler to be used as fuel. The condenser overheads are routed to the ECD where VOC and HAP emissions are combusted and controlled with a 98% efficiency.

Produced Water Slop Tank (Unit T-007)

Working, breathing, and Flash emissions from T-007 are calculated in this application using a BR&E ProMax simulation.

Slop Loading Emissions (Unit LOAD_SLOP) (Exempt pursuant to IA List Item #1.a.)

ProMax was used to perform the loading emissions calculations. Specifically, a RVP11 ProMax simulation was used to determine the stream compositions.

Enclosed Combustion Device (Unit ECD)

Emission calculations account for the possible presence of H2S in the fuel gas. Emissions of NO_x, CO, and PM are calculated using AP-42 Tables 1.4-1 & 2 emission factors. Pilot H2S emissions are calculated based on the conservative estimate of 0.25 g H_2S/100 scf and a 98% combustion efficiency of the ECD. Pilot SO_2 emissions are based on a conservative fuel sulfur content estimate of 5 gr S/100 scf and 100% conversion of elemental sulfur to SO_2. SO_2 emissions were calculated based on a destruction rate efficiency (DRE) of 98%, based on the manufacturer specification sheet, and conversion to SO_2. Emissions of VOC, H_2S, and HAPs are calculated based on the GRI-GLYCalc report for the Controlled Regenerator Emissions after the BTEX condenser and the report for the Flash Gas Emissions with a 98% DRE. For the H_2S, it was assumed 98% was combusted and 100% of the combusted H_2S was converted to SO_2.

Flare (Unit Flare)

Emission calculations were updated to account for the possible presence of H2S. An H2S composition of 0.5 mol % was assumed. Emissions of NO_x and CO are calculated using the larger of the AP-42 Table 13.5-1 and TNRCC RG-109 emission factors. Pilot H_2S emissions are calculated based on the conservative estimate of 0.25 g H_2S/100 scf and a 98% combustion efficiency of the flare. Pilot SO_2 emissions are based on a conservative fuel sulfur content estimated of 5 gr S/100 scf and 100% conversion of elemental sulfur to SO_2. SO_2 emissions were calculated assuming 98% combustion efficiency and conversion to SO_2.

Emissions of VOCs and HAPs are estimated based on the gas analysis and an assumed 98% combustion efficiency.

During non-routine conditions such as when gas must be released from portions of the facility for maintenance or in the event of an emergency, some VOCs will be directed to the flare. Gas streams 14 and 33 will be directed to the flare in the event of a plant shutdown. Additionally, during an emergency shutdown, pressure vessels or the gas contents of the refrigeration system may be released to the flare; however, the quantity of gas in these vessels or systems is less than the assumed maximum gas volume from streams 14 and 33.

Flare parameters are calculated using a temperature of 1000˚ C and a 20 m/sec velocity (per NMAQB guidelines), and an effective diameter calculated in accordance with the Modeling Guidelines.

Greenhouse gas emissions were estimated using 40 CFR 98 Subpart W calculation methodology.

Fugitive Emissions (Unit F-001)
Fugitive emission calculations were completed using emission factors from Table 2-4 of EPA Protocol for Equipment Leak Emission Estimates, 1995. Subcomponent counts for each subcomponent are based on estimated average component counts for each piece of equipment.

Subsection 2 – Emission calculations for all other units at this facility not affected by this application.

Solar Centaur 40-4700S (Unit 5)
NO_X, CO, and VOC emission rates were calculated using manufacturer specifications. SO_2 emissions are based on a conservative fuel sulfur content estimated of 5 gr S/100 scf and 100% conversion of elemental sulfur to SO_2. Particulate ($PM_{2.5}$, PM_{10}, and TSP) and HAP emissions were calculated using AP-42 Table 3.1-2a. Greenhouse gas emissions are estimated using emission factors from 40 CFR 98 Subpart C Tables C-1 and C-2.

Stabilized Condensate Storage Tanks (Units T-008, T-009, T-011, & T-012)
Working and breathing emissions from T-008, T-009, T-011, and T-012 are calculated in this application using a BR&E ProMax simulation.

Exempt Storage Tanks (Units T-001 through T-006)
Methanol storage tanks (T-002) and condensate slop oil tank (T-006) are exempt pursuant to 20.2.72.202.B.(5) NMAC. Emissions from T-002 were conservatively estimated based on 3 anticipated turnovers per year. Emissions from T-006 was calculated with BR&E ProMax using condenser liquid streams from the GRI-GLYCalc process simulation and other relevant calculations. Emission calculations for both units are included in the application for reference. All other storage tanks at South Carlsbad Compressor Station are either exempt because they contain liquids with vapor pressure less than 10mmHg (T-001, T-004, and T-005) or are not a source of regulated pollutants (T-003).

Condensate Loading Emissions (Unit LOAD)
ProMax and GRI-HAPCalc were used to perform the loading emissions calculations. Specifically, a RVP11 ProMax simulation was used to determine the stream compositions.

Unpaved Haul Road Emissions (Unit HAUL)
These emissions were calculated using Equation 2 of AP-42 Section 13.2.2. Haul road emissions at this facility are exempt pursuant to 20.2.72.202.B(5) NMAC. Emission calculations are included in the application for reference.

Vent (Unit VENT)
A RVP11 Promax simulation was used to determine the emissions associated to this unit based on the mole fraction calculated for different components found on the SC Vapor process stream located before the first stage compressor. In addition, to overcome H_2S possible molar fraction changes, it was assumed 0.05% mole instead of zero, as forecasted by the mentioned simulation.

From time to time, the pressurized gas in a portion of the facility's system must be vented in order to relieve the pressure. At South Carlsbad Compressor Station, this is primarily done in order to perform maintenance on the compressors and the compressor turbines (Units 1 and 2). This pressure relief is termed "blow down". Blow down at this facility is and will continue to be directed to various vents, including but not limited to pressure relief valves and blowdown vent stacks, aggregated in this application as unit VENT.

During routine startup, shutdown, or blow down events, gas from the turbines is diverted to unit VENT. A table of the inlet gas composition (based on the combined gas analysis) and the anticipated number of blow down events per year (conservatively estimated) is included in this section. Venting volume and frequency were estimated based on operating history and engineering knowledge. It is assumed that the gas being vented will contain a maximum of 10 ppmv of H_2S.

Maximum hourly venting emissions were calculated assuming 1 hour per event for a worst-case scenario. Annual venting emissions were calculated using the total volume of gas vented annually based on the estimate of predicted annual events with a safety factor of 100% to overcome for components variations. In addition, a molar concentration of 0.05% of H_2S was assumed since the analysis used did not showed any H_2S concentration.

Section 6

Subsection 1 – Emission Calculations for Units either Added or Modified with this Application

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For clarity, this Subsection 1 contains emission calculations for units that were either added or modified with this application (i.e. Units 1, 2, 6, 7, 8, 9, 10, 3a, 3b, T-007, LOAD_SLOP, ECD, Flare, F-001, and MALF). For all other emission calculations pertinent to the other units at this facility, please refer to Section 6 Subsection 2.

Maximum Uncontrolled Emissions																
Equipment	NO_x		CO		VOC		SO_x		PM		PM_{10}		$PM_{2.5}$		H_2S	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1	27.00	90.82	7.40	11.25	0.77	3.37	0.50	2.21	0.63	2.78	0.63	2.78	0.63	2.78	2.52E-04	1.10E-03
2	27.00	90.82	7.40	11.25	0.77	3.37	0.50	2.21	0.63	2.78	0.63	2.78	0.63	2.78	2.52E-04	1.10E-03
5	4.43	19.40	5.89	25.78	1.40	6.15	0.48	2.10	0.27	1.16	0.27	1.16	0.27	1.16	2.39E-04	1.05E-03
6	1.65	7.24	13.78	60.35	1.49	6.52	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04
7	1.65	7.24	13.78	60.35	1.49	6.52	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04
8	1.65	7.24	13.78	60.35	1.49	6.52	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04
9	1.65	7.24	13.78	60.35	1.49	6.52	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04
10	1.65	7.24	13.78	60.35	1.49	6.52	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04
3a	-	-	-	-	73.65	322.57		-	-	-	-	-	-	-	0.041	0.18
3b	0.29	1.29	0.25	1.08	0.016	0.071	0.036	0.16	0.022	0.10	0.022	0.10	0.022	0.10	8.93E-04	3.91E-03
T-007	-	-	-	-	*	0.67	-	-	-	-	-	-	-	-	-	-
T-008 **T-009** **T-011** **T-012**	-	-	-	-	*	18.85	-	-	-	-	-	-	-	-	-	-
F-001	-	-	-	-	*	44.88	-	-	-	-	-	-	-	-	-	-
LOAD	-	-	-	-	*	9.82	-	-	-	-	-	-	-	-	-	-
ECD	0.012	0.052	9.88E-03	0.043	-	-	6.59E-05	2.89E-04	-	-	-	-	-	-	3.50E-05	1.53E-04
Flare (Process)	7.79	2.82	62.84	22.65	61.88	22.28	0.11	0.46	-	-	-	-	-	-	0.056	0.020
Flare (SSM)	7.73	0.20	62.48	1.62	76.13	1.98	-	-	-	-	-	-	-	-	-	-
VENT (SSM)	-	-	-	-	*	26.81	-	-	-	-	-	-	-	-	*	0.10
MALF[1]	15.52	6.00	125.32	10.00	138.01	10.00	0.11	10.00	-	-	-	-	-	-	0.056	2.00
Total	**98.04**	**247.61**	**340.47**	**385.43**	**360.06**	**503.42**	**3.07**	**22.99**	**2.41**	**10.57**	**2.41**	**10.57**	**2.41**	**10.57**	**0.16**	**2.31**

"*" Denotes an hourly emission rate is not appropriate

"-" Indicates emissions of this pollutant are not expected

[1] Flare malfunction hourly emission rates reflect worst case emissions modeled for this unit. These emissions are the maximum allowed for the flare and are not additive with the Process and SSM emissions requested under Unit Flare.

Equipment	NO_x		CO		VOC		SO_x		PM		PM_{10}		$PM_{2.5}$		H_2S	
Controlled Emissions																
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1	27.00	90.82	7.40	11.25	0.77	3.37	0.50	2.21	0.63	2.78	0.63	2.78	0.63	2.78	2.52E-04	1.10E-03
2	27.00	90.82	7.40	11.25	0.77	3.37	0.50	2.21	0.63	2.78	0.63	2.78	0.63	2.78	2.52E-04	1.10E-03
5	4.43	19.40	5.89	25.78	1.40	6.15	0.48	2.10	0.27	1.16	0.27	1.16	0.27	1.16	2.39E-04	1.05E-03
6	1.65	7.24	3.31	14.48	3.86	16.90	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04
7	1.65	7.24	3.31	14.48	3.86	16.90	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04
8	1.65	7.24	3.31	14.48	3.86	16.90	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04
9	1.65	7.24	3.31	14.48	3.86	16.90	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04
10	1.65	7.24	3.31	14.48	3.86	16.90	0.27	1.17	0.17	0.75	0.17	0.75	0.17	0.75	1.34E-04	5.88E-04
3a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3b	0.29	1.29	0.25	1.08	0.016	0.071	0.036	0.16	0.022	0.10	0.022	0.10	0.022	0.10	8.93E-04	3.91E-03
T-007	-	-	-	-	*	0.67	-	-	-	-	-	-	-	-	-	-
T-008 **T-009** **T-011** **T-012**	-	-	-	-	*	18.85	-	-	-	-	-	-	-	-	-	-
F-001	-	-	-	-	*	44.88	-	-	-	-	-	-	-	-	-	-
LOAD	-	-	-	-	*	9.82	-	-	-	-	-	-	-	-	-	-
ECD	0.15	0.65	0.13	0.55	0.86	3.79	0.067	0.29	5.10E-03	0.022	5.10E-03	0.022	5.10E-03	0.022	7.61E-04	3.33E-03
Flare (Process)	7.79	2.82	62.84	22.65	61.88	22.28	0.11	0.46	-	-	-	-	-	-	0.056	0.020
Flare (SSM)	7.73	0.20	62.48	1.62	76.13	1.98	-	-	-	-	-	-	-	-	-	-
VENT (SSM)	-	-	-	-	*	26.81	-	-	-	-	-	-	-	-	*	0.10
MALF[1]	15.52	6.00	125.32	10.00	138.01	10.00	0.11	10.00	-	-	-	-	-	-	0.056	2.00
Total	**98.18**	**248.21**	**288.23**	**156.60**	**299.13**	**236.54**	**3.14**	**23.29**	**2.42**	**10.59**	**2.42**	**10.59**	**2.42**	**10.59**	**0.12**	**2.13**

"*" Denotes an hourly emission rate is not appropriate

"-" Indicates emissions of this pollutant are not expected

[1] Flare malfunction hourly emission rates reflect worst case emissions modeled for this unit. These emissions are the maximum allowed for the flare and are not additive with the Process and SSM emissions requested under Unit Flare.

Equipment	Total HAPs		Formaldehyde		Acetaldehyde		n-Hexane		Benzene		Toluene		Xylenes		Ethylbenzene		CO2e
Controlled HAP and Greenhouse Gas Emissions																	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	tpy
1	0.33	1.45	0.13	0.59	0.14	0.60	0.012	0.052	4.27E-03	0.019	3.26E-03	0.014	9.89E-03	0.043	-	-	21707.51
2	0.33	1.45	0.13	0.59	0.14	0.60	0.012	0.052	4.27E-03	0.019	3.26E-03	0.014	9.89E-03	0.043	-	-	21707.51
5	0.04	0.17	0.03	0.13	1.61E-03	7.04E-03	-	-	4.82E-04	2.11E-03	5.23E-03	0.023	2.57E-03	0.011	-	-	20618.14
6	0.38	1.67	0.22	0.97	0.14	0.63	-	-	7.53E-03	0.033	6.98E-03	0.031	3.15E-03	0.014	-	-	8784.43
7	0.38	1.67	0.22	0.97	0.14	0.63	-	-	7.53E-03	0.033	6.98E-03	0.031	3.15E-03	0.014	-	-	8784.43
8	0.38	1.67	0.22	0.97	0.14	0.63	-	-	7.53E-03	0.033	6.98E-03	0.031	3.15E-03	0.014	-	-	8784.43
9	0.38	1.67	0.22	0.97	0.14	0.63	-	-	7.53E-03	0.033	6.98E-03	0.031	3.15E-03	0.014	-	-	8784.43
10	0.38	1.67	0.22	0.97	0.14	0.63	-	-	7.53E-03	0.033	6.98E-03	0.031	3.15E-03	0.014	-	-	8784.43
3a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3b	0.022	0.09	1.26E-03	5.50E-03	1.10E-03	4.80E-03	2.10E-03	9.200E-03	1.12E-03	4.90E-03	1.53E-03	6.70E-03	1.99E-03	8.700E-03	3.17E-03	0.014	1538.65
T-007	*	0.10	-	-	-	-	*	7.66E-04	*	0.058	*	0.017	*	1.95E-03	*	5.44E-04	-
T-008 **T-009** **T-011** **T-012**	*	0.79	-	-	-	-	*	0.67	*	0.086	*	0.031	*	2.72E-03	*	1.44E-03	-
F-001	*	4.47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LOAD	*	0.45	-	-	-	-	*	0.39	*	0.043	*	7.00E-04	*	1.20E-03	*	1.30E-03	-
ECD	0.16	0.70	-	-	-	-	0.018	0.08	0.08	0.37	0.05	0.23	0.05	0.23	-	-	87.73
Flare (Process)	0.79	0.28	-	-	-	-	0.56	0.20	0.075	0.03	0.087	0.031	0.058	0.021	7.50E-03	2.70E-03	5366.81
Flare (SSM)	7.96E-03	2.07E-04	-	-	-	-	7.96E-03	2.07E-04	-	-	-	-	-	-	-	-	6971.17
VENT (SSM)	*	0.69	-	-	-	-	*	0.49	*	0.11	*	0.075	*	0.010	-	5.23E-03	1754.57
MALF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**3.58**	**18.98**	**1.40**	**6.14**	**0.99**	**4.35**	**0.61**	**1.95**	**0.21**	**0.90**	**0.19**	**0.59**	**0.15**	**0.44**	**0.011**	**0.025**	**123674.27**

Unit: 1, 2
Description: Solar Centaur T-4702 NG turbines

Fuel consumption	35.3	Mscf/hr	As permitted
Fuel heat value	1200	Btu/scf	Nominal LHV of fuel gas
Heat rate	42.3	MMbtu/hr	Fuel consumption * fuel heat value / 1000
Annual fuel usage	309.0	MMscf/yr	8760 hrs/yr operation

Uncontrolled Emissions

NO_x	CO	VOC	SO_2 [1]	PM[2]	H_2S[1]		
				0.015		lb/MMBtu	Solar Turbines Inc Product Information Letter 171 Particulates Emission Rate
15.8	1.5					lbs/hr	Unit 1: 2010 Stack Test Report Maximum Recordable Rate
-	-					lbs/hr	Unit 2: 2010 Stack Test Report Maximum Recordable Rate
15.2	0.8					lbs/hr	Unit 1: 2011 Stack Test Report Maximum Recordable Rate
15.4	1.0					lbs/hr	Unit 2: 2011 Stack Test Report Maximum Recordable Rate
16.4	1.2					lbs/hr	Unit 1: 2012 Stack Test Report Maximum Recordable Rate
15.2	1.0					lbs/hr	Unit 2: 2012 Stack Test Report Maximum Recordable Rate
17.57	2.14					lbs/hr	Unit 1: 2014 Stack Test Report Maximum Recordable Rate
18.85	1.87					lbs/hr	Unit 2: 2014 Stack Test Report Maximum Recordable Rate
15.63	1.87					lbs/hr	Unit 1: 2015 Stack Test Report Maximum Recordable Rate
16.62	1.27					lbs/hr	Unit 2: 2015 Stack Test Report Maximum Recordable Rate
7.85	0.90					lbs/hr	Unit 1: 2016 Stack Test Report Maximum Recordable Rate
9.75	1.21					lbs/hr	Unit 2: 2016 Stack Test Report Maximum Recordable Rate
18.9	2.1					lbs/hr	Maximum Recordable Rate
10%	20%						Safety Factor
20.7	**2.6**					lbs/hr	Emission Rate with Safety Factor
27.0	7.4	0.77				lb/hr	As permitted
27.0	**7.4**	**0.77**	**0.50**	**0.63**	**2.5E-04**	lb/hr	Hourly emission rate
90.8	**11.2**	**3.4**	**2.2**	**2.8**	**1.1E-03**	tpy	Annual emission rate (8760 hrs/yr)

Total HAP[3]	n-Hexane[3]	HCHO[3]	Acetaldehyde[3]	Benzene[3]	Toluene[3]	Xylenes[3]		
0.33	**0.012**	**0.13**	**0.14**	**0.0043**	**0.0033**	**0.0099**	lb/hr	Hourly emission rate
1.4	**0.052**	**0.59**	**0.60**	**0.019**	**0.014**	**0.043**	tpy	Annual emission rate (8760 hrs/yr)

[1] SO_2 emissions based on fuel sulfur content of 5 gr S/100 scf, or 0.00714 lb S/Mscf

lb/hr SO_2 = 5gr S/100scf * Fuel consumption (Mscf/hr) * 1lb/7000gr * 1000scf/Mscf * 64 lb SO_2/32 lb S

H_2S emissions based on 0.25 g/100 scf H_2S in fuel

lb/hr H_2S = 0.25 gr H_2S/100 scf * Fuel consumption (Mscf/hr) * 1000scf/Mscf * 1 lb/7000 gr * (1 - Comb. Eff [98%])

[2] Assumed TSP = PM_{10} = $PM_{2.5}$

[3] HAP emissions calculated from GRI-HAPCalc v3.01.

GHG Calculations

CO_2[4]	N_2O[4]	CH_4[4]	CO_2e[4]		
53.06	0.0001	0.001		kg/MMBtu	40 CFR 98 Subpart C Tables C-1 and C-2
1	298	25		GWP	40 CFR 98 Table A-1
21685.1	0.041	0.41		tpy	
21685.1	**12.2**	**10.2**	**21707.5**	tpy CO_2e	

[4] N_2O, CH_4, and CO_2 tpy Emission Rate= EF* Fuel Usage * Fuel Heat Value * 2.20462 lb/1 kg * 1 ton/2000 lb

CO_2e tpy Emission Rate = CO_2 Emission Rate + N_2O Emission Rate*GWP Factor +CH_4 Emission Rate*GWP Factor

Unit(s): 6-10
Description: Five (5) CAT G3608 4-Stroke Lean Burn Compressor Engines

Horsepower	2,500	bhp	
Fuel Consumption Rate	6,848	Btu/hp-hr	
Fuel consumption	18.8	Mscf/hr	
Fuel heat value	912	Btu/scf	Nominal LHV of fuel gas
Annual fuel usage	164.5	MMscf/yr	8760 hrs/yr operation

Uncontrolled Emissions

NO_x	CO	VOC	SO_2 [1]	PM[3]	H_2S[2]		
				0.0100	-	lb/MMBtu	AP-42 Table 3.2-2
0.300	2.5	0.270	-	-	-	g/bhp-hr	Vendor Emission Factors
1.65	**13.78**	**1.49**	**0.27**	**0.17**	**1.34E-4**	**lb/hr**	Hourly emission rate
7.24	**60.35**	**6.52**	**1.17**	**0.75**	**5.88E-4**	**tpy**	Annual emission rate (8760 hrs/yr)

Total HAP[4]	n-Hexane[4]	HCHO[4]	Acetaldehyde[4]	Benzene[4]	Toluene[4]	Xylenes[4]		
	1.11E-03		**8.36E-03**	**4.40E-04**	**4.08E-04**	**1.84E-04**	lb/MMBtu	AP-42 Table 3.2-2
-		0.16	-	-	-	-	g/bhp-hr	Vendor Emission Factors
1.04	**0.02**	0.88	**0.14**	**0.01**	**0.01**	**3.15E-3**	lb/hr	Hourly emission rate
4.57	**0.08**	**3.86**	**0.63**	**0.03**	**0.03**	**0.01**	tpy	Annual emission rate (8760 hrs/yr)

Controlled Emissions

NO_x	CO	VOC	SO_2 [1]	PM[3]	H_2S[2]		
				0.0100	-	lb/MMBtu	AP-42 Table 3.2-2
0.300	0.6	0.700	-	-	-	g/bhp-hr	Vendor Emission Factors
1.65	**3.31**	**3.86**	**0.27**	**0.17**	**1.34E-4**	**lb/hr**	Hourly emission rate
7.24	**14.48**	**16.90**	**1.17**	**0.75**	**5.88E-4**	**tpy**	Annual emission rate (8760 hrs/yr)

Total HAP[4]	n-Hexane[4]	HCHO[4]	Acetaldehyde[4]	Benzene[4]	Toluene[4]	Xylenes[4]		
	1.11E-03		**8.36E-03**	**4.40E-04**	**4.08E-04**	**1.84E-04**	lb/MMBtu	AP-42 Table 3.2-2
-		0.04	-	-	-	-	g/bhp-hr	Vendor Emission Factors
0.38	**0.02**	0.22	**0.14**	**0.01**	**0.01**	**3.15E-3**	lb/hr	Hourly emission rate
1.67	**0.08**	**0.97**	**0.63**	**0.03**	**0.03**	**0.01**	tpy	Annual emission rate (8760 hrs/yr)

[1] SO_2 emissions based on fuel sulfur content of 5 gr S/100 scf, or 0.00714 lb S/Mscf

lb/hr SO_2 = 5gr S/100scf * Fuel consumption (Mscf/hr) * 1lb/7000gr * 1000scf/Mscf * 64 lb SO_2/32 lb S

[2] H_2S emissions based on 0.25 g/100 scf H_2S in fuel

lb/hr H_2S = 0.25 gr H_2S/100 scf * Fuel consumption (Mscf/hr) * 1000scf/Mscf * 1 lb/7000 gr * (1 - Comb. Eff [98%])

[3] Assumed TSP = PM_{10} = $PM_{2.5}$

[4] HAP emissions calculated using emission factors from AP-42 Table 3.1-3.

GHG Calculations

CO_2[4]	N_2O[4]	CH_4[4]	CO_2e[4]		
53.06	0.0001	0.001		kg/MMBtu	40 CFR 98 Subpart C Tables C-1 and C-2
1	298	25		GWP	40 CFR 98 Table A-1
8,775.37	0.02	0.17	8,775.55	tpy	
8,775.37	**4.93**	**4.13**	**8,784.43**	tpy CO_2e	

[4] N_2O, CH_4, and CO_2 tpy Emission Rate= EF* Fuel Usage * Fuel Heat Value * 2.20462 lb/1 kg * 1 ton/2000 lb

CO_2e tpy Emission Rate = CO_2 Emission Rate + N_2O Emission Rate*GWP Factor +CH_4 Emission Rate*GWP Factor

Unit: 3a
Description: Gas Tech dehydrator with condenser & BTEX buster
3a Glycol Dehydrator(Still Vent and FlashTank)

Control Equipment: ECD (Unit ECD) to control dehydrator regenerator. ECD and reboiler (Unit 3b) to control flash tank emissions
Manufacturer: Gas Tech

Uncontrolled Emissions - Glycol Dehydrator Venting to Atmosphere

	NO_x	CO	VOC	SO_2	H_2S	PM		
Regenerator-unit 3a	-	-	56.35	-	0.037	-	lb/hr	GRI-GLYCalc (uncontrolled regenerator emissions)
Flash tank-unit 3a	-	-	17.30	-	3.60E-03	-	lb/hr	GRI-GLYCalc (flash tank off gas)
Total	**-**	**-**	**73.65**	**-**	**0.041**	**-**	**lb/hr**	
	-	**-**	**322.57**	**-**	**0.18**	**-**	**tpy**	

	n-Hexane	Benzene	Toluene	Xylenes	Total HAPs		
	1.14	7.30	8.14	2.53	19.1	lb/hr	GRI-GLYCalc (Regenerator - 3a)
	0.21	0.038	0.027	0.0030	0.28	lb/hr	GRI-GLYCalc (Flash tank-3a "off gas")
	1.4	**7.3**	**8.2**	**2.5**	**19.4**	**lb/hr**	
	5.9	**32.1**	**35.8**	**11.1**	**84.9**	**tpy**	

Controlled Emissions - Glycol Dehydrator

	NO_x	CO	VOC	SO_2[1]	H_2S[1]	PM		
Regenerator-unit 3a	BTEX still vent emissions are sent to the ECD for combustion. Emissions are represented at ECD.						lb/hr	GRI-GLYCalc (uncontrolled regenerator emissions)
Flash tank-unit 3a	Flash tank vapors are sent to the ECD for combustion, or to the Reboiler (Unit 3b) for fuel. Emissions are represented at those units.						lb/hr	GRI-GLYCalc (flash tank off gas)
Total	**-**	**-**	**-**	**-**	**-**	**-**	**lb/hr**	
	-	**-**	**-**	**-**	**-**	**-**	**tpy**	

	n-Hexane	Benzene	Toluene	Xylenes	Total HAPs		
Regenerator-unit 3a	BTEX still vent emissions are sent to the ECD for combustion. Emissions are represented at ECD.					lb/hr	GRI-GLYCalc (Regenerator - 3a)
Flash tank-unit 3a	Flash tank vapors are sent to the ECD for combustion, or to the Reboiler (Unit 3b) for fuel. Emissions are represented at those units.					lb/hr	GRI-GLYCalc (Flash tank-3a "off gas")
Total	**-**	**-**	**-**	**-**	**-**	**lb/hr**	
	-	**-**	**-**	**-**	**-**	**tpy**	

Unit: 3b
Description: Gas Tech dehydrator reboiler
3b 3 MMBtu/hr Glycol Dehydrator Reboiler

Control Equipment: Controls flash tank vapors from dehy (Unit 3a), along with the ECD (Unit ECD)
Manufacturer: Gas Tech

Reboiler Emissions

Reboiler Fuel Usage

Fuel Consumption	3.0	MMBtu/hr	Input heat rate
Throughput	200	MMscf/d	Throughput
Fuel heat value	1200	Btu/scf	Nominal LHV of fuel gas
Hourly fuel usage	2.50	Mscf/hr	Fuel usage
Annual fuel usage	21.90	MMscf/yr	Annual usage
Operating hours	8760	hr/yr	

Flash Tank Usage

	759	scf/hr	GRI-GLYCalc - flash tank off gas stream (Sent to Fuel Inlet)
Flow to Reboiler	100%		Percentage sent to the reboiler (as fuel)
	0.76	Mscf/hr	Total fuel routed to Reboiler (flash tank off gas not combusted by ECD)

	NO_x	CO	VOC	SO_2[1]	H_2S[1]	PM		
Reboiler-unit 3b	100	84	5.5			7.6	lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG
	117.6	98.8	6.5			8.9	lb/MMscf	Adjusted emission factor: EF X (Fuel Heat Value/1,020 Btu/scf)
				0.036	8.93E-04		lb/hr	
Total	**0.29**	**0.25**	**0.016**	**0.036**	**8.93E-04**	**0.022**	**lb/hr**	lb/MMscf * (Mscf/hr / 1000 Mscf/1 MMscf)
	1.29	**1.08**	**0.07**	**0.16**	**3.91E-03**	**0.10**	**tpy**	

	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	HCOH	Acetaldehyde	Total HAPs		
	0.0092	0.0049	0.0067	0.0139	0.0087	0.0055	0.0048	0.0946	tpy	GRI-HAPCalc (Reboiler-3b)
Total	**2.10E-03**	**1.12E-03**	**1.53E-03**	**3.17E-03**	**1.99E-03**	**1.26E-03**	**1.10E-03**	**0.022**	**lb/hr**	
	9.20E-03	**4.90E-03**	**6.70E-03**	**0.014**	**8.70E-03**	**5.50E-03**	**4.80E-03**	**0.095**	**tpy**	

GHG Calculations

CO_2[3]	N_2O[3]	CH_4[3]	CO_2e[3]		
53.06	0.0001	0.001		kg/MMBtu	40 CFR 98 Subpart C Tables C-1 and C-2
1	298	25		GWP	40 CFR 98 Table A-1
1537.07	*0.0029*	*0.029*		tpy	
		19.8			GRI-GLYCalc (flash tank off gas)
		-			GRI-GLYCalc (flash tank off gas, Routed to Fuel)
1537.1	**0.86**	**0.72**	**1538.7**	tpy CO_2e	

[3] N_2O, CH_4, and CO_2 tpy Emission Rate= EF* Fuel Usage * Fuel Heat Value * 2.20462 lb/1 kg * 1 ton/2000 lb
CO_2e tpy Emission Rate = CO_2 Emission Rate + N_2O Emission Rate*GWP Factor +CH_4 Emission Rate*GWP Factor

Exhaust Parameters

Heat Rate:	3000	MBtu/hr	
Exhaust temp (Tstk):	800	°F	
Site Elevation:	3060	ft MSL	
Ambient pressure (Pstk):	26.73	in. Hg	Calculated based on elevation
F factor:	10610	wscf/MMBtu	40 CFR 60 Appx A Method 19
Exhaust flow	530.5	scfm	Calculated from F factor and heat rate
Exhaust flow:	1438.6	acfm	scfm * (Pstd/Pstk)*(Tstk/Tstd), Pstd = 29.92 "Hg, Tstd = 520 °R
Stack diameter:	1.33	ft	Engineering estimate
Stack height:	35	ft	Engineering estimate
Exhaust velocity:	17.3	ft/sec	Exhaust flow ÷ stack area

Site Data

Site Elevation	3060	ft MSL	
Standard Pressure	29.92	in Hg	
Pressure at Elevation	26.75	in Hg	Hess, Introduction to Theoretical Meteorology, eqn. 6.8
Standard Temperature	528	R	

Slop Water Tank Emissions

Unit: T-007
Description: Slop Water Tank from 3-Phase Separator and Dehy

Tank Throughput

226	bbl/day	bbl/yr / 365 day/yr
82,381	bbl/yr	Maximum Throughput
3,459,993	gal/yr	bbl/yr * 42 gal/bbl

Promax Emissions Report
Annual Emissions

Components	Working Losses (ton/yr)	Breathing Losses (ton/yr)	Flashing Losses (ton/yr)	Total Losses (ton/yr)[1]
Hydrogen Sulfide	--	--	--	--
Nitrogen	4.50E-6	1.44E-6	0.01	0.01
Carbon Dioxide	0.02	0.01	0.58	0.61
Methane	1.16E-3	3.72E-4	1.03	1.03
Ethane	7.96E-4	2.55E-4	0.62	0.62
Propane	6.92E-5	2.22E-5	0.31	0.31
i-Butane	1.66E-6	5.32E-7	0.03	0.03
n-Butane	4.30E-6	1.38E-6	0.09	0.09
2,2-Dimethylpropane	2.39E-9	7.66E-10	1.50E-4	1.50E-4
i-Pentane	1.64E-7	5.25E-8	0.01	0.01
n-Pentane	2.06E-8	6.59E-9	0.01	0.01
2,2-Dimethylbutane	9.32E-11	2.99E-11	4.09E-5	4.09E-5
Cyclopentane	--	--	--	--
2,3-Dimethylbutane	2.41E-9	7.74E-10	5.66E-4	5.66E-4
2-Methylpentane	2.12E-9	6.80E-10	1.01E-3	1.01E-3
3-Methylpentane	5.41E-9	1.73E-9	1.20E-3	1.20E-3
n-Hexane	5.71E-10	1.83E-10	7.66E-4	7.66E-4
Methylcyclopentane	5.26E-9	1.69E-9	9.57E-4	9.57E-4
Benzene	1.84E-5	5.91E-6	0.06	0.06
Cyclohexane	1.33E-8	4.27E-9	1.49E-3	1.49E-3
2-Methylhexane	3.12E-11	9.99E-12	7.40E-5	7.40E-5
3-Methylhexane	--	--	--	--
2,2,4-Trimethylpentane	2.97E-11	9.52E-12	1.12E-4	1.12E-4
n-Heptane	2.48E-11	7.95E-12	1.56E-4	1.56E-4
Methylcyclohexane	6.88E-10	2.20E-10	3.85E-4	3.85E-4
Toluene	1.16E-6	3.71E-7	0.02	0.02
n-Octane	7.42E-14	2.38E-14	3.98E-6	3.98E-6
Ethylbenzene	1.09E-8	3.50E-9	5.44E-4	5.44E-4
m-Xylene	1.15E-9	3.70E-10	1.00E-4	1.00E-4
p-Xylene	--	--	--	--
o-Xylene	3.80E-8	1.22E-8	1.85E-3	1.85E-3
n-Nonane	2.71E-15	8.67E-16	5.59E-7	5.59E-7
n-Decane	6.01E-18	1.93E-18	1.51E-8	1.51E-8
n-Undecane	--	--	--	--
Saftey Factor	**25%**	**25%**	**25%**	**--**
Total VOC	**1.19E-4**	**3.81E-5**	**0.67**	**0.67**
Total HAP	**2.46E-5**	**7.87E-6**	**0.10**	**0.10**

Slop Water Loading Emissions

Unit: LOAD_SLOP
Description: Emissions from Truck Loading of Slop Water

Emission Calculations

Loading from T-006

12,000	Throughput (bbl/yr)	Expected condensate throughput
504,000	Throughput (gal/yr)	bbl/d * 42 gal/bbl * 365 d/yr
10.3	tpy VOC	GRI-HAPCalc 3.01
1%	Based on 1% Crude Oil[1]	
0.10	**tpy VOC**	

Total HAPs	n-Hexane	Benzene	Toluene	e-Benzene	Xylenes		
0.5	0.41	0.05	0.02	0.0007	0.0012	tpy	GRI-HAPCalc3.01
1%	1%	1%	1%	1%	1%	%	Based on 1% Crude Oil[1]
4.71E-03	**4.08E-03**	**4.56E-04**	**1.51E-04**	**7.00E-06**	**1.20E-05**	tpy	

[1] Assume slop water contains 1% hydrocarbons per TCEQ guidance.

Loading from T-007

4.81E-5	Calculated VOC Emissions (tpy)	Calculated using ProMax
25%	Safety Factor	
6.01E-5	**tpy VOC**	

Total HAPs	n-Hexane	Benzene	Toluene	e-Benzene	Xylenes		
9.94E-06	2.89E-10	9.33E-06	5.86E-07	5.52E-09	1.98E-08	tpy	Calculated using ProMax
25%	25%	25%	25%	25%	25%	%	Safety Factor
1.24E-05	**3.61E-10**	**1.17E-05**	**7.32E-07**	**6.90E-09**	**2.48E-08**	tpy	

Total Emissions

0.10 **tpy VOC**

Total HAPs	n-Hexane	Benzene	Toluene	e-Benzene	Xylenes	
4.72E-03	**4.08E-03**	**4.68E-04**	**1.52E-04**	**7.01E-06**	**1.20E-05**	**tpy**

Unit:	ECD
Description:	BTEX Combustor
DRE:	98%

Pilot Emissions

MW of fuel gas	16.04	lb/lb-mol	Estimated, nominal for natural gas
Pilot fuel flow	100	scf/hr	Engineering estimate
Fuel heating value	1200	Btu/scf	Estimated, nominal for LHV natural gas
Heat rate	0.12	MMBtu/hr	Btu/scf * scf/hr / 1,000,000
Annual fuel usage	0.88	MMscf/yr	scf/hr * 8760 hrs/yr / 1,000,000

Flash Tank & Still Vent Emissions

Still Vent Flow	362	scf/hr	GRI-GLYcalc Controlled Regenerator Stream
Still Vent Heating Value	2356.59	Btu/scf	Estimated using weighted heat values of components
Flash Tank Flow	759	scf/hr	GRI-GLYcalc Flash Tank Off Gas Stream
Percentage Sent to ECD	50%		Percentage sent to ECD for combustion. Remaining vapors are sent to reboiler as fuel.
Flash Tank Flow to ECD	380	scf/hr	
Flash Tank Heating Value	1447.76	Btu/scf	Estimated using weighted heat values of components
Total Flow	742	scf/hr	BTEX Still Vent + Flash Tank Vapors sent to ECD
Total Heating Value	1891.45	Btu/scf	Weighted average of BTEX Still Vent and Flash Tank streams
Total Heating Rate	1.40	MMBtu/hr	Btu/scf * scf/hr / 1,000,000
Annual fuel usage	6.50	MMscf/yr	scf/hr * 8760 hrs/yr / 1,000,000

Emission Rates

	NO_x	CO	VOC[1]	H_2S[2]	SO_2[3]	PM	HAPs[1]		
Emission Factors	100	84				7.6		lb/MMscf	AP-42 Tables 1.4-1 & 2
	117.65	98.82				8.94		lb/MMscf	Adjusted emission factor (Pilot): EF X (Fuel Heat Value/1,020 Btu/scf)
	185.44	155.77				14.09		lb/MMscf	Adjusted emission factor (Still Vent & Flash Tank Vapors): EF X (Fuel Heat Value/1,020 Btu/scf)
			34.59	0.035			7.82	lb/hr	Still Vent: GRI-GLYCalc Controlled Regenerator Emisisons Stream
			8.65	1.80E-03			0.14	lb/hr	Flash Tank: GRI-GLYcalc Flash Tank Off Gas Stream
				3.57E-05				lb H_2S/hr	Pilot Gas: Sweet natural gas fuel, 0.25 gr H_2S/100scf
					0.0014			lb SO_2/hr	Pilot Gas: Sweet natural gas fuel, 5 gr S/100scf
Pilot	0.012	9.88E-03	-	3.50E-05	6.588E-05	-	-	lb/hr	98% combustion H_2S; 100% H_2S -> SO_2
	0.052	0.043	-	1.53E-04	2.89E-04	-	-	tpy	
Glycol Regenerator Still Vent & Flash Tank	0.138	0.116	0.86	7.26E-04	0.067	5.10E-03	0.16	lb/hr	98% combustion H_2S; 100% H_2S -> SO_2
	0.60	0.51	3.79	3.18E-03	0.29	0.022	0.70	tpy	
Total (Pilot + Gases)	**0.15**	**0.125**	**0.86**	**7.61E-04**	**0.067**	**5.10E-03**	**0.16**	lb/hr	
	0.65	**0.55**	**3.79**	**3.33E-03**	**0.29**	**0.022**	**0.70**	tpy	lb/hr * (8760 hr/yr operation)/ 2000 lb/ton

n-Hexane	Benzene	Toluene	Xylenes	Total HAPs		
0.80	4.16	2.59	0.28	7.82	lb/hr	Still Vent: GRI-GLYCalc Controlled Regenerator Emisisons Stream
0.11	0.04	0.03	3.00E-03	0.17	lb/hr	Flash Tank: GRI-GLYcalc Flash Tank Off Gas Stream
0.018	**0.08**	**0.05**	**0.006**	**0.16**	lb/hr	
0.08	**0.37**	**0.23**	**0.02**	**0.70**	tpy	

[1] Pilot fuel is purchased natural gas, comprised mainly of methane. VOC and HAP emissions from pilot only are assumed to be negligible.

[2] Pilot H_2S emissions based on 0.25 g/100 scf H_2S in fuel, 98% combustion.

0.25 gr H_2S/100 scf * fuel scf/hr * 1 lb/7000 gr = lb/hr H_2S (prior to combustion and conversion to SO_2)

[3] SO_2 emissions based on sulfur content of 5 g/100 scf S in fuel and 100% combustion of H_2S to SO_2.

5 gr S/100 scf * fuel scf/hr * 1 lb/7000 gr * 64 lb SO_2/32 lb S = lb/hr SO_2

GHG Calculations

CO_2[4]	N_2O[4]	CH_4[4]	CO_2e[4]		
53.06	0.0001	0.001		kg/MMBtu	40 CFR 98 Subpart C Tables C-1 and C-2
1	298	25		GWP	40 CFR 98 Table A-1
61.5	0.0001	0.001		tpy	
		9.04		tpy	Still Vent: GRI-GLYCalc Controlled Regenerator Emisisons Stream
		43.34		tpy	Flash Tank: GRI-GLYcalc Flash Tank Off Gas Stream
-	-	*1.05*		tpy	Controlled emissions with 98% Combustion Control
61.5	**0.03**	**26.22**	**87.7**	tpy CO_2e	

[4] N_2O, CH_4, and CO_2 tpy Emission Rate= EF* Fuel Usage * Fuel Heat Value * 2.20462 lb/1 kg * 1 ton/2000 lb
CO_2e tpy Emission Rate = CO_2 Emission Rate + N_2O Emission Rate*GWP Factor +CH_4 Emission Rate*GWP Factor

Exhaust Parameters

Heat Rate:	1522.51	MBtu/hr	Design Specification
Exhaust temp (Tstk):	650	°F	Eng Estimate
Site Elevation:	3060	ft MSL	
Ambient pressure (Pstk):	26.73	in. Hg	Calculated based on elevation
F factor:	10610	wscf/MMBtu	40 CFR 60 Appx A Method 19
Exhaust flow	269.2	scfm	Calculated from F factor and heat rate
Exhaust flow:	643.2	acfm	scfm * (Pstd/Pstk)*(Tstk/Tstd), Pstd = 29.92 "Hg, Tstd = 520 °R
Stack diameter:	4.5	ft	Spec Sheet
Stack height:	11.99	ft	Spec Sheet
Exhaust velocity:	0.67	ft/sec	Exhaust flow ÷ stack area

Site Data

Site Elevation	3060	ft MSL	
Standard Pressure	29.92	in Hg	
Pressure at Elevation	26.75	in Hg	Hess, Introduction to Theoretical Meteorology, eqn. 6.8
Standard Temperature	528	R	

Flare Alternative Operating Scenario

Unit: Flare (Process)
Description: Combustion of vapors from condensate stabilizer - alternative operating scenario

Pilot Emissions

MW of fuel gas	16.04	lb/lb-mol	Estimated, nominal for natural gas
Pilot fuel flow	100	scf/hr	Engineering estimate
Fuel heating value	1200	Btu/scf	Estimated, nominal for LHV natural gas
Heat rate	0.12	MMBtu/hr	Btu/scf * scf/hr / 1,000,000
Annual fuel usage	0.88	MMscf/yr	scf/hr * 8760 hrs/yr / 1,000,000

Pilot Emission Calculations

NOx	CO	VOC[1]	H_2S[2]	SO_2[3]	HAPs[1]		
0.0680	0.3100					lb/MMBtu	AP-42 Tables 13.5-1 & 13.5-2 (02/18)
103%						%	Safety Factor[4]
			3.57E-05			lb H_2S/hr	Sweet natural gas fuel, 0.25 gr H_2S/100scf
				0.0014		lb SO_2/hr	Sweet natural gas fuel, 5 gr S/100scf
			7.1E-07	6.6E-05		lb/hr	98% combustion H_2S; 100% H_2S -> SO_2
0.0166	**0.037**	**-**	**7.1E-07**	**0.0015**	**-**	lb/hr	
0.0181	**0.041**	**-**	**7.8E-07**	**0.0016**	**-**	tpy	lb/hr * (2190 hr/yr operation)/ 2000 lb/ton
0.073	0.163	-	3.1E-06	0.0065	-	tpy	lb/hr * (8760 hr/yr operation)/ 2000 lb/ton

[1] Fuel is purchased natural gas, comprised mainly of methane. VOC and HAP emissions from pilot only are assumed to be negligible.
[2] H_2S emissions based on 0.25 g/100 scf H_2S in fuel, 98% combustion.
0.25 gr H_2S/100 scf * fuel scf/hr * 1 lb/7000 gr = lb/hr H_2S (prior to combustion and conversion to SO_2)
[3] SO_2 emissions based on sulfur content of 5 g/100 scf S in fuel and 100% combustion of H_2S to SO_2.
5 gr S/100 scf * fuel scf/hr * 1 lb/7000 gr * 64 lb SO_2/32 lb S = lb/hr SO_2
[4] TCEQ EF factors were removed from calculation; SF used to maintain emissions as currently permitted.

Source: Armstron Gas Lab Analysis No. 211306

Component	MW	vol/mol % Gas Analysis	Dry vol/mol%	MW * dry vol %	Spec. Volume (scf/lb)	Flow (scf/hr)	Loading (lb/hr)	Annual Flow (scf/yr)	Annual Loading (lb/yr)
Water	18.02	0.000%							
Nitrogen	28.01	0.412%	0.414%	0.116	13.547	259	19.102	186,314.1	13,753.2
CO2	44.01	1.020%	1.025%	0.451	8.623	641	74.298	461,284.7	53,494.7
H2S	34.08	0.050%	0.050%	0.017	11.136	31	2.821	22,616.4	2,030.9
Methane	16.04	45.293%	45.527%	7.304	23.65	28455	1203.152	20,487,273.4	866,269.5
Ethane	30.07	15.926%	16.008%	4.814	12.62	10005	792.795	7,203,649.3	570,812.2
Propane	44.10	22.771%	22.889%	10.093	8.606	14305	1662.258	10,299,883.7	1,196,825.9
i-Butane	58.12	4.100%	4.121%	2.395	6.529	2576	394.501	1,854,502.0	284,040.7
n-Butane	58.12	7.034%	7.071%	4.110	6.529	4419	676.846	3,181,769.7	487,328.8
i-Pentane	72.15	1.333%	1.340%	0.967	5.26	838	159.256	603,134.9	114,664.4
n-Pentane	72.15	1.120%	1.126%	0.812	5.26	703	133.745	506,517.5	96,296.1
Cyclopentane	70.14	0.000%	0.000%	0.000	5.411	0	0.000	0.0	0.0
n-Hexane	86.18	0.196%	0.197%	0.170	4.404	123	**28.006**	88,804.9	**20,164.6**
Cyclohexane	84.16	0.000%	0.000%	0.000	4.509	0	0.000	0.0	0.0
Other Hexanes	84.16	0.000%	0.000%	0.000	4.509	0	0.000	0.0	0.0
Heptanes	100.20	0.059%	0.059%	0.059	3.787	37	9.794	26,705.8	7,052.0
Methylcyclohexane	98.19	0.000%	0.000%	0.000	3.865	0	0.000	0.0	0.0
2,2,4-Trimethylpentane	114.23	0.000%	0.000%	0.000	3.322	0	**0.000**	0.0	**0.0**
Benzene	78.11	0.029%	0.029%	0.023	4.858	18	**3.772**	13,192.0	**2,715.5**
Toluene	92.14	0.028%	0.029%	0.026	4.119	18	**4.340**	12,870.3	**3,124.6**
Ethylbenzene	106.17	0.002%	0.002%	0.002	3.574	1	**0.375**	965.3	**270.1**
Xylenes	106.17	0.016%	0.016%	0.017	3.574	10	**2.876**	7,400.4	**2,070.6**
C8+ heavies	114.23	0.095%	0.096%	0.109	3.322	60	18.026	43,115.4	12,978.8
Total		99.5%	100.0%	20.83		62500	5186.0	45,000,000.0	2,227,532.2
Dry total		99.5%							

*Note: * Although the RVP 11 gas simulation did not account and H_2S it was determined that a 0.05% wet/mol % will be used to overcome gas composition fluctuations.*

Uncontrolled VOC Emissions	**36.98%**	**3,093.8**	**lb/hr**	**2,227,532.2**	**lb/yr**
Uncontrolled HAP Emissions		**39.4**	**lb/hr**	**28,345.4**	**lb/yr**

Gas to Flare	62,500	scf/hr	maximum expected flow of 1.5MMscf/day; assumed 24 hour operation
	45,000,000	scf/yr	maximum expected annual flow
	1,828.35	Btu/scf	
	114.27	MMbtu/hr	
	82,275.84	Mmbtu/yr	
	20.83	MW	
Pilot Gas to Flare	100.00	scf/hr	
	16.04	MW	
Totals all streams	62,600.00	scf/hr	
	20.82	MW	volume-weighted average

	NOx	CO	VOC	H_2S	SO_2	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	HAPs		
	0.0680	0.3100										lb/MMBtu	AP-42 Table 13.5-1
		77%										%	Safety Factor
					0.10							lb/hr	98% combustion H_2S; 100% H_2S -> SO_2
Gas to Flare Stack	**7.8**	**62.8**										**lb/hr**	lb/MMBtu * MMBtu/hr
			61.9	**0.056**	**0.10**	**0.56**	**0.075**	**0.087**	**0.008**	**0.058**	**0.79**	**lb/hr**	98% destruction of calculated content
Gas to Flare Stack -	**2.8**	**22.6**		**-**	**-**							**tpy**	lb/MMBtu * MMBtu/yr/2000
annual emissions			**22.3**	**0.020**	**0.46**	**0.20**	**0.027**	**0.031**	**0.003**	**0.021**	**0.28**	**tpy**	98% destruction of calculated content

[1] TCEQ EF factors were removed from calculation; SF used to maintain emissions as currently permitted.

Flare Emission Totals (Pilot + Inlet Gases)

NOx	CO	VOC	H_2S	SO_2	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	HAPs	
7.8	**62.8**	**61.9**	**5.6E-02**	**1.1E-01**	**0.56**	**0.075**	**0.087**	**0.0075**	**0.058**	**0.79**	**lb/hr**
2.8	**22.6**	**22.3**	**2.0E-02**	**4.6E-01**	**0.20**	**0.027**	**0.031**	**0.0027**	**0.021**	**0.28**	**tpy**

Stack Parameters

1000	°C	Exhaust temperature	Per NMAQB guidelines
20	m/sec	Exhaust velocity	Per NMAQB guidelines
65	ft	Flare height	Engineering design

Pilot only

8,400	cal/sec	Heat release (q)	MMBtu/hr * 10^6 * 252 cal/Btu ÷ 3600 sec/hr
6,785		q_n	$q_n = q(1-0.048(MW)^{1/2})$
0.08	m	Effective stack diameter (D)	$D = (10^{-6}q_n)^{1/2}$

Pilot and Normal Operation

114.4	MMBtu/hr	Total heat input	Sum of fuel and flare gas heating values
20.82	g/mol	Total mean MW	Volume weighted average of gas MWs
8,007,440	cal/sec	Heat release (q)	MMBtu/hr * 10^6 * 252 cal/Btu ÷ 3600 sec/hr
6,253,560		q_n	$q_n = q(1-0.048(MW)^{1/2})$
2.501	m	Effective stack diameter (D)	$D = (10^{-6}q_n)^{1/2}$

Flare GHG Emissions

§98.233(n) Flare stack GHG emissions.

flared Amine vent gas & Assist Gas

Step 1. Calculate contribution of un-combusted CH_4 emissions

$E_{a,CH4}$ (un-combusted) = V_a * (1- η)* X_{CH4} *(Equation W-39B)*

where:

$E_{a,CH4}$ = contribution of annual un-combusted CH_4 emissions from regenerator in cubic feet under actual conditions.

V_a = volume of gas sent to combustion unit during the year (cf)

η = Fraction of gas combusted by a burning flare (or regenerator), default value from Subpart W = 0.98

For gas sent to an unlit flare, η is zero.

	Client Analysis	Pilot NG Composition
X_{CH4} = Mole fraction of CH_4 in gas to the flare =	0.452929	0.9500

Step 2. Calculate contribution of un-combusted CO_2 emissions

$E_{a,CO2}$ = V_a * X_{CO2} *(Equation W-20)*

where:

$E_{a,CO2}$ = contribution of annual un-combusted CO_2 emissions from regenerator in cubic feet under actual conditions.

	Client Analysis	Pilot NG Composition
V_a = volume of gas sent to combustion unit during the year (cf)		
X_{CO2} = Mole fraction of CO_2 in gas to the flare =	0.010198	0.005

Step 3. Calculate contribution of combusted CO_2 emissions

$E_{a,CO2}$ (combusted) = Σ (η * V_a * Y_j * R_j) *(Equation W-21)*

where:

η = Fraction of gas combusted by a burning flare (or regenerator) = 0.98

For gas sent to an unlit flare, η is zero.

V_a = volume of gas sent to combustion unit during the year (cf)

Y_j = mole fraction of gas hydrocarbon constituents j:	Client Analysis	Pilot NG Composition
Constituent j, Methane =	0.452929	0.9500
Constituent j, Ethane =	0.159257	0.0320
Constituent j, Propane =	0.227708	0.0020
Constituent j, Butane =	0.111341	0.00060
Constituent j, Pentanes Plus =	0.028800006	0.015

R_j = number of carbon atoms in the gas hydrocarbon constituent j:	
Constituent j, Methane =	1
Constituent j, Ethane =	2
Constituent j, Propane =	3
Constituent j, Butane =	4
Constituent j, Pentanes Plus =	5

Step 4. Calculate GHG volumetric emissions at standard conditions (scf).

$$E_{s,n} = \frac{E_{a,n} * (459.67 + T_s) * P_a}{(459.67 + T_a) * P_s}$$ *(Equation W-33)*

where:

$E_{s,n}$ = GHG i volumetric emissions at standard temperature and pressure (STP) in cubic feet

$E_{a,n}$ = GHG i volumetric emissions at actual conditions (cf)

T_s = Temperature at standard conditions (F) = 60 F

T_a = Temperature at actual conditions (F) = 76 F (Based on Annual Avg Max Temperature for Hobbs, NM from Western Regional Climate Center)

P_s = Absolute pressure at standard conditions (psia) = 14.7 psia

P_a = Absolute pressure at actual conditions (psia) = 14.7 psia (Assumption)

Constant = 459.67 (temperature conversion from F to R)

Step 5. Calculate annual CH_4 and CO_2 mass emissions (ton).

$Mass_{s,i}$ = $E_{s,i}$ * ρ_i * 0.0011023 *(Equation W-36)*

where:

$Mass_{s,i}$ = GHG i (CO_2, CH_4, or N_2O) mass emissions at standard conditions in tons (tpy)

$E_{s,i}$ = GHG i (CO_2, CH_4, or N_2O) volumetric emissions at standard conditions (cf)

ρ_i = Density of GHG i. Use:

CH_4: 0.0192 kg/ft^3 (at 60F and 14.7 psia)

CO_2: 0.0526 kg/ft^3 (at 60F and 14.7 psia)

Step 6. Calculate annual N_2O emissions from portable or stationary fuel combustion sources under actual conditions (cf) using Equation W-40 .

$Mass_{N2O}$ = 0.0011023 * Fuel * HHV * EF *(Equation W-40)*

where:

$Mass_{N2O}$ = annual N_2O emissions from combustion of a particular type of fuel (tons).

Fuel = mass or volume of the fuel combusted

HHV = high heat value of the fuel

Pilot Gas = 1.200E-03 MMBtu/scf

Inlet Gas = 1.828E-03 MMBtu/scf

EF = 1.00E-04 kg N_2O/MMBtu

10^{-3} = conversion factor from kg to metric tons.

Step 7. Calculate total annual emission from flare by summing Equations W-40, W-19, W-20, and W-21.

Gas Sent to Flare	Gas Sent to Flare (cf/yr)	CH_4 Un-Combusted, $E_{a,CH4}$ (cf)	CO_2 Un-Combusted, $E_{a,CO2}$ (cf)	CO_2 Combusted, $E_{a,CO2}$ (cf)	CH_4 Un-Combusted, $E_{a,CH4}$ (scf)	CO_2 Un-Combusted, $E_{a,CO2}$ (scf)	CO_2 Combusted, $E_{a,CO2}$ (scf)	CH_4 Un-Combusted, $E_{a,CH4}$ (tpy)	CO_2 Un-Combusted, $E_{a,CO2}$ (tpy)	CO_2 Combusted, $E_{a,CO2}$ (tpy)	N_2O Mass Emissions (tpy)	CO2e (tpy)
Inlet Gas	45,000,000	407,636.1	458,910.0	90,137,358.4	395,239.0	444,953.6	87,396,087.5	8.4	25.8	5,067.3	0.0091	5,304.9
Pilot Gas	876,000	16,644.0	4,380.0	943,812.9	16,137.8	4,246.8	915,109.5	0.34	0.25	53.1	0.0001	61.9
							Total	**8.7**	**26.0**	**5,120.4**	**0.0092**	**5,366.8**

	CO_2	CH_4	N_2O
GWP	1	25	298

Flare SSM Emissions

Unit: Flare (SSM)
Description: Flare controlling blowdown and emergency emissions from the facility

Flaring Excess Gas When Plant is Down

Stream 11	26274.78	scf/hr	
	2163.24	Btu/scf	
	56.84	MMbtu/hr	
	37.87	lb/lbmol	
Totals all streams	26274.78	scf/hr	
	37.87	MW	volume-weighted average

	NOx	CO	VOC	H_2S	SO_2	HAPs	PM	Units	
	0.0680	0.3100						lb/MMBtu	AP-42 Tables 13.5-1 & 13.5-2 (02/18)
	0.0641	0.5496						lb/MMBtu	TNRCC RG-109 High Btu ("Other")
				0.0000				% H2S	Max est. concentration from inlet
Stream 11	3.8650	31.2386	-	-	-	-	-	lb/hr	lb/MMBtu * MMBtu/hr
	-	-	38.0652	-	-	0.0040	-	lb/hr	98% destruction of calculated content
	-	-	-	-	-	-	-	lb/hr	Estimated 100% conversion of combusted H_2S to SO_2
	3.87	31.24	38.07	-	-	0.0040	-	lb/hr	Total; Flared gas (upset)
	100%	**100%**	**100%**	**-**	**-**	**100%**	**100%**	**%**	**Safety Factor**
	7.7	**62.5**	**76.1**	**-**	**-**	**0.0080**	-	**lb/hr**	
	0.201	**1.62**	**1.98**	**-**	**-**	**2.07E-04**	-	**tpy**	**Total; Upset Flared gas**

Assume 52 events of 1 hr duration for upset conditions

Flare SSM Emissions

Unit: Flare (SSM)
Description: Flare controlling blowdown and emergency emissions from the facility

Stack Parameters

1000	˚C	Exhaust temperature	Per NMAQB guidelines
20	m/sec	Exhaust velocity	Per NMAQB guidelines
65	ft	Flare height	Engineering design

Upset flare gas

56.8	MMBtu/hr	Total heat input	Sum of fuel and flare gas heating values
37.87	g/mol	Total mean MW	Volume weighted average of gas MWs
3,978,713	cal/sec	Heat release (q)	MMBtu/hr * 10^6 * 252 cal/Btu ÷ 3600 sec/hr
2,803,389		q_n	$q_n = q(1-0.048(MW)^{1/2})$
1.674	m	Effective stack diameter (D)	$D = (10^{-6} q_n)^{1/2}$

Combined Normal and SSM Emission Scenario

NOx	CO	VOC	SO_2	H2S	Units
15.52	125.32	138.0	-	-	lb/hr
3.02	24.27	24.25	-	-	tpy

Pilot, Normal and Upset Combined Flow

171.2	MMBtu/hr	Total heat input	Sum of fuel and flare gas heating values
37.87	g/mol	Total mean MW	Volume weighted average of gas MWs
1.20E+07	cal/sec	Heat release (q)	MMBtu/hr * 10^6 * 252 cal/Btu ÷ 3600 sec/hr
8,445,408		q_n	$q_n = q(1-0.048(MW)^{1/2})$
2.9061	m	Effective stack diameter (D)	$D = (10^{-6} q_n)^{1/2}$

Flare SSM GHG Emissions

§98.233(n) Flare stack GHG emissions.

flared Amine vent gas & Assist Gas

Step 1. Calculate contribution of un-combusted CH_4 emissions

$E_{a,CH4}$ (un-combusted) = V_a * (1- η)* X_{CH4} *(Equation W-39B)*

where:

$E_{a,CH4}$ = contribution of annual un-combusted CH_4 emissions from regenerator in cubic feet under actual conditions.

V_a = volume of gas sent to combustion unit during the year (cf)

η = Fraction of gas combusted by a burning flare (or regenerator), default value from Subpart W = 0.98

For gas sent to an unlit flare, η is zero. Stream 11

X_{CH4} = Mole fraction of CH_4 in gas to the flare = 0.27

Step 2. Calculate contribution of un-combusted CO_2 emissions

$E_{a,CO2}$ = V_a * X_{CO2} *(Equation W-20)*

where:

$E_{a,CO2}$ = contribution of annual un-combusted CO_2 emissions from regenerator in cubic feet under actual conditions.

V_a = volume of gas sent to combustion unit during the year (cf) Stream 11

X_{CO2} = Mole fraction of CO_2 in gas to the flare = 0.464

Step 3. Calculate contribution of combusted CO_2 emissions

$E_{a,CO2}$ (combusted) = Σ (η * V_a * Y_j * R_j) *(Equation W-21)*

where:

η = Fraction of gas combusted by a burning flare (or regenerator) = 0.98

For gas sent to an unlit flare, η is zero.

V_a = volume of gas sent to combustion unit during the year (cf)

Y_j = mole fraction of gas hydrocarbon constituents j: Stream 11

Constituent j, Methane =	0.2719
Constituent j, Ethane =	0.1906
Constituent j, Propane =	0.2786
Constituent j, Butane =	0.1556
Constituent j, Pentanes Plus =	0.034979868

R_j = number of carbon atoms in the gas hydrocarbon constituent j:

Constituent j, Methane =	1
Constituent j, Ethane =	2
Constituent j, Propane =	3
Constituent j, Butane =	4
Constituent j, Pentanes Plus =	5

Step 4. Calculate GHG volumetric emissions at standard conditions (scf).

$$E_{s,n} = \frac{E_{a,n} * (459.67 + T_s) * P_a}{(459.67 + T_a) * P_s}$$ *(Equation W-33)*

where:

$E_{s,n}$ = GHG i volumetric emissions at standard temperature and pressure (STP) in cubic feet

$E_{a,n}$ = GHG i volumetric emissions at actual conditions (cf)

T_s = Temperature at standard conditions (F) = 60 F

T_a = Temperature at actual conditions (F) = 76 F (Based on Annual Avg Max Temperature for Hobbs, NM from Western Regional Climate Center)

P_s = Absolute pressure at standard conditions (psia) = 14.7 psia

P_a = Absolute pressure at actual conditions (psia) = 14.7 psia (Assumption)

Constant = 459.67 (temperature conversion from F to R)

Step 5. Calculate annual CH_4 and CO_2 mass emissions (ton).

$Mass_{s,i}$ = $E_{s,i}$ * ρ_i * 0.0011023 *(Equation W-36)*

where:

$Mass_{s,i}$ = GHG i (CO_2, CH_4, or N_2O) mass emissions at standard conditions in tons (tpy)

$E_{s,i}$ = GHG i (CO_2, CH_4, or N_2O) volumetric emissions at standard conditions (cf)

ρ_i = Density of GHG i. Use:

CH_4: 0.0192 kg/ft^3 (at 60F and 14.7 psia)

CO_2: 0.0526 kg/ft^3 (at 60F and 14.7 psia)

Step 6. Calculate annual N_2O emissions from portable or stationary fuel combustion sources under actual conditions (cf) using Equation W-40 .

$Mass_{N2O}$ = 0.0011023 * Fuel * HHV * EF *(Equation W-40)*

where:

$Mass_{N2O}$ = annual N_2O emissions from combustion of a particular type of fuel (tons).

Fuel = mass or volume of the fuel combusted

HHV = high heat value of the fuel

Stream 11 = 2.163E-03 MMBtu/scf

EF = 1.00E-04 kg N_2O/MMBtu

10^{-3} = conversion factor from kg to metric tons.

Step 7. Calculate total annual emission from flare by summing Equations W-40, W-19, W-20, and W-21.

Gas Sent to Flare	Gas Sent to Flare (cf/yr)	CH_4 Un-Combusted, $E_{a,CH4}$ (cf)	CO_2 Un-Combusted, $E_{a,CO2}$ (cf)	CO_2 Combusted, $E_{a,CO2}$ (cf)	CH_4 Un-Combusted, $E_{a,CH4}$ (scf)	CO_2 Un-Combusted, $E_{a,CO2}$ (scf)	CO_2 Combusted, $E_{a,CO2}$ (scf)	CH_4 Un-Combusted, $E_{a,CH4}$ (tpy)	CO_2 Un-Combusted, $E_{a,CO2}$ (tpy)	CO_2 Combusted, $E_{a,CO2}$ (tpy)	N_2O Mass Emissions (tpy)	CO2e (tpy)
Stream 11	45,000,000	244,718	20,898,382.3	100,814,700.3	237,275.5	20,262,817.5	97,748,708.5	5.0	1,174.9	5,667.6	0.0107	6,971.2
							Total	**5.0**	**1,174.9**	**5,667.6**	**0.0**	**6,971.2**

	CO_2	CH_4	N_2O
GWP	1	25	298

Emission unit: F-001

Facility-wide Fugitive Emissions Per Piece of Equipment							
Subcomponent		Emission Factor[1] (lb/hr/comp)	Control Efficiency	VOC Content[2] (wt%)	H_2S Content[2] (wt%)	HAP Content[2] (wt%)	Subcomponent Counts[3,6]
Valves	Gas	9.92E-03	0.0%	21.99%	0.00%	0.56%	1089
	Light Oil	5.51E-03	0.0%	100.00%	0.00000%	12.51%	1089
	Heavy Oil	1.85E-05	0.0%	0.00%	0.00000%	0.00%	0
Flanges	Gas	8.60E-04	0.0%	21.99%	0.0000%	0.56%	0
	Light Oil	2.43E-04	0.0%	100.00%	0.000000%	12.51%	0
	Heavy Oil	8.60E-07	0.0%	0.00%	0.000000%	0.00%	0
Connectors	Gas	4.41E-04	0.0%	21.99%	0.00%	0.56%	2673
	Light Oil	4.63E-04	0.0%	100.00%	0.00000%	12.51%	2673
	Heavy Oil	1.65E-05	0.0%	0.00%	0.00000%	0.00%	0
Pumps	Light Oil	2.87E-02	0.0%	100.00%	0.00000%	12.51%	13
	Heavy Oil	2.87E-02	0.0%	0.00%	0.00000%	0.00%	0
Other	Gas	1.94E-02	0.0%	21.99%	0.00%	0.56%	0
	Light Oil	1.65E-02	0.0%	100.00%	0.00000%	12.51%	0
	Heavy Oil	7.06E-05	0.0%	0.00%	0.00000%	0.00%	0
				Safety Factor[6]			0.25
				Hourly VOC Emission Rate (lb/hr)[4]			10.25
				Annual VOC Emission Rate (tpy)[5]			44.88
				Hourly H_2S Emission Rate (lb/hr)[4]			0.00
				Annual H_2S Emission Rate (tpy)[5]			0.00
				Hourly HAP Emission Rate (lb/hr)[4]			1.02
				Annual HAP Emission Rate (tpy)[5]			4.47

[1] Emission factors from Table 2-4 of EPA Protocol for Equipment Leak Emission Estimates, 1995.
[2] Weight percent of gas and liquid components are referenced from flash gas and liquid streams from a ProMax simulation for this facility.
[3] Subcomponent counts for each subcomponent are based on estimated average component counts for each piece of equipment.
[4] Hourly Emissions [lb/hr] = Emissions Factor [lb/hr/component] * Weight Content of Chemical Component [%] * Subcomponent Count.
[5] Annual Emissions [ton/yr] = Hourly Emissions [lb/hr] * 8760 [hr/yr] * 1/2000 [ton/lb].
[6] The safety factor of 25% is added to accommodate the addition of the CAT G3608 engines.

Facility Malfunction Emissions

Unit: MALF
Description: Facility-wide malfunction emissions

Emission Calculations

Requested NO_X MALF:	6	tons/yr
Requested CO MALF:	10	tons/yr
Requested VOC MALF:	10	tons/yr
Requested SO_X MALF:	10	tons/yr
Requested H_2S MALF:	2	tons/yr
Inlet gas VOC content:	21.99	Mass %
Inlet gas CO_2 content:	3.28	Mass %
Inlet gas CH_4 content:	57.05	Mass %

Section 6

Subsection 2 – Emission Calculations for All Other Units at this Facility Not Affected by this Application

For clarity, this Subsection 2 contains emission calculations for all other units that were not affected by this application (i.e. all units except for Units 1, 2, 6, 7, 8, 9, 10, 3a, 3b, T-007, LOAD_SLOP, ECD, Flare , F-001, and MALF). For pertinent calculations relevant to the changes at the facility in this application, please refer to Section 6 Subsection 1.

Unit: 5
Description: Solar Centaur 40-4700 NG turbines

Fuel consumption	33.5	Mscf/hr	
Fuel heat value	1200	Btu/scf	Nominal LHV of fuel gas
Heat rate	40.2	MMBtu/hr	Fuel consumption * fuel heat value / 1000
Annual fuel usage	293.5	MMscf/yr	8760 hrs/yr operation

Uncontrolled Emissions

NO_x	CO	VOC	SO_2 [1]	PM[2]	H_2S[1]		
				0.0066	-	lb/MMBtu	AP-42 Table 3.1-2a
0.100	0.122	0.035			-	lb/MMBtu	Hourly Emission Factors
0.100	0.122	0.035			-	lb/MMBtu	Annual emission rate (8760 hrs/yr)
4.03	4.90	1.40	0.48	0.27		lb/hr	
17.64	21.48	6.15	2.10	1.16	-	tpy	
10%	20%						Safety Factor
4.43	**5.89**	**1.40**	**0.48**	**0.27**	**2.39E-04**	**lb/hr**	Emission Rate with Safety Factor
19.40	**25.78**	**6.15**	**2.10**	**1.16**	**1.05E-03**	**tpy**	

Total HAP[3]	HCHO[3]	Acetaldehyde[3]	Benzene[3]	Toluene[3]	Xylenes[3]		
	7.10E-04	**4.00E-05**	**1.20E-05**	**1.30E-04**	**6.40E-05**	lb/MMBtu	AP-42 Table 3.1-3
0.038	**0.029**	**0.002**	**4.82E-04**	**0.0052**	**0.0026**	lb/hr	Hourly emission rate
0.17	**0.13**	**0.0070**	**0.0021**	**0.023**	**0.011**	tpy	Annual emission rate (8760 hrs/yr)

[1] SO_2 emissions based on fuel sulfur content of 5 gr S/100 scf, or 0.00714 lb S/Mscf

lb/hr SO_2 = 5gr S/100scf * Fuel consumption (Mscf/hr) * 1lb/7000gr * 1000scf/Mscf * 64 lb SO_2/32 lb S

H_2S emissions based on 0.25 g/100 scf H_2S in fuel

lb/hr H_2S = 0.25 gr H_2S/100 scf * Fuel consumption (Mscf/hr) * 1000scf/Mscf * 1 lb/7000 gr * (1 - Comb. Eff [98%])

[2] Assumed TSP = PM_{10} = $PM_{2.5}$

[3] HAP emissions calculated using emission factors from AP-42 Table 3.1-3.

GHG Calculations

CO_2[4]	N_2O[4]	CH_4[4]	CO_2e[4]		
53.06	0.0001	0.001		kg/MMBtu	40 CFR 98 Subpart C Tables C-1 and C-2
1	298	25		GWP	40 CFR 98 Table A-1
20596.9	0.039	0.39		tpy	
20596.866	**11.6**	**9.7**	**20618.1**	tpy CO_2e	

[4] N_2O, CH_4, and CO_2 tpy Emission Rate= EF* Fuel Usage * Fuel Heat Value * 2.20462 lb/1 kg * 1 ton/2000 lb

CO_2e tpy Emission Rate = CO_2 Emission Rate + N_2O Emission Rate*GWP Factor +CH_4 Emission Rate*GWP Factor

Slop Water Tank Emissions

Unit: T-006
Description: Slop Water Tank from 3-Phase Separator and Dehy

Tank Throughput

33	bbl/day	bbl/yr / 365 day/yr
12,000	bbl/yr	Maximum Throughput
504,000	gal/yr	bbl/yr * 42 gal/bbl

Promax Emissions Report
Annual Emissions

Components	Working Losses (ton/yr)	Breathing Losses (ton/yr)	Total Losses (ton/yr)[1]
Hydrogen Sulfide	3.28692E-05	1.89576E-05	5.18268E-05
Nitrogen	1.10618E-05	6.38002E-06	1.74418E-05
Carbon Dioxide	0.002045151	0.001179563	0.003224714
Methane	0.000521325	0.00030068	0.000822004
Ethane	0.00410824	0.002369471	0.006477712
Propane	0.009757611	0.005627806	0.015385417
i-Butane	0.001901042	0.001096446	0.002997489
n-Butane	0.00583467	0.003365208	0.009199879
2,2-Dimethylpropane	0	0	0
i-Pentane	0.001544366	0.00089073	0.002435096
n-Pentane	0.001627716	0.000938803	0.002566519
2,2-Dimethylbutane	0	0	0
Cyclopentane	0	0	0
2,3-Dimethylbutane	0	0	0
2-Methylpentane	0	0	0
3-Methylpentane	0	0	0
n-Hexane	0.000416481	0.00024021	0.00065669
Methylcyclopentane	0	0	0
Benzene	0.002117181	0.001221107	0.003338287
Cyclohexane	0.000822733	0.00047452	0.001297252
2-Methylhexane	0	0	0
3-Methylhexane	0	0	0
2,2,4-Trimethylpentane	0	0	0
n-Heptane	0.000369694	0.000213225	0.000582919
Methylcyclohexane	0.000511008	0.000294729	0.000805737
Toluene	0.00118465	0.00068326	0.00186791
n-Octane	0.000519775	0.000299786	0.000819561
Ethylbenzene	6.81112E-08	3.92839E-08	1.07395E-07
m-Xylene	0.000140878	8.12527E-05	0.00022213
p-Xylene	0	0	0
o-Xylene	0	0	0
n-Nonane	0	0	0
n-Decane	0	0	0
n-Undecane	0	0	0
Saftey Factor	**100%**	**100%**	**100%**
Total VOC	**0.0535**	**0.0309**	**0.0843**
Total HAP	**7.72E-03**	**4.45E-03**	**1.22E-02**

[1] Emissions are assumed to be 1% condensate.

Condensate Tank Emissions

Unit: T-008. 009, T-011, T-012
Description: Stabilized condensate tanks
# of tanks 4
Tank Throughput*
190 bbl/day

Tanks 4.09d Emissions Report
Annual Emissions

	Uncontrolled Emissions per Tank			Uncontrolled Tank Battery
Components	Working Losses (ton/yr)	Breathing Losses (ton/yr)	Total Losses (ton/yr)	Total Losses (ton/yr)
Hydrogen Sulfide	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon Dioxide	1.16E-11	1.10E-11	2.26E-11	9.04E-11
Methane	1.05E-13	1.00E-13	2.05E-13	8.19E-13
Ethane	7.64E-08	7.28E-08	1.49E-07	5.97E-07
Propane	4.13E-04	3.93E-04	8.06E-04	3.22E-03
i-Butane	2.98E-02	2.84E-02	5.83E-02	2.33E-01
n-Butane	7.27E-01	6.93E-01	1.42E+00	5.68E+00
2,2-Dimethylpropane	1.45E-02	1.39E-02	2.84E-02	1.14E-01
i-Pentane	6.38E-01	6.08E-01	1.25E+00	4.99E+00
n-Pentane	5.78E-01	5.51E-01	1.13E+00	4.51E+00
2,2-Dimethylbutane	5.63E-03	5.37E-03	1.10E-02	4.40E-02
Cyclopentane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2,3-Dimethylbutane	3.99E-02	3.80E-02	7.80E-02	3.12E-01
2-Methylpentane	9.24E-02	8.80E-02	1.80E-01	7.22E-01
3-Methylpentane	4.87E-02	4.65E-02	9.52E-02	3.81E-01
n-Hexane	8.57E-02	8.17E-02	1.67E-01	6.70E-01
Methylcyclopentane	3.96E-02	3.77E-02	7.73E-02	3.09E-01
Benzene	1.10E-02	1.05E-02	2.15E-02	8.58E-02
Cyclohexane	2.72E-02	2.59E-02	5.32E-02	2.13E-01
2-Methylhexane	7.08E-03	6.75E-03	1.38E-02	5.53E-02
3-Methylhexane	7.97E-03	7.59E-03	1.56E-02	6.22E-02
2,2,4-Trimethylpentane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
n-Heptane	3.02E-02	2.88E-02	5.89E-02	2.36E-01
Methylcyclohexane	1.65E-02	1.58E-02	3.23E-02	1.29E-01
Toluene	3.94E-03	3.76E-03	7.70E-03	3.08E-02
n-Octane	7.97E-03	7.60E-03	1.56E-02	6.23E-02
Ethylbenzene	1.84E-04	1.76E-04	3.60E-04	1.44E-03
m-Xylene	1.71E-04	1.63E-04	3.33E-04	1.33E-03
p-Xylene	1.78E-04	1.70E-04	3.48E-04	1.39E-03
o-Xylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
n-Nonane	7.42E-04	7.07E-04	1.45E-03	5.80E-03
n-Decane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
n-Undecane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL VOC	**2.41**	**2.30**	**4.71**	**18.85**
TOTAL HAPs	**0.101**	**0.096**	**0.20**	**0.79**

* Facility throughout will be 190 bbl/day. Each tank has the potential to route entire facility throughput through a give tank however actual throughput will likely be much lower.

Venting VOC Emissions

Unit: VENT
Description: Emission rates from venting during startup, shutdown, and blowdown operation

Volume Vented Calculations

	Venting Unit	Volume (Mscf)	Events/yr	Gas Stream	Volume Vented (Mscf/yr)	
	1	9	120	Inlet	1080	
	2	9	120	Inlet	1080	
Totals			**240**		**2160**	
Total (hrs)			240			Assumes 1 hour per event

Source: Promax RVP11 Simulation, SC Vapor Stream, from File: ProMax Report South Carlsbad_8

Component	MW	Wet vol/mol %	Dry vol/mol %	MW * dry vol %	Mass Fraction (dry)	Spec. Volume ft^3/lb	Spec. Volume VOC ft^3/lb
Water	18.02	0.015%				21.06	
Nitrogen	28.01	2.72%	2.72%	0.762	3.54%	13.547	
CO_2	44.01	1.61%	1.61%	0.706	3.28%	8.623	
H_2S*	34.08	0.05%	0.05%	1.70%	0.08%	11.136	
Methane	16.04	76.6%	76.58%	12.286	57.09%	23.65	
Ethane	30.07	10.1%	10.12%	3.044	14.14%	12.62	
Propane	44.10	5.4%	5.38%	2.375	11.03%	8.606	4.342
i-Butane	58.12	0.67%	0.67%	0.387	1.80%	6.529	0.537
n-Butane	58.12	1.6%	1.56%	0.908	4.22%	6.529	1.260
2,2 Dimethylpropane	72.15	0.010%	0.01%	0.007	0.03%	5.302	0.008
i-Pentane	72.15	0.37%	0.37%	0.264	1.23%	5.26	0.295
n-Pentane	72.15	0.38%	0.38%	0.276	1.28%	5.26	0.308
2,2 Dimethylbutane	86.18	0.0040%	0.00%	0.003	0.02%	5.26	0.004
Cyclopentane	70.14	0.00%	0.00%	0.000	0.00%	5.411	0.000
2,3 Dimethylbutane	86.18	0.035%	0.03%	0.030	0.14%	4.404	0.028
2 Methylpentane	86.18	0.087%	0.09%	0.075	0.35%	4.404	0.070
3 Methylpentane	86.18	0.049%	0.05%	0.043	0.20%	4.404	0.040
n-Hexane	86.18	0.10%	0.10%	0.087	0.40%	4.404	0.081
Methylcyclopentane	84.16	0.053%	0.05%	0.045	0.21%	4.509	0.043
Cyclohexane	84.16	0.048%	0.05%	0.040	0.19%	3.787	0.033
2-Methylhexane	100.20	0.013%	0.01%	0.013	0.06%	3.787	0.010
3-Methylhexane	100.20	0.014%	0.01%	0.015	0.07%	3.787	0.012
n-Heptanes	100.20	0.066%	0.07%	0.066	0.31%	3.787	0.053
Other Heptanes	100.20	0.00%	0.00%	0.000	0.00%	3.787	0.000
Methylcyclohexane	98.19	0.036%	0.04%	0.036	0.17%	3.865	0.029
2,2,4-Trimethylpentane	114.23	0.00%	0.00%	0.000	0.00%	3.322	0.000
Benzene	78.11	0.024%	0.02%	0.018	0.09%	4.858	0.019
Toluene	92.14	0.014%	0.01%	0.013	0.06%	4.119	0.011
Ethylbenzene	106.17	0.00087%	0.00%	0.001	0.00%	3.574	0.001
Xylenes	106.17	0.0017%	0.00%	0.002	0.01%	3.574	0.001
C8+ heavies	114.23	0.0037%	0.00%	0.004	0.02%	3.322	0.003
Total		100.0%	100.0%	21.52	100%		7.188
Dry total		100.0%		*(mixture mol. wt)*			
NMEHC (VOC)		8.92%					21.87%
Mixture heating value		1241	BTU/scf				

*Note: * Although the RVP 11 gas simulation did not account and H_2S it was determined that a 0.05% wet/mol % will be used to overcome gas composition fluctuations.*

Venting VOC Emissions

Unit: VENT
Description: Emission rates from venting during startup, shutdown, and blowdown operation

Emission Calculations

Inlet Gas 1.0 Mcf/hr Engineering estimate

VOC	H_2S		
8.92%	0.0500%	mol%	VOC content from gas analysis; H2S content based on maximum possible estimated inlet concentration
7.2	11.136	ft^3/lb	Specific volume from gas analysis, calculated above
12.4	0.04490	lb/hr	vol. gas * mole fraction / specific volume
12.4	0.04490	lb/Mcf	lb/hr / Mcf/hr

Total Blowdown Emissions

These calculations estimate the total emission rate per blowdown event, based on duration and volume of gas

Vent

2160	Mcf/yr total vented
100%	Safety Factor
4320	with SF
9	Max Mcf/event
100%	Safety Factor
18	with SF

	VOC	H_2S		
Inlet Gas	12.4	0.04490	lb/Mcf vented	
	223.4	0.808	lb/Max event	Max Mcf/event * lb/Mcf
	223.4	0.808	lb/hr	lb/Max event / 1 hr/evei Hourly emission rate shown for informational purposes only
	26.8	**0.10**	tpy vented	(Mcf/yr * lb/Mcf) / 2000 lb/ton

HAP	VOC content	Specific Volume	lb/Mcf[1]	tpy[2]
n-Hexane	0.1004%	4.404	0.2280	0.49
2,2,4-TMP	0.0000%	3.322	0.0000	0.00
Benzene	0.0236%	4.858	0.0486	0.11
Toluene	0.0142%	4.119	0.0345	0.075
Ethylbenzene	0.0009%	3.574	0.0024	0.0052
Xylenes	0.0017%	3.574	0.0048	0.010
Total HAPs				**0.69**

[1] (Vol. gas * mole fraction / specific volume) / Mcf/hr
[2] (Mcf/yr * lb/Mcf) / 2000 lb/ton

GHG Calculations

CO_2	CH_4	CO_2e		
4.0	70.0		tpy	Mscf/yr * 1000scf/yr * density * 1.1023tons/MT * 1MT/1000kg*Safety Factor
1	25		GWP	40 CFR 98 Table A-1
4.0	**1,750.5**	**1,754.6**	tpy CO_2e	

Loading Emissions

Unit: LOAD
Description: Emissions from Truck Loading of Condensate

Emission Calculations

69,350	Throughput (bbl/yr)	Expected condensate throughput
2,912,700	Throughput (gal/yr)	bbl/d * 42 gal/bbl * 365 d/yr
9.82	tpy VOC	GRI-HAPCalc 3.01

Total HAPs	n-Hexane	Benzene	Toluene	e-Benzene	Xylenes		
0.4	0.39	0.04	0.00	0.001	0.0012	tpy	GRI-HAPCalc3.01

Haul Road Emissions

Input Data

Empty vehicle weight[1]	16	tons	
Load weight[2]	21.2	tons	
Loaded vehicle[3]	37.2	tons	
Mean vehicle weight[4]	26.6	tons	
Vehicle frequency	1.2	vehicles/day	Throughput (gal/yr) * (1 yr/365 days) * (1 truck/7,560 gal)
Vehicle frequency	1.2	trips/hour	Maximum
Round-trip distance	0.40	mile/trip	
Operating hours	8760	hours/yr	
Surface silt content[5]	1.8	%	
Annual wet days[6]	60	days/yr	
Vehicle miles traveled[7]	0.5	mile/hr	

Emission Factors and Constants

Parameter	PM_{30}	PM_{10}	$PM_{2.5}$
k, lb/VMT[8]	4.9	1.5	0.15
a, lb/VMT[8]	0.70	0.90	0.90
b, lb/VMT[8]	0.45	0.45	0.45
Hourly EF, lb/VMT[9]	3.47	0.73	0.07
Annual EF, lb/VMT[10]	2.90	0.61	0.06

Uncontrolled Emissions

PM_{30}	PM_{10}	$PM_{2.5}$	
1.7	0.36	0.036	lb/hr[11]
0.26	0.055	0.0055	ton/yr[12]

Footnotes

[1] Empty vehicle weight includes driver and occupants and full fuel load.
[2] Cargo, transported materials, etc. (lb/gal RVP11 *7560 gal truck/ 2000lb/ton)
[3] Loaded vehicle weight = Empty + Load Size
[4] Mean Vehicle weight = (Loaded Weight + Empty Weight) / 2
[5] AP-42 Table 13.2.2-1, Taconite mining and processing mean silt content
A 60% reduction in silt is used based on the use of gravel roads at this facility.
[6] AP-42 Figure 13.2.2-1
[7] VMT/hr = Vehicle Miles Traveled per hour = Trips per hour * Miles per trip
[8] Table 13.2.2-2, Industrial Roads
[9] AP-42 13.2.2, Equation 1a
[10] AP-42 13.2.2, Equation 2
[11] lb/hr = Hourly EF (lb/VMT) * VMT (mile/hr)
[12] ton/yr = Annual EF (lb/VMT) * Truck/day * Mile/truck * 365day/yr * 1ton/2000lb

Unit(s):	PIGGING		
Description:	Pig Receiver and Launcher Emissions		
Exemption:	20.2.72.202.B(5) NMAC		
Inlet Receiver Volume	140.00	scf/event	Estimate based on similar Facility Design
Safety Factor	100%		
Inlet Receiver Volume	280.00	scf/event	Calculated
Annual Events:	24	# of events/yr	Estimate based on similar Facility Design
Duration of Event	0.5	hr/event	Estimate
Number of Receivers:	1		Estimate based on similar Facility Design

Pigging Emissions based on Inlet Analysis

Composition	MW[2]	Wet vol/mol%[1]	Dry vol/mol%	MW*Mol%	Spec. Volume (scf/lb)[2]	Mass Flow (lb/hr)[3]	Mass Flow (lb/yr4	Mass Flow (ton/yr)[5]
Water	18.015	0.015%			21.06			
Nitrogen	28.013	2.72%	2.720%	0.76	13.55	1.12E-02	1.35E-01	6.75E-05
CO2	44.010	1.61%	1.605%	0.71	8.62	1.04E-02	1.25E-01	6.25E-05
H2S*	34.082	0.05%	0.050%	0.02	11.14	2.51E-04	3.02E-03	1.51E-06
Methane	16.043	76.6%	76.581%	12.29	23.65	1.81E-01	2.18E+00	1.09E-03
Ethane	30.070	10.1%	10.122%	3.04	12.62	4.49E-02	5.39E-01	2.70E-04
Propane	44.097	5.4%	5.385%	2.37	8.61	3.50E-02	4.20E-01	2.10E-04
i-Butane	58.123	0.67%	0.666%	0.39	6.53	5.71E-03	6.86E-02	3.43E-05
n-Butane	58.123	1.6%	1.563%	0.91	6.53	1.34E-02	1.61E-01	8.04E-05
2,2 Dimethylpropane	72.150	0.010%	0.010%	0.01	5.30	1.05E-04	1.26E-03	6.32E-07
i-Pentane	72.150	0.37%	0.366%	0.26	5.26	3.89E-03	4.67E-02	2.34E-05
n-Pentane	72.150	0.38%	0.382%	0.28	5.26	4.07E-03	4.88E-02	2.44E-05
2,2 Dimethylbutane	86.180	0.0040%	0.004%	0.003	5.26	4.23E-05	5.07E-04	2.54E-07
Cyclopentane	70.140	0.00%	0.000%	0.000	5.41	0.00E+00	0.00E+00	0.00E+00
2,3 Dimethylbutane	86.180	0.035%	0.035%	0.030	4.40	4.40E-04	5.28E-03	2.64E-06
2 Methylpentane	86.180	0.087%	0.087%	0.075	4.40	1.11E-03	1.33E-02	6.64E-06
3 Methylpentane	86.180	0.049%	0.049%	0.043	4.40	6.28E-04	7.53E-03	3.77E-06
n-Hexane	86.180	0.10%	0.100%	0.087	4.40	1.28E-03	1.53E-02	7.66E-06
Methylcyclopentane	84.160	0.053%	0.053%	0.045	4.51	6.60E-04	7.92E-03	3.96E-06
Cyclohexane	84.160	0.048%	0.048%	0.040	3.79	7.10E-04	8.52E-03	4.26E-06
2-Methylhexane	100.200	0.013%	0.013%	0.013	3.79	1.86E-04	2.23E-03	1.12E-06
3-Methylhexane	100.200	0.014%	0.014%	0.015	3.79	2.14E-04	2.57E-03	1.29E-06
n-Heptanes	100.200	0.066%	0.066%	0.066	3.79	9.78E-04	1.17E-02	5.87E-06
Other Heptanes	100.200	0.00%	0.000%	0.000	3.79	0.00E+00	0.00E+00	0.00E+00
Methylcyclohexane	98.190	0.036%	0.036%	0.036	3.87	5.27E-04	6.32E-03	3.16E-06
2,2,4-Trimethylpentane	114.230	0.00%	0.000%	0.000	3.32	0.00E+00	0.00E+00	0.00E+00
Benzene	78.110	0.024%	0.024%	0.018	4.86	2.72E-04	3.27E-03	1.63E-06
Toluene	92.140	0.014%	0.014%	0.013	4.12	1.93E-04	2.32E-03	1.16E-06
Ethylbenzene	106.170	0.00087%	0.001%	0.001	3.57	1.36E-05	1.63E-04	8.14E-08
Xylenes	106.170	0.0017%	0.002%	0.002	3.57	2.66E-05	3.19E-04	1.60E-07
C8+ heavies	114.230	0.0037%	0.004%	0.004	3.32	6.18E-05	7.41E-04	3.71E-07
Total		100.0%	100.0%	21.52				
Dry Total		100.0%				**0.32**	**3.81**	**0.0019**
VOC Total		**0.19**		**7.75**		**0.11**	**1.37**	**6.87E-04**

Notes

[1] Source: Promax RVP11 Simulation, SC Vapor Stream, from File: ProMax Report South Carlsbad_8
[2] From "Physical Properties of Hydrocarbons"
[3] Flow (lb/hr) = Volume (scf/event) / Duration (hr/event) / Sp. Vol. (scf/lb) * Mol%
[4] Flow (tons/yr) = Volume (scf/yr) / Sp. Vol. (scf/lb) * Mol%
[5] Flow (tons/yr) = Flow (lb/yr) / 2000 lb/ton

Section 6.a

Green House Gas Emissions

(Submitting under 20.2.70, 20.2.72 20.2.74 NMAC)

Title V (20.2.70 NMAC), Minor NSR (20.2.72 NMAC), and PSD (20.2.74 NMAC) applicants must estimate and report greenhouse gas (GHG) emissions to verify the emission rates reported in the public notice, determine applicability to 40 CFR 60 Subparts, and to evaluate Prevention of Significant Deterioration (PSD) applicability. GHG emissions that are subject to air permit regulations consist of the sum of an aggregate group of these six greenhouse gases: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Calculating GHG Emissions:

1. Calculate the ton per year (tpy) GHG mass emissions and GHG CO_2e emissions from your facility.
2. GHG mass emissions are the sum of the total annual tons of greenhouse gases without adjusting with the global warming potentials (GWPs). GHG CO_2e emissions are the sum of the mass emissions of each individual GHG multiplied by its GWP found in Table A-1 in 40 CFR 98 Mandatory Greenhouse Gas Reporting.
3. Emissions from routine or predictable start up, shut down, and maintenance must be included.
4. Report GHG mass and GHG CO_2e emissions in Table 2-P of this application. Emissions are reported in **short** tons per year and represent each emission unit's Potential to Emit (PTE).
5. All Title V major sources, PSD major sources, and all power plants, whether major or not, must calculate and report GHG mass and CO2e emissions for each unit in Table 2-P.
6. For minor source facilities that are not power plants, are not Title V, and are not PSD there are three options for reporting GHGs in Table 2-P: 1) report GHGs for each individual piece of equipment; 2) report all GHGs from a group of unit types, for example report all combustion source GHGs as a single unit and all venting GHGs as a second separate unit; 3) or check the following ☐ By checking this box, the applicant acknowledges the total CO2e emissions are less than 75,000 tons per year.

Sources for Calculating GHG Emissions:

- Manufacturer's Data
- AP-42 Compilation of Air Pollutant Emission Factors at http://www.epa.gov/ttn/chief/ap42/index.html
- EPA's Internet emission factor database WebFIRE at http://cfpub.epa.gov/webfire/
- 40 CFR 98 Mandatory Green House Gas Reporting except that tons should be reported in short tons rather than in metric tons for the purpose of PSD applicability.
- API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry. August 2009 or most recent version.
- Sources listed on EPA's NSR Resources for Estimating GHG Emissions at http://www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases:

Global Warming Potentials (GWP):
Applicants must use the Global Warming Potentials codified in Table A-1 of the most recent version of 40 CFR 98 Mandatory Greenhouse Gas Reporting. The GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to that of one unit mass of CO_2 over a specified time period.

"Greenhouse gas" for the purpose of air permit regulations is defined as the aggregate group of the following six gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. **(20.2.70.7 NMAC, 20.2.74.7 NMAC).** You may also find GHGs defined in 40 CFR 86.1818-12(a).

Metric to Short Ton Conversion:
Short tons for GHGs and other regulated pollutants are the standard unit of measure for PSD and title V permitting programs. 40 CFR 98 Mandatory Greenhouse Reporting requires metric tons.
1 metric ton = 1.10231 short tons (per Table A-2 to Subpart A of Part 98 – Units of Measure Conversions)

Section 7

Information Used to Determine Emissions

<u>Information Used to Determine Emissions</u> shall include the following:

- ☒ If manufacturer data are used, include specifications for emissions units <u>and</u> control equipment, including control efficiencies specifications and sufficient engineering data for verification of control equipment operation, including design drawings, test reports, and design parameters that affect normal operation.
- ☒ If test data are used, include a copy of the complete test report. If the test data are for an emissions unit other than the one being permitted, the emission units must be identical. Test data may not be used if any difference in operating conditions of the unit being permitted and the unit represented in the test report significantly effect emission rates.
- ☒ If the most current copy of AP-42 is used, reference the section and date located at the bottom of the page. Include a copy of the page containing the emissions factors, and clearly mark the factors used in the calculations.
- ☒ If an older version of AP-42 is used, include a complete copy of the section.
- ☒ If an EPA document or other material is referenced, include a complete copy.
- ☒ Fuel specifications sheet.
- ☒ If computer models are used to estimate emissions, include an input summary (if available) and a detailed report, and a disk containing the input file(s) used to run the model. For tank-flashing emissions, include a discussion of the method used to estimate tank-flashing emissions, relative thresholds (i.e., permit or major source (NSPS, PSD or Title V)), accuracy of the model, the input and output from simulation models and software, all calculations, documentation of any assumptions used, descriptions of sampling methods and conditions, copies of any lab sample analysis.

This section contains the following references or actual documentation to support the emissions in the required forms and the calculations in Section 6:

Subsection 1 – Documentation used to support calculations in this permit revision.

- Current version of AP-42 located online at: http://www.epa.gov/ttn/chief/ap42/index.html. Specific sections used in this application:
  - Section 1.4 –Natural Gas External Combustion Sources-Natural Gas (Table 1.4-1,2)
  - Section 3.2 – Natural Gas-fired Reciprocating Engines (Table 3.2-2)
- ProMax Output for slop working, breathing, flashing, and loading emissions (for T-007)
- Gas and liquid stream compositions used (for Unit F-001)
- Compressor manufacturer specifications (for Units 6, 7, 8, 9, and 10)
- SpiralX manufacturer specification sheet (for Unit ECD)
- TCEQ TNRCC RG-109 Flare guidance documentation
- Flare manufacturer specifications (for Unit flare)
- Stream 11 properties used (for Unit Flare (SSM))
- GRI-GLYCalc Report (for 3a and ECD)
- 40 CFR 98 Subpart A, Table A-1
- 40 CFR 98 Subpart C, Tables C-1 & C-2

Subsection 2 – Documentation used to support calculations from previous permit application.

- Current version of AP-42 located online at: http://www.epa.gov/ttn/chief/ap42/index.html. Specific sections used in this application:
  - Section 3.1- Stationary Natural Gas Turbines (Table 3.1-2a)
  - Section 13.2.2 – Introduction to Fugitive Dust sources – Unpaved Roads
- HAPCalc® 3.01 run results loading
- ProMax Output for slop and condensate working and breathing, and slop loading emissions

- Armstrong Gas Lab Analysis No. 211306
- Turbine manufacturer specifications (for Unit 5)
- Turbine Stack Test Data – Reports (for Units 1 and 2)

Section 7

Subsection 1 – Information Used to Determine Emissions for Units Added or Modified with this Application

For clarity, this Subsection 1 contains information used to determine emissions for units that were either added or modified with this application. (i.e. Units 1, 2, 6, 7, 8, 9, 10, 3a, 3b, T-007, LOAD_SLOP, ECD, Flare , F-001, and MALF). For information pertinent to all other units that were not affected by this application, please refer to Subsection 2.

Table 1.4-1. EMISSION FACTORS FOR NITROGEN OXIDES (NO_x) AND CARBON MONOXIDE (CO) FROM NATURAL GAS COMBUSTION[a]

Combustor Type (MMBtu/hr Heat Input) [SCC]	NO_x[b]		CO	
	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
Large Wall-Fired Boilers (>100) [1-01-006-01, 1-02-006-01, 1-03-006-01]				
Uncontrolled (Pre-NSPS)[c]	280	A	84	B
Uncontrolled (Post-NSPS)[c]	190	A	84	B
Controlled - Low NO_x burners	140	A	84	B
Controlled - Flue gas recirculation	100	D	84	B
Small Boilers (<100) [1-01-006-02, 1-02-006-02, 1-03-006-02, 1-03-006-03]				
Uncontrolled	100	B	84	B
Controlled - Low NO_x burners	50	D	84	B
Controlled - Low NO_x burners/Flue gas recirculation	32	C	84	B
Tangential-Fired Boilers (All Sizes) [1-01-006-04]				
Uncontrolled	170	A	24	C
Controlled - Flue gas recirculation	76	D	98	D
Residential Furnaces (<0.3) [No SCC]				
Uncontrolled	94	B	40	B

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. Emission factors are based on an average natural gas higher heating value of 1,020 Btu/scf. To convert from $1b/10^6$ scf to lb/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. SCC = Source Classification Code. ND = no data. NA = not applicable.

[b] Expressed as NO_2. For large and small wall fired boilers with SNCR control, apply a 24 percent reduction to the appropriate NO_X emission factor. For tangential-fired boilers with SNCR control, apply a 13 percent reduction to the appropriate NO_X emission factor.

[c] NSPS=New Source Performance Standard as defined in 40 CFR 60 Subparts D and Db. Post-NSPS units are boilers with greater than 250 MMBtu/hr of heat input that commenced construction modification, or reconstruction after August 17, 1971, and units with heat input capacities between 100 and 250 MMBtu/hr that commenced construction modification, or reconstruction after June 19, 1984.

TABLE 1.4-2. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM NATURAL GAS COMBUSTION[a]

Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
CO_2[b]	120,000	A
Lead	0.0005	D
N_2O (Uncontrolled)	2.2	E
N_2O (Controlled-low-NO_X burner)	0.64	E
PM (Total)[c]	7.6	D
PM (Condensable)[c]	5.7	D
PM (Filterable)[c]	1.9	B
SO_2[d]	0.6	A
TOC	11	B
Methane	2.3	B
VOC	5.5	C

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. To convert from $lb/10^6$ scf to 1b/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. TOC = Total Organic Compounds. VOC = Volatile Organic Compounds.

[b] Based on approximately 100% conversion of fuel carbon to CO_2. $CO_2[lb/10^6 \text{ scf}] = (3.67)$ (CON) (C)(D), where CON = fractional conversion of fuel carbon to CO_2, C = carbon content of fuel by weight (0.76), and D = density of fuel, $4.2x10^4$ $lb/10^6$ scf.

[c] All PM (total, condensible, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors presented here may be used to estimate PM_{10}, $PM_{2.5}$ or PM_1 emissions. Total PM is the sum of the filterable PM and condensible PM. Condensible PM is the particulate matter collected using EPA Method 202 (or equivalent). Filterable PM is the particulate matter collected on, or prior to, the filter of an EPA Method 5 (or equivalent) sampling train.

[d] Based on 100% conversion of fuel sulfur to SO_2.
Assumes sulfur content is natural gas of 2,000 grains/10^6 scf. The SO_2 emission factor in this table can be converted to other natural gas sulfur contents by multiplying the SO_2 emission factor by the ratio of the site-specific sulfur content (grains/10^6 scf) to 2,000 grains/10^6 scf.

Table 3.2-2. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE LEAN-BURN ENGINES[a]
(SCC 2-02-002-54)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Criteria Pollutants and Greenhouse Gases		
NO_x[c] 90 - 105% Load	4.08 E+00	B
NO_x[c] <90% Load	8.47 E-01	B
CO[c] 90 - 105% Load	3.17 E-01	C
CO[c] <90% Load	5.57 E-01	B
CO_2[d]	1.10 E+02	A
SO_2[e]	5.88 E-04	A
TOC[f]	1.47 E+00	A
Methane[g]	1.25 E+00	C
VOC[h]	1.18 E-01	C
PM10 (filterable)[i]	7.71 E-05	D
PM2.5 (filterable)[i]	7.71 E-05	D
PM Condensable[j]	9.91 E-03	D
Trace Organic Compounds		
1,1,2,2-Tetrachloroethane[k]	<4.00 E-05	E
1,1,2-Trichloroethane[k]	<3.18 E-05	E
1,1-Dichloroethane	<2.36 E-05	E
1,2,3-Trimethylbenzene	2.30 E-05	D
1,2,4-Trimethylbenzene	1.43 E-05	C
1,2-Dichloroethane	<2.36 E-05	E
1,2-Dichloropropane	<2.69 E-05	E
1,3,5-Trimethylbenzene	3.38 E-05	D
1,3-Butadiene[k]	2.67E-04	D
1,3-Dichloropropene[k]	<2.64 E-05	E
2-Methylnaphthalene[k]	3.32 E-05	C
2,2,4-Trimethylpentane[k]	2.50 E-04	C
Acenaphthene[k]	1.25 E-06	C

Table 3.2-2. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE LEAN-BURN ENGINES (Continued)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Acenaphthylene[k]	5.53 E-06	C
Acetaldehyde[k,l]	8.36 E-03	A
Acrolein[k,l]	5.14 E-03	A
Benzene[k]	4.40 E-04	A
Benzo(b)fluoranthene[k]	1.66 E-07	D
Benzo(e)pyrene[k]	4.15 E-07	D
Benzo(g,h,i)perylene[k]	4.14 E-07	D
Biphenyl[k]	2.12 E-04	D
Butane	5.41 E-04	D
Butyr/Isobutyraldehyde	1.01 E-04	C
Carbon Tetrachloride[k]	<3.67 E-05	E
Chlorobenzene[k]	<3.04 E-05	E
Chloroethane	1.87 E-06	D
Chloroform[k]	<2.85 E-05	E
Chrysene[k]	6.93 E-07	C
Cyclopentane	2.27 E-04	C
Ethane	1.05 E-01	C
Ethylbenzene[k]	3.97 E-05	B
Ethylene Dibromide[k]	<4.43 E-05	E
Fluoranthene[k]	1.11 E-06	C
Fluorene[k]	5.67 E-06	C
Formaldehyde[k,l]	5.28 E-02	A
Methanol[k]	2.50 E-03	B
Methylcyclohexane	1.23 E-03	C
Methylene Chloride[k]	2.00 E-05	C
n-Hexane[k]	1.11 E-03	C
n-Nonane	1.10 E-04	C

Table 3.2-2. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE LEAN-BURN ENGINES
(Continued)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
n-Octane	3.51 E-04	C
n-Pentane	2.60 E-03	C
Naphthalene[k]	7.44 E-05	C
PAH[k]	2.69 E-05	D
Phenanthrene[k]	1.04 E-05	D
Phenol[k]	2.40 E-05	D
Propane	4.19 E-02	C
Pyrene[k]	1.36 E-06	C
Styrene[k]	<2.36 E-05	E
Tetrachloroethane[k]	2.48 E-06	D
Toluene[k]	4.08 E-04	B
Vinyl Chloride[k]	1.49 E-05	C
Xylene[k]	1.84 E-04	B

[a] Reference 7. Factors represent uncontrolled levels. For NO_x, CO, and PM10, “uncontrolled” means no combustion or add-on controls; however, the factor may include turbocharged units. For all other pollutants, “uncontrolled” means no oxidation control; the data set may include units with control techniques used for NOx control, such as PCC and SCR for lean burn engines, and PSC for rich burn engines. Factors are based on large population of engines. Factors are for engines at all loads, except as indicated. SCC = Source Classification Code. TOC = Total Organic Compounds. PM-10 = Particulate Matter ≤ 10 microns (μm) aerodynamic diameter. A “<“ sign in front of a factor means that the corresponding emission factor is based on one-half of the method detection limit.

[b] Emission factors were calculated in units of (lb/MMBtu) based on procedures in EPA Method 19. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by the heat content of the fuel. If the heat content is not available, use 1020 Btu/scf. To convert from (lb/MMBtu) to (lb/hp-hr) use the following equation:

$$\text{lb/hp-hr} = (\text{lb/MMBtu})\,(\text{heat input, MMBtu/hr})\,(\text{1/operating HP, 1/hp})$$

[c] Emission tests with unreported load conditions were not included in the data set.

[d] Based on 99.5% conversion of the fuel carbon to CO_2. CO_2 [lb/MMBtu] = (3.67)(%CON)(C)(D)(1/h), where %CON = percent conversion of fuel carbon to CO_2, C = carbon content of fuel by weight (0.75), D = density of fuel, 4.1 E+04 lb/10^6 scf, and

h = heating value of natural gas (assume 1020 Btu/scf at 60°F).

[e] Based on 100% conversion of fuel sulfur to SO_2. Assumes sulfur content in natural gas of 2,000 gr/10^6scf.

[f] Emission factor for TOC is based on measured emission levels from 22 source tests.

[g] Emission factor for methane is determined by subtracting the VOC and ethane emission factors from the TOC emission factor. Measured emission factor for methane compares well with the calculated emission factor, 1.31 lb/MMBtu vs. 1.25 lb/MMBtu, respectively.

[h] VOC emission factor is based on the sum of the emission factors for all speciated organic compounds less ethane and methane.

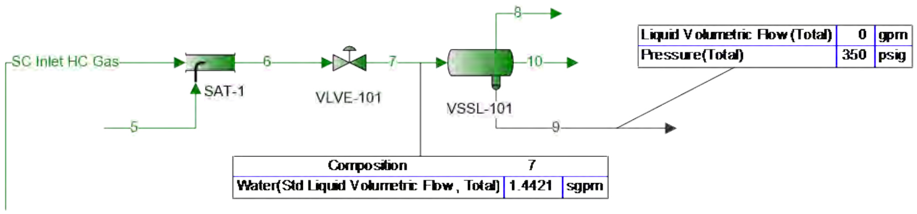
[i] Considered $\leq$ 1 μm in aerodynamic diameter. Therefore, for filterable PM emissions, PM10(filterable) = PM2.5(filterable).

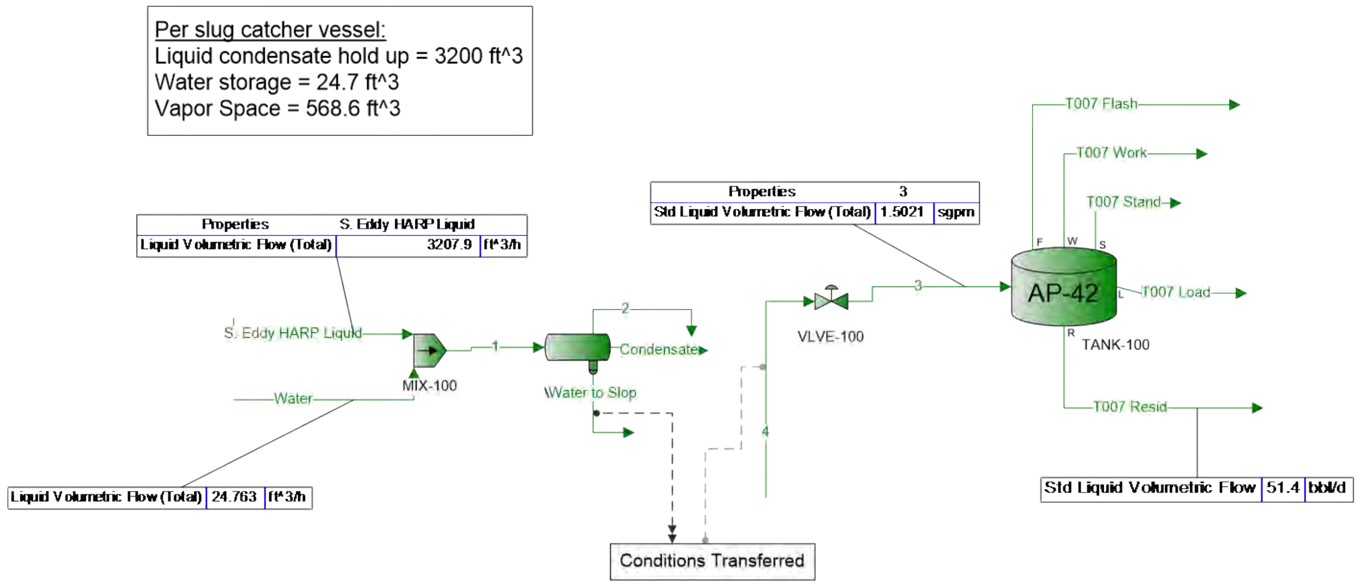
[j] PM Condensable = PM Condensable Inorganic + PM-Condensable Organic

[k] Hazardous Air Pollutant as defined by Section 112(b) of the Clean Air Act.

[l] For lean burn engines, aldehyde emissions quantification using CARB 430 may reflect interference with the sampling compounds due to the nitrogen concentration in the stack. The presented emission factor is based on FTIR measurements. Emissions data based on CARB 430 are available in the background report.

Flash Emissions for T007





Process Streams		T007 Flash	T007 Load	T007 Resid	T007 Stand	T007 Work
Composition	Status:	Solved	Solved	Solved	Solved	Solved
Phase: Vapor	From Block:	TANK-100	TANK-100	TANK-100	TANK-100	TANK-100
	To Block:	--	--	--	--	--
Mass Flow		lb/h	lb/h		lb/h	lb/h
CO2		0.133378	0.00189041		0.00119717	0.00373511
N2		0.00253144	5.20004E-07		3.29312E-07	1.02744E-06
Methane		0.234813	0.000134200		8.49873E-05	0.000265156
Ethane		0.140636	9.19687E-05		5.82427E-05	0.000181714
Propane		0.0718049	8.00178E-06		5.06744E-06	1.58101E-05
i-Butane		0.00714517	1.91629E-07		1.21357E-07	3.78626E-07
n-Butane		0.0203610	4.96324E-07		3.14316E-07	9.80649E-07
2,2-Dimethylpropane		3.41758E-05	2.76260E-10		1.74953E-10	5.45842E-10
i-Pentane		0.00295933	1.89223E-08		1.19833E-08	3.73871E-08
n-Pentane		0.00122503	2.37697E-09		1.50531E-09	4.69648E-09
2,2-Dimethylbutane		9.32821E-06	1.07660E-11		6.81797E-12	2.12717E-11
Cyclopentane		0	0		0	0
2,3-Dimethylbutane		0.000129139	2.78977E-10		1.76673E-10	5.51210E-10
2-Methylpentane		0.000230393	2.45186E-10		1.55274E-10	4.84445E-10
3-Methylpentane		0.000273982	6.25413E-10		3.96067E-10	1.23571E-09
n-Hexane		0.000174999	6.59635E-11		4.17739E-11	1.30332E-10
Methylcyclopentane		0.000218516	6.08282E-10		3.85218E-10	1.20186E-09
Benzene		0.0132306	2.13091E-06		1.34948E-06	4.21031E-06
Cyclohexane		0.000339756	1.53830E-09		9.74191E-10	3.03942E-09
2-Methylhexane		1.68889E-05	3.60261E-12		2.28149E-12	7.11813E-12
3-Methylhexane		0	0		0	0
2,2,4-Trimethylpentane		2.55548E-05	3.43200E-12		2.17345E-12	6.78104E-12
n-Heptane		3.56897E-05	2.86606E-12		1.81504E-12	5.66283E-12
Methylcyclohexane		8.79239E-05	7.94464E-11		5.03125E-11	1.56972E-10
Toluene		0.00376847	1.33734E-07		8.46922E-08	2.64235E-07
n-Octane		9.08574E-07	8.57030E-15		5.42748E-15	1.69334E-14
Ethylbenzene		0.000124212	1.26097E-09		7.98555E-10	2.49145E-09
m-Xylene		2.28563E-05	1.33288E-10		8.44099E-11	2.63354E-10
o-Xylene		0.000421244	4.38913E-09		2.77959E-09	8.67215E-09
n-Nonane		1.27632E-07	3.12644E-16		1.97994E-16	6.17729E-16
n-Decane		3.44277E-09	6.94417E-19		4.39766E-19	1.37205E-18
Undecane		8.55938E-11	6.20916E-21		3.93219E-21	1.22682E-20
Dodecane		2.66972E-11	1.98251E-21		1.25550E-21	3.91709E-21
Water		0.0179314	3.95852E-05		2.50689E-05	7.82135E-05

Process Streams		T007 Flash	T007 Load	T007 Resid	T007 Stand	T007 Work
Properties	**Status:**	Solved	Solved	Solved	Solved	Solved
Phase: Vapor	**From Block:**	TANK-100	TANK-100	TANK-100	TANK-100	TANK-100
	To Block:	--	--	--	--	--
Property	**Units**					
Temperature	°F	79.2053	79.2053		79.2053	79.2053
Pressure	psig	-1.81595	-1.81595		-1.81595	-1.81595
Mole Fraction Vapor	%	100	100		100	100
Mole Fraction Light Liquid	%	0	0		0	0
Mole Fraction Heavy Liquid	%	0	0		0	0
Phase Mole Fraction	%	100	13.4249		13.4249	13.4249
Molecular Weight	lb/lbmol	25.2452	38.1519		38.1519	38.1519
Mass Density	lb/ft^3	0.0564449	0.0853451		0.0853451	0.0853451
Molar Flow	lbmol/h	0.0258240	5.68167E-05		3.59814E-05	0.000112260
Mass Flow	lb/h	0.651930	0.00216766		0.00137276	0.00428293
Vapor Volumetric Flow	ft^3/h	11.5499	0.0253988		0.0160848	0.0501836
Liquid Volumetric Flow	gpm	1.43998	0.00316661		0.00200538	0.00625666
Std Vapor Volumetric Flow	MMSCFD	0.000235195	5.17465E-07		3.27704E-07	1.02242E-06
Std Liquid Volumetric Flow	sgpm	0.00315865	6.15482E-06		3.89778E-06	1.21609E-05
Compressibility		0.996134	0.995639		0.995639	0.995639
Specific Gravity		0.871650	1.31729		1.31729	1.31729
API Gravity						
Enthalpy	Btu/h	-1351.68	-7.88170		-4.99139	-15.5729
Mass Enthalpy	Btu/lb	-2073.34	-3636.03		-3636.03	-3636.03
Mass Cp	Btu/(lb*°F)	0.409161	0.237816		0.237816	0.237816
Ideal Gas CpCv Ratio		1.23906	1.28190		1.28190	1.28190
Dynamic Viscosity	cP	0.0111200	0.0143701		0.0143701	0.0143701
Kinematic Viscosity	cSt	12.2987	10.5114		10.5114	10.5114
Thermal Conductivity	Btu/(h*ft*°F)	0.0156055	0.0112447		0.0112447	0.0112447
Surface Tension	lbf/ft					
Net Ideal Gas Heating Value	Btu/ft^3	1052.52	230.930		230.930	230.930
Net Liquid Heating Value	Btu/lb	15713.4	2205.07		2205.07	2205.07
Gross Ideal Gas Heating Value	Btu/ft^3	1158.34	256.574		256.574	256.574
Gross Liquid Heating Value	Btu/lb	17304.5	2460.23		2460.23	2460.23

Inlet Stream for F-001 (Gas)	
Component	**Mass Fraction (%)**
Hydrogen Sulfide	0
Nitrogen	3.538829845
Carbon Dioxide	3.280317616
Methane	57.05313454
Ethane	14.13458413
Propane	11.02638721
i-Butane	1.798158364
n-Butane	4.216596727
2,2-Dimethylpropane	0.033428867
i-Pentane	1.224412919
n-Pentane	1.279324499
2,2-Dimethylbutane	0.015859292
Cyclopentane	0
2,3-Dimethylbutane	0.138343572
2-Methylpentane	0.347523529
3-Methylpentane	0.19713613
n-Hexane	0.400739155
Methylcyclopentane	0.207266998
Benzene	0.085429758
Cyclohexane	0.187366259
2-Methylhexane	0.058323127
3-Methylhexane	0.067035915
2,2,4-Trimethylpentane	0
n-Heptane	0.305009246
Methylcyclohexane	0.164664219
Toluene	0.060471679
n-Octane	0.147028817
Ethylbenzene	0.004176951
m-Xylene	0.004116063
p-Xylene	0.004145743
o-Xylene	0
n-Nonane	0.02018884

Condensate Stream for F-001 (LL)	
Component	**Mass Fraction (%)**
Hydrogen Sulfide	0
Nitrogen	0
Carbon Dioxide	1.56E-12
Methane	3.41E-14
Ethane	2.94E-08
Propane	0.000634161
i-Butane	0.128229103
n-Butane	5.031456961
2,2-Dimethylpropane	0.158545918
i-Pentane	14.05103734
n-Pentane	17.18954573
2,2-Dimethylbutane	0.266527577
Cyclopentane	0
2,3-Dimethylbutane	2.563416485
2-Methylpentane	6.596582328
3-Methylpentane	3.881328456
n-Hexane	8.492380503
Methylcyclopentane	4.295514381
Benzene	1.519673324
Cyclohexane	4.138898529
2-Methylhexane	1.565672441
3-Methylhexane	1.873134659
2,2,4-Trimethylpentane	0
n-Heptane	9.463728444
Methylcyclohexane	5.067089098
Toluene	1.749635538
n-Octane	8.41525751
Ethylbenzene	0.244897106
m-Xylene	0.256298415
p-Xylene	0.249932323
o-Xylene	0
n-Nonane	2.800062758

September 26, 2016

Emission Control Application Data Sheet

Maxim Silencers
6545 N. ELDRIDGE PKWY
HOUSTON TX. 77041
Phone: 713-682-6777
Fax: 713-682-3628

Customer: **COMPASS** Project: **OPP# 2207-270-EPD** Date: **11/11/2022**

Customer Contact Powertherm Contact: Order/Quote #: **0**

Engine Data:

Engine Model:	**CAT 3608A4**		Speed:	**1000**	RPM
Fuel & Operating Type:	**Natural Gas Lean Burn**		Engine Power:	**2500**	Hp
				1880	KW
Exhaust Flow Rate:	**16069**	**acfm**	Exhaust Temperature:	**833**	°F
	27301	**m^3/hr**		**445**	°C
	29528	**lbs/hr**			

Catalyst Data:

Number of Core layers:	**1**						
Model:	**MCCOF3-6-2420C3**				Inlet Size:	**20**	in
Grade:	**Critical**				Outlet Size:	**24**	in
Body Diameter:	**54**	in			Body Length:	**182**	in
Estimated weight:	**4180**	lbs			Estimated Back Pressure of the unit:	**6.01**	in of WC
	1897	Kg				**15.0**	mbar
Core Part Number:	**ERH-1536-1, 15 X 36 SIZE**		Qty	**3**	Speed through inlet:	**5279**	ft/min
Cell Density	300	cpsi			Back Pressure across Element(s) only	2.66	in of WC
						6.6	mbar

Emission:

Min. Temp. at Core Face:	**752** °F	**400** °C	Catalyst Type:	**Oxidation**
Max. Temp. at Core Face:	**917** °F	**492** °C		
			O_2 in Exhaust	vol %
			H_2O in Exhaust	vol %

	Pollutant					
	NOx	CO	NMNEHC/VOC	CH_2O/CHCO	ORGANIC PM10	
Engine Out / Pre Emission:	**0.3**	**2.5**	**0.27**	**0.16**	**0**	g/bhp-hr
	72.19	**601.62**	**64.97**	**38.50**	**0.00**	mg/Nm3
Post Emission:	**0.300**	**0.600**	**0.700**	**0.040**	**0.000**	g/bhp-hr
	72.19	**144.39**	**168.45**	**9.63**	**0.00**	mg/Nm3
	0.0	***76.0***	***-159.3***	***75.0***	***50.0***	% Reduction
	1.65	3.31	3.86	0.22		lb/hr
	7.24	14.48	16.90	0.97		tons/year operation **8760** hr/year
	34.7	69.3	80.9	4.6		ppmv
						ppmvd @ 15% O2

Acoustics:

Frequency Band (Hz):	31.5	63	125	250	500	1000	2000	4000	8000	
Raw Noise SPL (dB) at 3.28 ft.:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	7 dBA
Estimated Attenuation (dB):	**24**	**35**	**37**	**31**	**28**	**24**	**25**	**29.5**	**30**	No Element
Plus:	**24**	**36**	**39**	**33**	**32**	**29**	**31**	**35.5**	**35**	One Element Layer
Silenced SPL (dB) at 3.28 ft.:	**-24**	**-36**	**-39**	**-33**	**-32**	**-29**	**-31**	**-35.5**	**-35**	-24.8 dBA

Warranty & Notes:

- **If Pre-Emission levels are not as noted above, contact Maxim Silencers for a re-quote.**
- To achieve Post Emissions levels detailed above, exhaust temperature and Pre-Emission data must be as specified.
- Maximum allowable exhaust temperature at core face is 1350°F.
- If applicable, the engine will require an air/fuel ratio controller to meet above emission levels. For Rich Burn engines λ must be 0.96 - 0.99.
- Catalyst cleaning/regeneration required, if initial backpressure increases by 2" of WC.
- Engine operation to be stable and reproducible.
- QAC is not designed to withstand a backfire, therefore measures should be taken prior to QAC unit to alleviate backfire pressure.
- Maximum lubrication oil consumption rate to be less than 0.0015 lb/bhp/hr.
- Lube oil sulfate ash contents should not exceed 0.5%.
- Phosphorus and/or Zinc should not exceed 5 ppmv in the exhaust stream.
- A high temperature alarm/shutdown to be maintained at downstream of catalyst at 1300°F.
- Fuel not to contain heavy or transition metals such as Pb, Ar, Zn, Cu, Sn, Fe, Ba, Ni, Cr etc.
- Chlorinated or Silicone containing compounds in the exhaust not to exceed 1 ppmv.
- Sulfur compounds in the exhaust gas stream not to exceed 25 ppmv.
- Performance guarantee is voided should the catalyst become masked or de-activated by any contaminant in the exhaust stream.
- Engine to be maintained and operated in accordance within manufacturer's recommended practice.
- Under no condition will Maxim Silencers assume any contingent liabilities.
- Operating manual is available online at www.maximsilencers.com or contact a Maxim sales representative.
- Nomenclature: QAC4-292-8, 4 is grade (Super Critical), 29 is catalyst block size, 2 is no. of catalyst(s) and 8 is flange diameter.
- Organic PM10 are estimate only and not a guarantee because of the variability in fuels and additives which change PM10.
- Maxim Silencers standard one year warranty applies.

Rev level: 86

G3608

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
Enterprise

CATERPILLAR®

GAS COMPRESSION APPLICATION

ENGINE SPEED (rpm):	1000
COMPRESSION RATIO:	7.6
AFTERCOOLER TYPE:	SCAC
AFTERCOOLER - STAGE 2 INLET (°F):	130
AFTERCOOLER - STAGE 1 INLET (°F):	174
JACKET WATER OUTLET (°F):	190
ASPIRATION:	TA
COOLING SYSTEM:	JW+1AC, OC+2AC
CONTROL SYSTEM:	ADEM4
EXHAUST MANIFOLD:	DRY
COMBUSTION:	LOW EMISSION
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.3
SET POINT TIMING:	18

RATING STRATEGY:	STANDARD
RATING LEVEL:	CONTINUOUS
FUEL SYSTEM:	GAV
	WITH AIR FUEL RATIO CONTROL

SITE CONDITIONS:

FUEL:	Nat Gas
FUEL PRESSURE RANGE(psig): (See note 1)	58.0-70.3
FUEL METHANE NUMBER:	95.2
FUEL LHV (Btu/scf):	912
ALTITUDE(ft):	3000
INLET AIR TEMPERATURE(°F):	110
STANDARD RATED POWER:	2500 bhp@1000rpm

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	2500	2500	1875	1250
INLET AIR TEMPERATURE			°F	110	110	110	110
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(3)	Btu/bhp-hr	6848	6848	7075	7573
FUEL CONSUMPTION (HHV)		(3)	Btu/bhp-hr	7598	7598	7849	8403
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(4)(5)	ft3/min	6636	6636	5029	3419
AIR FLOW	(WET)	(4)(5)	lb/hr	27720	27720	21007	14282
FUEL FLOW (60°F, 14.7 psia)			scfm	313	313	242	173
INLET MANIFOLD PRESSURE		(6)	in Hg(abs)	104.4	104.4	78.9	55.1
EXHAUST TEMPERATURE - ENGINE OUTLET		(7)	°F	833	833	876	941
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(5)(8)	ft3/min	16069	16069	12600	9005
EXHAUST GAS MASS FLOW	(WET)	(5)(8)	lb/hr	28528	28528	21633	14728
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(9)(10)	g/bhp-hr	0.30	0.30	0.30	0.30
CO		(9)(10)	g/bhp-hr	2.50	2.50	2.49	2.50
THC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	4.41	4.41	4.68	4.75
NMHC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	0.41	0.41	0.43	0.44
NMNEHC (VOCs) (mol. wt. of 15.84)		(9)(10)(11)	g/bhp-hr	0.27	0.27	0.29	0.30
HCHO (Formaldehyde)		(9)(10)	g/bhp-hr	0.16	0.16	0.17	0.20
CO2		(9)(10)	g/bhp-hr	425	425	441	470
EXHAUST OXYGEN		(9)(12)	% DRY	11.3	11.3	11.1	10.7
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(13)	Btu/min	27700	27700	23042	18866
HEAT REJ. TO ATMOSPHERE		(13)	Btu/min	11186	11186	11118	10432
HEAT REJ. TO LUBE OIL (OC)		(13)	Btu/min	12553	12553	11937	10885
HEAT REJ. TO A/C - STAGE 1 (1AC)		(13)(14)	Btu/min	27175	27175	13666	3763
HEAT REJ. TO A/C - STAGE 2 (2AC)		(13)(14)	Btu/min	9026	9026	5673	2840

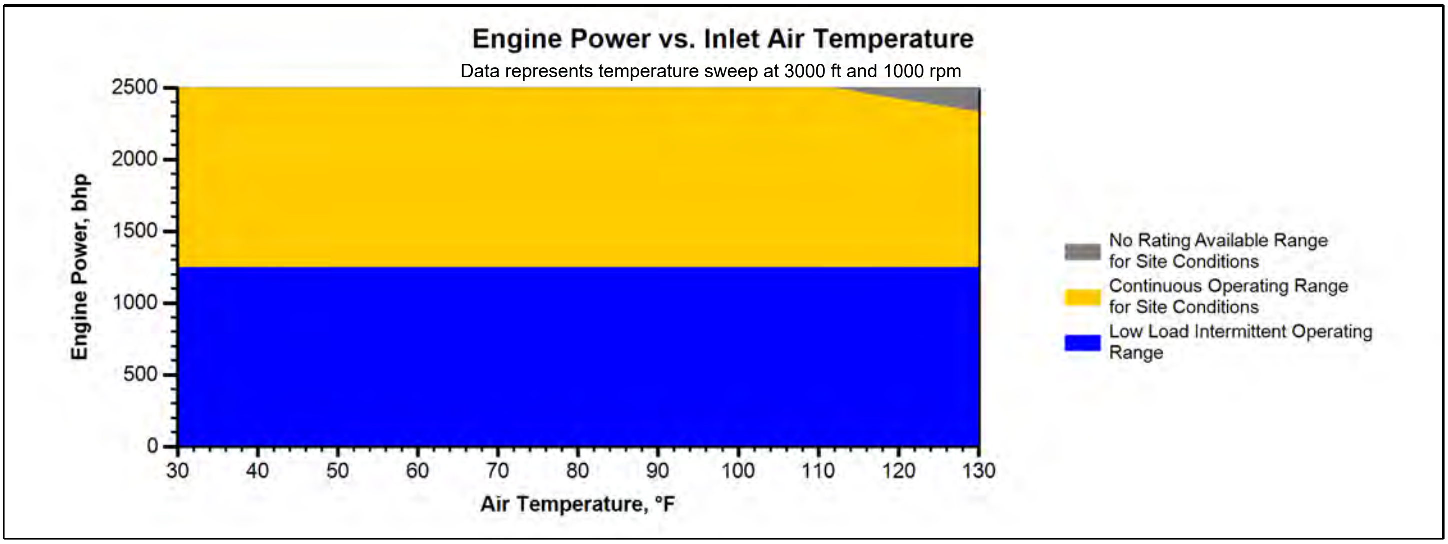
COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+1AC)	(14)(15)	Btu/min	59003
TOTAL STAGE 2 AFTERCOOLER CIRCUIT (OC+2AC)	(14)(15)	Btu/min	24540
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

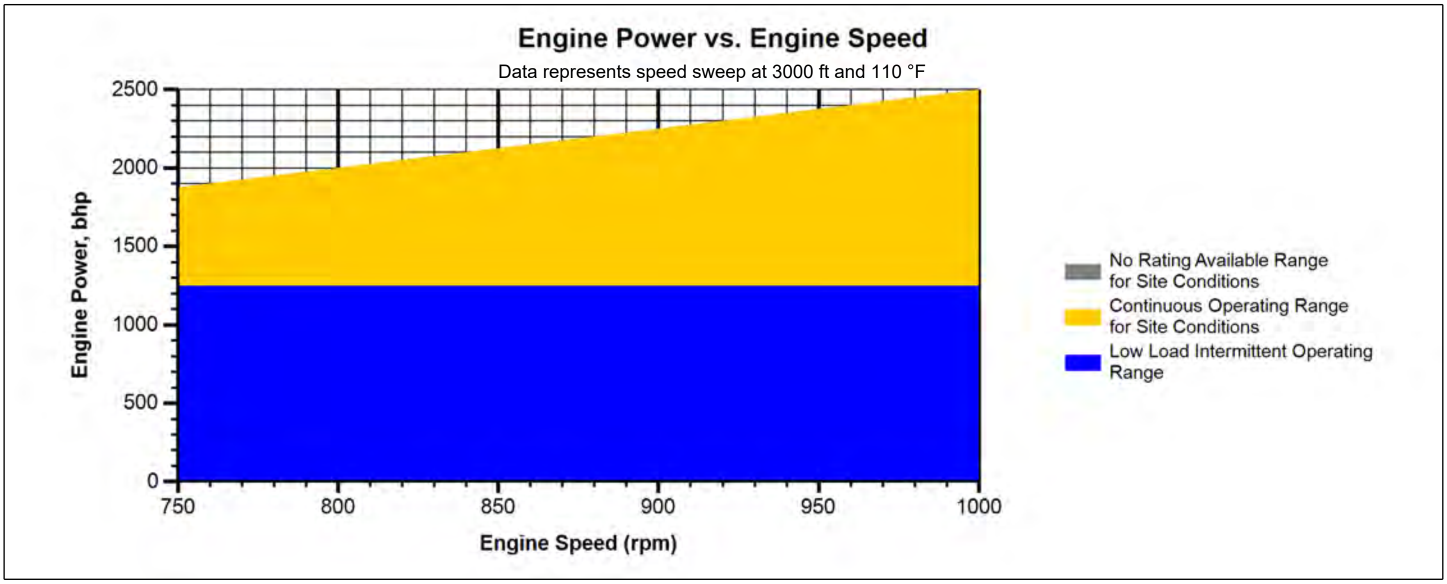
CONDITIONS AND DEFINITIONS

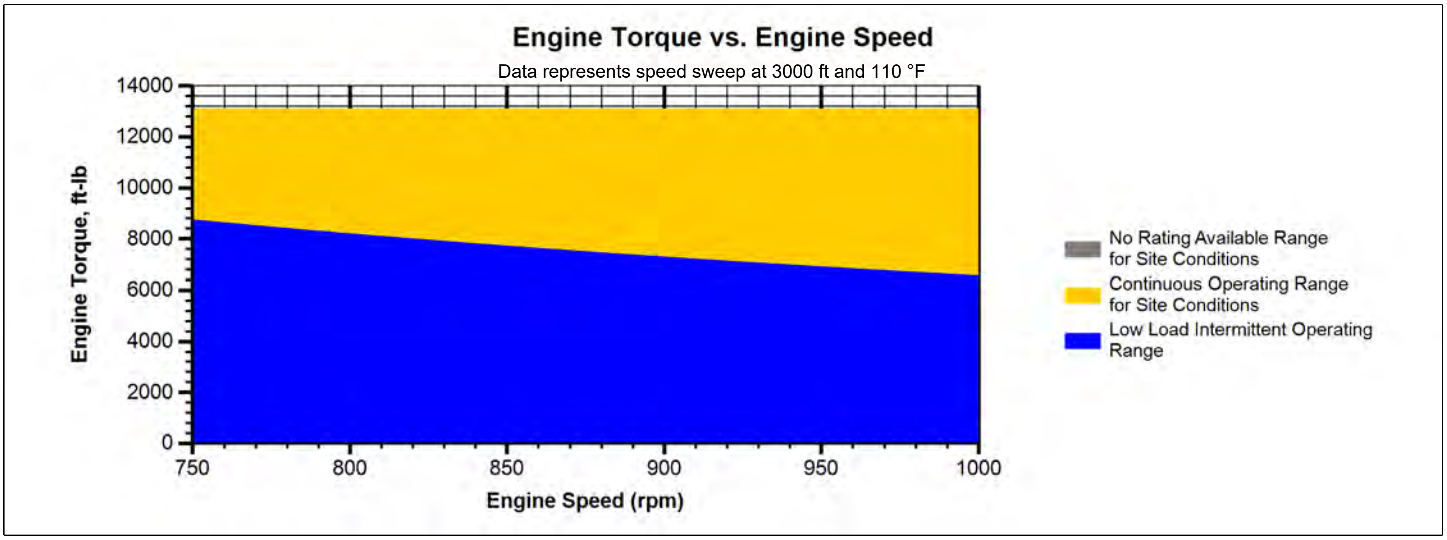
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature for the specified fuel at site altitude and reduced inlet air temperature. Refer to product O&M manual for details on additional lower load capability. No overload permitted at rating shown.

For notes information consult page three.

PREPARED BY: ,
Data generated by GERP Web Version 2.2.0.17
Ref. Dta Set EM1410-04-001, Printed 11Nov2022







Note:
At site conditions of 3000 ft and 110°F inlet air temp., constant torque can be maintained down to 750 rpm. The minimum speed for loading at these conditions is 750 rpm.

NOTES:

1. Fuel pressure range specified is to the engine gas shutoff valve (GSOV). Additional fuel train components should be considered in pressure and flow calculations.

2. Engine rating is with two engine driven water pumps. Tolerance is ± 3% of full load.

3. Fuel consumption tolerance is ± 2.5% of full load data.

4. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.

5. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.

6. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.

7. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.

8. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of ± 6 %.

9. Emissions data is at engine exhaust flange prior to any after treatment.

10. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate the maximum values expected under steady state conditions. Fuel methane number cannot vary more than ± 3. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

11. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ

12. Exhaust Oxygen level is the result of adjusting the engine to operate at the specified NOx level. Tolerance is ± 0.5.

13. Heat rejection values are nominal. Tolerances, based on treated water, are ± 10% for jacket water circuit, ± 50% for radiation, ± 20% for lube oil circuit, and ± 5% for aftercooler circuit.

14. Aftercooler heat rejection includes an aftercooler heat rejection factor for the site elevation and inlet air temperature specified. Aftercooler heat rejection values at part load are for reference only. Do not use part load data for heat exchanger sizing.

15. Cooling system sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
Enterprise

CATERPILLAR®

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	97.1350	97.1350
Ethane	C2H6	1.5540	1.5540
Propane	C3H8	0.0410	0.0410
Isobutane	iso-C4H10	0.0000	0.0000
Norbutane	nor-C4H10	0.0000	0.0000
Isopentane	iso-C5H12	0.0000	0.0000
Norpentane	nor-C5H12	0.0000	0.0000
Hexane	C6H14	0.0000	0.0000
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	1.2480	1.2480
Carbon Dioxide	CO2	0.0000	0.0000
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0220	0.0220
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0000	0.0000
Helium	HE	0.0000	0.0000
Neopentane	neo-C5H12	0.0000	0.0000
Octane	C8H18	0.0000	0.0000
Nonane	C9H20	0.0000	0.0000
Ethylene	C2H4	0.0000	0.0000
Propylene	C3H6	0.0000	0.0000
TOTAL (Volume %)		100.0000	100.0000

Fuel Makeup:	Nat Gas
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	95.2
Lower Heating Value (Btu/scf):	912
Higher Heating Value (Btu/scf):	1012
WOBBE Index (Btu/scf):	1211
THC: Free Inert Ratio:	79.11
Total % Inerts (% N2, CO2, He):	1.25%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.998
Stoich A/F Ratio (Vol/Vol):	9.52
Stoich A/F Ratio (Mass/Mass):	16.80
Specific Gravity (Relative to Air):	0.567
Fuel Specific Heat Ratio (K):	1.314

CONDITIONS AND DEFINITIONS

Caterpillar Methane Number represents the knock resistance of a gaseous fuel. It should be used with the Caterpillar Fuel Usage Guide for the engine and rating to determine the rating for the fuel specified. A Fuel Usage Guide for each rating is included on page 2 of its standard technical data sheet.

RPC always applies to naturally aspirated (NA) engines, and turbocharged (TA or LE) engines only when they are derated for altitude and ambient site conditions.

Project specific technical data sheets generated by the Caterpillar Gas Engine Rating Pro program take the Caterpillar Methane Number and RPC into account when generating a site rating.

Fuel properties for Btu/scf calculations are at 60F and 14.696 psia.

Caterpillar shall have no liability in law or equity, for damages, consequently or otherwise, arising from use of program and related material or any part thereof.

FUEL LIQUIDS

Field gases, well head gases, and associated gases typically contain liquid water and heavy hydrocarbons entrained in the gas. To prevent detonation and severe damage to the engine, hydrocarbon liquids must not be allowed to enter the engine fuel system. To remove liquids, a liquid separator and coalescing filter are recommended, with an automatic drain and collection tank to prevent contamination of the ground in accordance with local codes and standards.

To avoid water condensation in the engine or fuel lines, limit the relative humidity of water in the fuel to 80% at the minimum fuel operating temperature.

GAS ENGINE TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1000	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	7.6	APPLICATION:	GAS COMPRESSION
AFTERCOOLER TYPE:	SCAC	RATING LEVEL:	CONTINUOUS
AFTERCOOLER - STAGE 2 INLET (°F):	130	FUEL:	NAT GAS
AFTERCOOLER - STAGE 1 INLET (°F):	174	FUEL SYSTEM:	GAV
JACKET WATER OUTLET (°F):	190		WITH AIR FUEL RATIO CONTROL
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig): (See note 1)	58.0-70.3
COOLING SYSTEM:	JW+1AC, OC+2AC	FUEL METHANE NUMBER:	85
CONTROL SYSTEM:	ADEM4	FUEL LHV (Btu/scf):	905
EXHAUST MANIFOLD:	DRY	ALTITUDE CAPABILITY AT 100°F INLET AIR TEMP. (ft):	4706
COMBUSTION:	LOW EMISSION		
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.3		

RATING		NOTES	LOAD	100%	75%	50%
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	2500	1875	1250
ENGINE EFFICIENCY	(ISO 3046/1)	(3)	%	38.1	36.8	34.4
ENGINE EFFICIENCY	(NOMINAL)	(3)	%	37.2	36.0	33.6
ENGINE DATA						
FUEL CONSUMPTION	(ISO 3046/1)	(4)	Btu/bhp-hr	6685	6906	7393
FUEL CONSUMPTION	(NOMINAL)	(4)	Btu/bhp-hr	6848	7075	7574
AIR FLOW (77°F, 14.7 psia)	(WET)	(5)(6)	ft3/min	6252	4738	3221
AIR FLOW	(WET)	(5)(6)	lb/hr	27723	21010	14283
FUEL FLOW (60°F, 14.7 psia)			scfm	315	244	174
COMPRESSOR OUT PRESSURE			in Hg(abs)	104.9	79.3	55.3
COMPRESSOR OUT TEMPERATURE			°F	379	307	223
AFTERCOOLER AIR OUT TEMPERATURE			°F	136	136	136
INLET MAN. PRESSURE		(7)	in Hg(abs)	104.4	78.9	55.1
INLET MAN. TEMPERATURE	(MEASURED IN PLENUM)	(8)	°F	136	136	136
TIMING		(9)	°BTDC	18	17	16
EXHAUST TEMPERATURE - ENGINE OUTLET		(10)	°F	833	876	941
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(6)(11)	ft3/min	16088	12616	9016
EXHAUST GAS MASS FLOW	(WET)	(6)(11)	lb/hr	28584	21676	14760
EMISSIONS DATA - ENGINE OUT						
NOx (as NO2)		(12)(13)	g/bhp-hr	0.30	0.30	0.30
CO		(12)(14)	g/bhp-hr	2.50	2.50	2.50
THC (mol. wt. of 15.84)		(12)(14)	g/bhp-hr	4.42	4.69	4.76
NMHC (mol. wt. of 15.84)		(12)(14)	g/bhp-hr	0.41	0.43	0.44
NMNEHC (VOCs) (mol. wt. of 15.84)		(12)(14)(15)	g/bhp-hr	0.28	0.29	0.30
HCHO (Formaldehyde)		(12)(14)	g/bhp-hr	0.16	0.17	0.20
CO2		(12)(14)	g/bhp-hr	426	442	471
EXHAUST OXYGEN		(12)(16)	% DRY	11.3	11.1	10.7
LAMBDA		(12)(16)		2.01	1.97	1.87
ENERGY BALANCE DATA						
LHV INPUT		(17)	Btu/min	285298	221058	157762
HEAT REJECTION TO JACKET WATER (JW)		(18)(26)	Btu/min	27698	23042	18866
HEAT REJECTION TO ATMOSPHERE		(19)	Btu/min	10994	10961	10310
HEAT REJECTION TO LUBE OIL (OC)		(20)(27)	Btu/min	12553	11937	10886
HEAT REJECTION TO EXHAUST (LHV TO 77°F)		(21)(22)	Btu/min	97849	78104	56771
HEAT REJECTION TO EXHAUST (LHV TO 350°F)		(21)	Btu/min	61035	50617	38964
HEAT REJECTION TO A/C - STAGE 1 (1AC)		(23)(26)	Btu/min	19561	9599	2375
HEAT REJECTION TO A/C - STAGE 2 (2AC)		(24)(27)	Btu/min	7683	4956	2595
PUMP POWER		(25)	Btu/min	2957	2957	2957

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1. (Standard reference conditions of 77°F, 29.60 in Hg barometric pressure.) No overload permitted at rating shown. Consult the altitude deration factor chart for applications that exceed the rated altitude or temperature.

Emission levels are at engine exhaust flange prior to any after treatment. Values are based on engine operating at steady state conditions, adjusted to the specified NOx level at 100% load. Tolerances specified are dependent upon fuel quality. Fuel methane number cannot vary more than ±3.

For notes information consult page three.

FUEL USAGE GUIDE

CAT METHANE NUMBER	<10	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	100
SET POINT TIMING	-	16	16	16	16	16	16	16	16	17	17	17	17	18	18	18	18	18
DERATION FACTOR	0	0.50	0.62	0.75	0.87	1	1	1	1	1	1	1	1	1	1	1	1	1

WOBBE INDEX(BTU/scfm)	700	850	1550	1870
DERATION FACTOR	0.77	1	1	0.9

ALTITUDE DERATION FACTORS AT RATED SPEED

INLET AIR TEMP °F	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	1	1	0.97	0.93	0.90	0.86	0.83	0.80	0.76	0.73	0.69	0.65	0.61
120	1	1	1	0.97	0.94	0.90	0.87	0.84	0.80	0.77	0.73	0.69	0.64
110	1	1	1	1	0.98	0.94	0.91	0.88	0.85	0.81	0.78	0.74	0.68
100	1	1	1	1	1	0.99	0.96	0.92	0.89	0.85	0.82	0.78	0.75
90	1	1	1	1	1	1	0.97	0.93	0.90	0.87	0.83	0.80	0.77
80	1	1	1	1	1	1	0.98	0.94	0.91	0.88	0.85	0.81	0.78
70	1	1	1	1	1	1	0.99	0.95	0.92	0.89	0.85	0.82	0.78
60	1	1	1	1	1	1	1	0.96	0.93	0.89	0.86	0.82	0.79
50	1	1	1	1	1	1	1	0.97	0.93	0.90	0.86	0.82	0.79

ALTITUDE (FEET ABOVE SEA LEVEL)

AFTERCOOLER HEAT REJECTION FACTORS (ACHRF)

INLET AIR TEMP °F	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	1.32	1.36	1.41	1.46	1.51	1.56	1.58	1.58	1.58	1.58	1.58	1.58	1.58
120	1.25	1.30	1.35	1.40	1.44	1.49	1.52	1.52	1.52	1.52	1.52	1.52	1.52
110	1.19	1.23	1.28	1.33	1.38	1.43	1.45	1.45	1.45	1.45	1.45	1.45	1.45
100	1.13	1.17	1.22	1.26	1.31	1.36	1.38	1.38	1.38	1.38	1.38	1.38	1.38
90	1.06	1.11	1.15	1.20	1.24	1.29	1.31	1.31	1.31	1.31	1.31	1.31	1.31
80	1	1.04	1.08	1.13	1.18	1.22	1.24	1.24	1.24	1.24	1.24	1.24	1.24
70	1	1	1.02	1.06	1.11	1.15	1.17	1.17	1.17	1.17	1.17	1.17	1.17
60	1	1	1	1	1.04	1.09	1.11	1.11	1.11	1.11	1.11	1.11	1.11
50	1	1	1	1	1	1.02	1.04	1.04	1.04	1.04	1.04	1.04	1.04

ALTITUDE (FEET ABOVE SEA LEVEL)

MINIMUM SPEED CAPABILITY AT THE RATED SPEED'S SITE TORQUE (RPM)

INLET AIR TEMP °F	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	750	750	750	750	750	750	750	750	750	750	750	750	750
120	750	750	750	750	750	750	750	750	750	750	750	750	750
110	750	750	750	750	750	750	750	750	750	750	750	750	750
100	750	750	750	750	750	750	750	750	750	750	750	750	750
90	750	750	750	750	750	750	750	750	750	750	750	750	750
80	750	750	750	750	750	750	750	750	750	750	750	750	750
70	750	750	750	750	750	750	750	750	750	750	750	750	750
60	750	750	750	750	750	750	750	750	750	750	750	750	750
50	750	750	750	750	750	750	750	750	750	750	750	750	750

ALTITUDE (FEET ABOVE SEA LEVEL)

FUEL USAGE GUIDE:

This table shows the derate factor and full load set point timing required for a given fuel. Note that deration and set point timing adjustment may be required as the methane number decreases. Methane number is a scale to measure detonation characteristics of various fuels. The methane number of a fuel is determined by using the Caterpillar methane number calculation.
The Fuel Lower Heating Value (LHV) table shows the derate factor required for a given fuel. To determine the actual power available, use the lowest factor between the Fuel LHV table and the Caterpillar Methane Number table.

ALTITUDE DERATION FACTORS:

This table shows the deration required for various air inlet temperatures and altitudes. Use this information along with the fuel usage guide chart to help determine actual engine power for your site. The derate factors shown do not account for the external cooling system capacity. The derate factors provided assume the external cooling system can maintain the specified cooling water temperatures at site conditions.

ACTUAL ENGINE RATING:

To determine the actual rating of the engine at site conditions, one must consider separately, limitations due to fuel characteristics and air system limitations. The Fuel Usage Guide deration establishes fuel limitations. The Altitude/ Temperature deration factors and RPC(reference the Caterpillar Methane Program) establish air system limitations. RPC comes into play when the Altitude/Temperature deration is less than 1.0 (100%). Under this condition, add the two factors together. When the site conditions do not require an Altitude/Temperature derate (factor is 1.0), it is assumed the turbocharger has sufficient capability to overcome the low fuel relative power, and RPC is ignored. To determine the actual power available, take the lowest rating between 1) and 2).
1) Fuel Usage Guide Deration
2) 1 - ((1 - Altitude / Temperature Deration) +(1 - RPC))

AFTERCOOLER HEAT REJECTION FACTORS(ACHRF):

To maintain a constant air inlet manifold temperature, as the inlet air temperature goes up, so must the heat rejection. As altitude increases, the turbocharger must work harder to overcome the lower atmospheric pressure. This increases the amount of heat that must be removed from the inlet air by the aftercooler. Use the aftercooler heat rejection factor (ACHRF) to adjust for inlet air temp and altitude conditions. See notes (26) and (27) for application of this factor in calculating the heat exchanger sizing criteria. Failure to properly account for these factors could result in detonation and cause the engine to shutdown or fail.

MINIMUM SPEED CAPABILITY AT THE RATED SPEED'S SITE TORQUE (RPM):

This table shows the minimum allowable engine turndown speed where the engine will maintain the Rated Speed's Torque for the given ambient conditions.

NOTES:

1. Fuel pressure range specified is to the engine gas shutoff valve (GSOV). Additional fuel train components should be considered in pressure and flow calculations.
2. Engine rating is with two engine driven water pumps. Tolerance is ± 3% of full load.
3. ISO 3046/1 engine efficiency tolerance is (+)0, (-)5% of full load % efficiency value. Nominal engine efficiency tolerance is ± 2.5% of full load % efficiency value.
4. ISO 3046/1 fuel consumption tolerance is (+)5, (-)0% of full load data. Nominal fuel consumption tolerance is ± 2.5% of full load data.
5. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.
6. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.
7. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.
8. Inlet manifold temperature is a nominal value with a tolerance of ± 9°F.
9. Timing indicated is for use with the minimum fuel methane number specified. Consult the appropriate fuel usage guide for timing at other methane numbers.
10. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.
11. Exhaust flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 6 %.
12. Emissions data is at engine exhaust flange prior to any after treatment.
13. NOx values are the maximum values expected under steady state conditions.
14. CO, CO2, THC, NMHC, NMNEHC, and HCHO are the maximum values expected under steady state conditions. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.
15. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ
16. Exhaust Oxygen tolerance is ± 0.5; Lambda tolerance is ± 0.05. Lambda and Exhaust Oxygen level are the result of adjusting the engine to operate at the specified NOx level.
17. LHV rate tolerance is ± 2.5%.
18. Heat rejection to jacket water value displayed includes heat to jacket water alone. Value is based on treated water. Tolerance is ± 10% of full load data.
19. Heat rejection to atmosphere based on treated water. Tolerance is ± 50% of full load data.
20. Lube oil heat rate based on treated water. Tolerance is ± 20% of full load data.
21. Exhaust heat rate based on treated water. Tolerance is ± 10% of full load data.
22. Heat rejection to exhaust (LHV to 77°F) value shown includes unburned fuel and is not intended to be used for sizing or recovery calculations.
23. Heat rejection to A/C - Stage 1 based on treated water. Tolerance is ±5% of full load data.
24. Heat rejection to A/C - Stage 2 based on treated water. Tolerance is ±5% of full load data.
25. Pump power includes engine driven jacket water and aftercooler water pumps. Engine brake power includes effects of pump power.
26. Total Jacket Water Circuit heat rejection is calculated as: (JW x 1.1) + (1AC x 1.05) + [0.85 x (1AC + 2AC) x (ACHRF - 1) x 1.05]. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.
27. Total Second Stage Aftercooler Circuit heat rejection is calculated as: (OC x 1.2) + (2AC x 1.05) + [(1AC + 2AC) x 0.15 x (ACHRF - 1) x 1.05]. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.

FREE FIELD MECHANICAL & EXHAUST NOISE

MECHANICAL: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	Overall	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	2500	126.0	86.3	94.5	99.2	98.8	101.7	105.9	108.0	110.7	108.4	107.3
75	1875	123.1	84.1	92.8	97.4	96.9	101.0	105.5	107.6	110.8	108.0	108.2
50	1250	120.9	86.3	99.0	97.2	97.3	101.3	104.6	108.5	111.8	108.0	107.2

MECHANICAL: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	2500	108.0	109.0	113.2	108.2	108.4	111.8	114.5	124.9	108.8	107.8	111.3
75	1875	107.5	107.6	113.0	107.5	108.0	111.1	116.8	112.2	106.9	115.0	105.5
50	1250	106.9	107.0	112.8	106.9	107.2	110.8	111.5	108.3	107.1	104.8	100.9

EXHAUST: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	Overall	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	2500	138.9	107.1	113.4	117.7	115.0	116.0	120.0	122.0	120.4	122.1	121.7
75	1875	136.7	107.6	108.7	110.6	109.0	110.9	114.2	115.4	113.2	115.3	116.0
50	1250	133.7	104.2	104.2	108.5	106.1	105.8	108.3	112.6	108.2	111.4	112.2

EXHAUST: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	2500	124.8	123.2	123.9	125.9	126.6	130.6	131.3	130.6	129.6	128.0	124.2
75	1875	119.5	119.8	121.2	124.8	126.6	129.0	129.8	128.5	127.4	124.3	119.6
50	1250	116.1	117.3	119.6	122.3	124.4	126.4	127.1	125.5	124.0	119.6	114.0

SOUND PARAMETER DEFINITION:
Sound Power Level Data - DM8702-03

Sound power is defined as the total sound energy emanating from a source irrespective of direction or distance. Sound power level data is presented under two index headings:
Sound power level -- Mechanical
Sound power level -- Exhaust

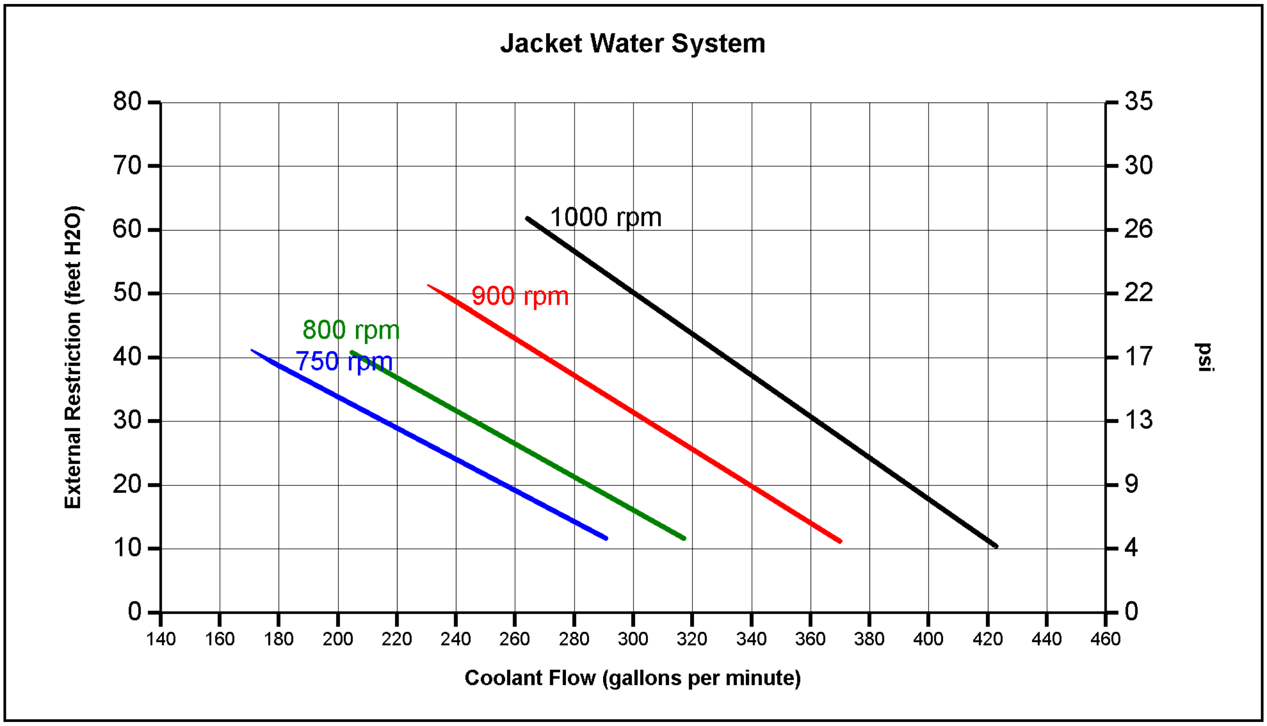
Mechanical: Sound power level data is calculated in accordance with ISO 3747. The data is recorded with the exhaust sound source isolated.

Exhaust: Sound power level data is calculated in accordance with ISO 6798 Annex A. Exhaust data is post-catalyst on gas engine ratings labeled as "Integrated Catalyst".

Measurements made in accordance with ISO 3747 and ISO 6798 for mechanical and exhaust sound level only. Frequency bands outside the displayed ranges are not measured, due to physical test, and environmental conditions that affect the accuracy of the measurement. No cooling system noise is included unless specifically indicated. Sound level data is indicative of noise levels recorded on one engine sample in a survey grade 3 environment.

How an engine is packaged, installed and the site acoustical environment will affect the site specific sound levels. For site specific sound level guarantees, sound data collection needs to be done on-site or under similar conditions.

ENGINE POWER (bhp):	2500	JACKET WATER OUTLET (°F):	190
ENGINE SPEED (rpm):	1000	COOLING SYSTEM:	JW+1AC, OC+2AC
EXHAUST MANIFOLD:	DRY	INLET MANIFOLD AIR TEMP (°F):	

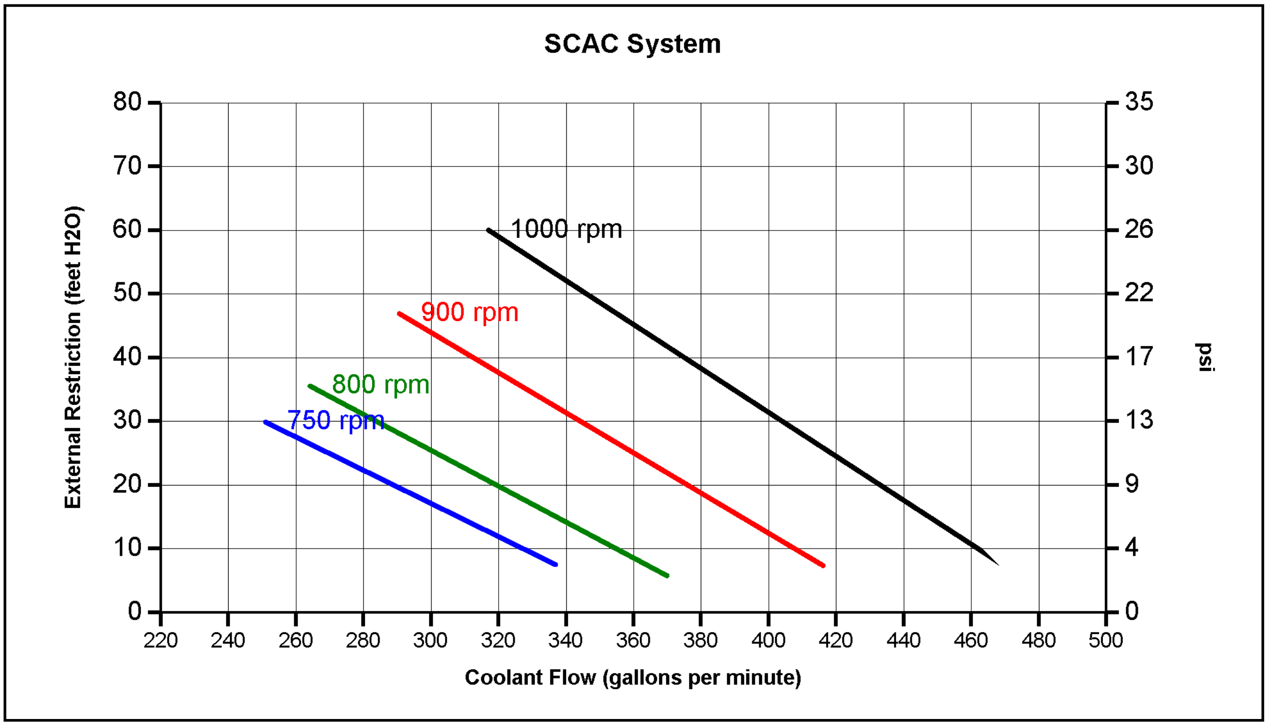


Coolant Flow vs. Allowable External Restriction

Engine Speed (rpm)	750	800	900	**1000**
Flow (GPM)	Restriction (feet H2O)			
180	38.7			
200	33.9			
220	29.0	36.9		
240	24.1	31.7	48.8	
260	19.2	26.5	43.0	
280	14.3	21.3	37.2	**56.7**
300		16.1	31.4	**50.2**
320			25.6	**43.7**
340			19.8	**37.2**
360			14.1	**30.8**
380				**24.3**
400				**17.8**
420				**11.3**

Notes:
- 7E8181 JW Pump
- Drive Ratio 2.5:1
- Curves indicate maximum allowable external resistance.
- Do not project curves beyond range shown.
- PSI conversion based on specific gravity of 1.0

ENGINE POWER (bhp):	2500	JACKET WATER OUTLET (°F):	190
ENGINE SPEED (rpm):	1000	COOLING SYSTEM:	JW+1AC, OC+2AC
EXHAUST MANIFOLD:	DRY	INLET MANIFOLD AIR TEMP (°F):	



Coolant Flow vs. Allowable External Restriction

Engine Speed (rpm)	750	800	900	**1000**
Flow (GPM)	Restriction (feet H2O)			
260	27.5			
280	22.3	31.1		
300	17.1	25.5	44.0	
320	11.9	19.8	37.7	**59.0**
340		14.2	31.3	**52.1**
360		8.5	25.0	**45.2**
380			18.7	**38.3**
400			12.4	**31.4**
420				**24.5**
440				**17.6**
460				**10.7**

Notes:
- 7E8181 SCAC Pump
- Drive Ratio 2.5:1
- Curves indicate maximum allowable external resistance.
- Do not project curves beyond range shown.
- PSI conversion based on specific gravity of 1.0

SpiralX

Table of Contents

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1 | INTRODUCTION

SpiralX LLC offers 30” or 48” enclosed combustors as an efficient method of destroying BTEX. They are designed for the destruction of volatile organic compounds (VOCs) at rates greater than 95%, and compliant with regulations governing upstream oil and gas facilities (40 CFR 60, Subpart OOOOa) and gas dehydration facilities (40 CFR 63, Subparts HH and HHH). They can be built on-skid with the condenser as a single unit, or separately on an independent skid. All our combustion units use a Profire™ Burner Management System for the most reliable and efficient means of monitoring the pilot flame, and various accessories allow the combustor to thrive in almost any weather condition. Please look over the many types of units and accessories available within this catalog to see which combustor assembly is right for you. Please call us at 469-480-8802 for any questions you may have.

1.1 | Competitive Advantage

SpiralX has modified product design per customer feedback and includes:

- Stainless steel burner grids for increased product life (2-3 years). Shown to outlast standard carbon steel and ceramic burner grids.
- Lifting supports located at the top of the combustor for easier handling during transport and a top ring bracket for adding optional accessories such as rain/snow caps and body extensions.
- Dual burner grid option for burning exhaust from two different sources.
- Precision laser cutting for more precise and consistent designs.

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1.2 | Important Safety Information

Combustors are an explosion and fire hazard and must always be handled and inspected with caution.

Combustors should always be level or at a slight incline from their condenser units to avoid condensate from entering the combustion chamber.

Condensate fluid is extremely flammable. All safety precautions should be used when operating the system.

Positions of components shown within this document may differ slightly from your actual unit.

EXPLOSION HAZARD

Do not attempt to service or open access panel unless proper safety precautions have been taken.

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2 | SIZING

SpiralX LLC combustors are made from A36 structural steel and come in 30” or 48” diameter bodies, depending on the amount of BTEX destruction required. These bodies are surrounded by a steel grate to protect objects from coming is direct contact with the combustion section during operation. The two sizes are listed below with their respective dimensions. Note that the on-site dimensions can change depending on the type of skid utilized for the combustor.

2.1 | 30” Combustor

HEIGHT: 106.00”

WEIGHT: 1300 LBS.

DIAMETER: 34.16” with grate. 37.86” max with legs.

2.2 | 48” Combustor

HEIGHT: 143.88”

WEIGHT: 1900 LBS.

DIAMETER: 54” with grate. 63.67” max with legs.

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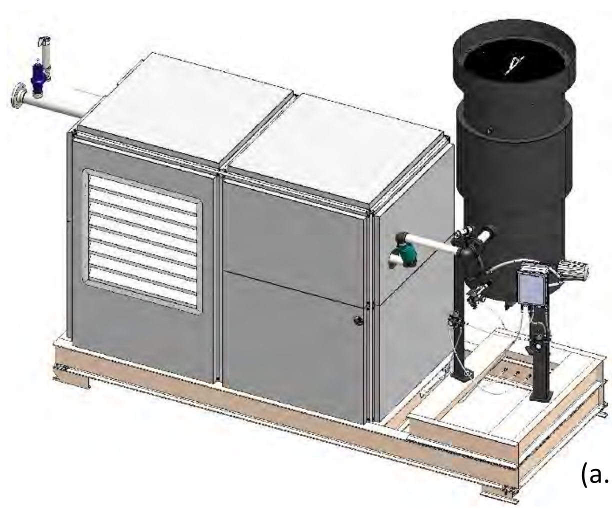
3 | CONFIGURATIONS AND ACCESSORIES

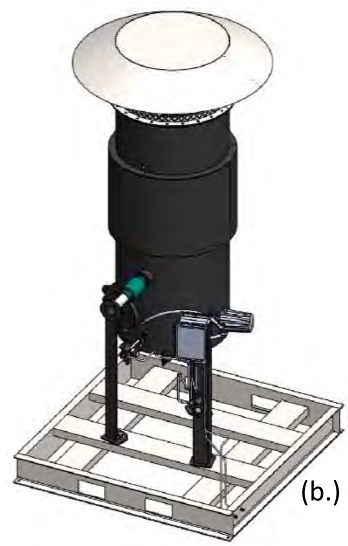
SpiralX combustors are made to suit many environments and regulations within the industry. Here is a list of different designs SpiralX offers.

3.1 | Skid Options

Spatial restrictions can sometimes limit the required footprint of the BTEX system, so SpiralX offers combustor designs that can be attached to or separate from the condenser system.



(a.)



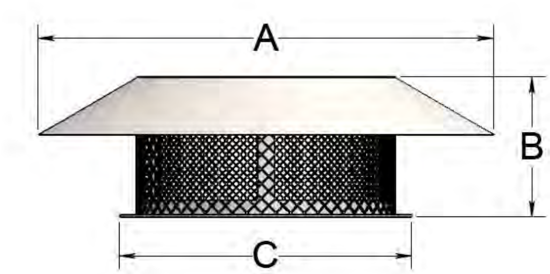
(b.)

Example of combustor attached to condenser skid (a.) and a standalone combustor skid that can be set close by on site (b.).

3.2 | Rain/Snow Cap

The rain cap can be attached to the top ring bracket to protect the pilot ignition from being extinguished during rainstorms. In the colder regions, the cap can prevent snow from filling up the combustor which can make initial pilot ignition very difficult and time consuming.

Plain Carbon Steel



	30”	***48”***
A	53”	69.75”
B	16.3”	16.3”
C	34”	52”
Weight	66 lbs.	107 lbs.

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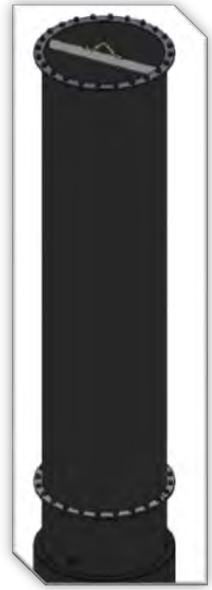
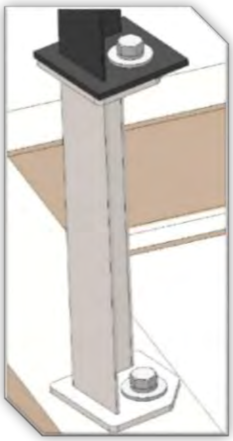
3.3 | Body Extension



SpiralX offers an extended 120” middle section to the combustor for sites that have safety regulations requiring destroyed gases to be vented at higher altitudes. The tops of these extensions have top ring brackets as well in case a rain cap is also needed.

3.4 | Leg Extension



Leg extensions can raise the combustor exhaust similar to a body extension by lifting the entire combustor, but only to an additional height of 20.75”. The main function of the leg extensions is to make the combustor inlet higher than the condenser outlet. This prevents condensate from entering the combustor which can be hazardous.

3.5 | Standard Accessories

3.5.1 – Profire™ BMS

All SpiralX combustors are fitted with Profire™ Burner Management Systems (BMS). The 2100 model offers advanced pilot monitoring with automatic reignition upon spark detection and self-regulating valve automation based on combustor temperature. All monitored data can optionally be communicated to a central location in real time and remotely controlled via the SCADA and Modbus RS-485 add-ons. This on-board data logging feature can record pilot status and other key operating parameters, allowing for historical data retrieval which can aid in compliance documentation.

For simpler systems that only require flame detection and ignition, a more cost-effective Flare Ignition System (1300F model) is available, designed solely for automatic ignition of flare stacks.

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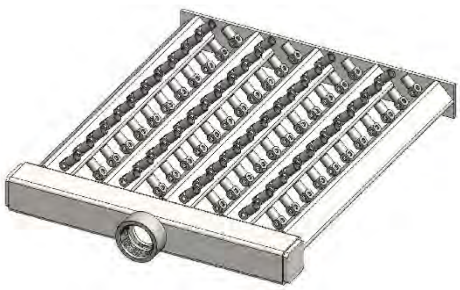
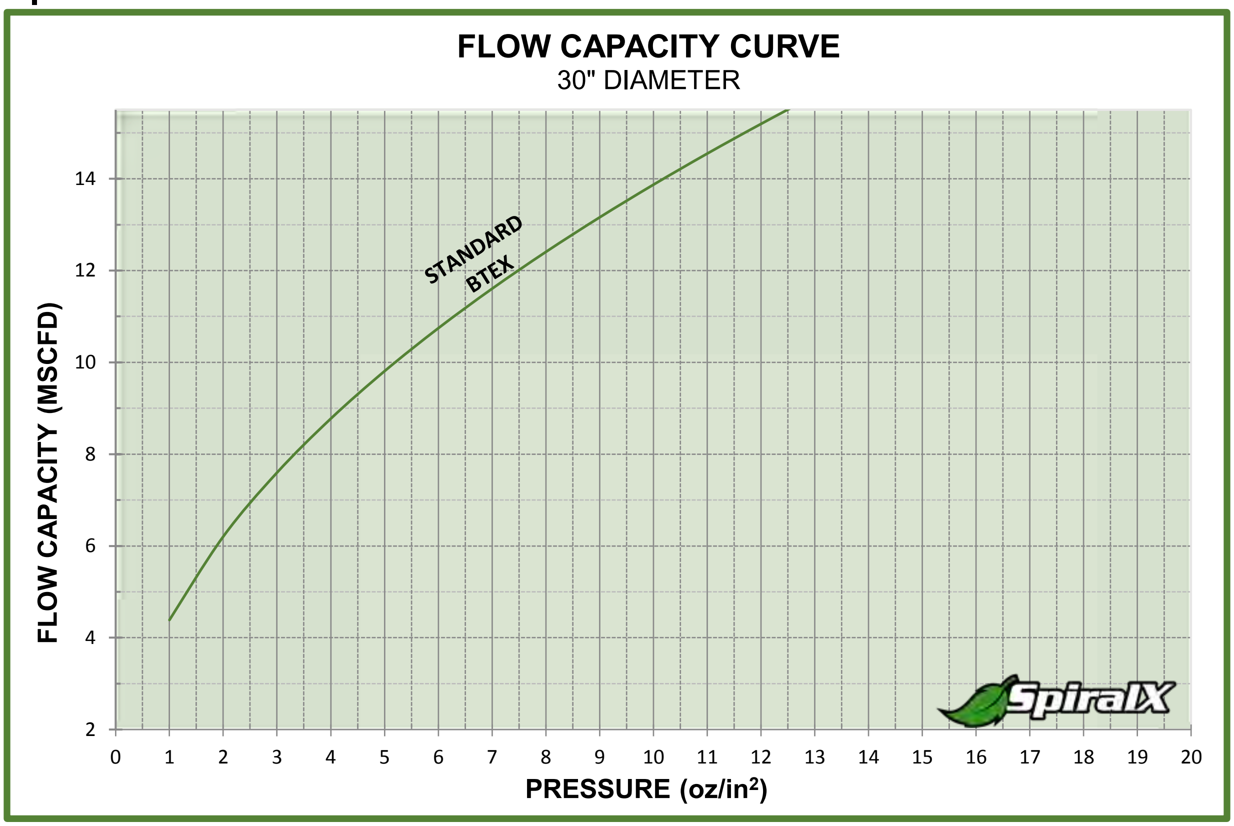
These systems are rated for Class 1, Div. II, but can be wired remotely to the combustor for sites with Div. I environments. Hook ups can be made with stainless steel tubing or JIC hosing.



3.5.2 – Stainless Steel Burner Grid

SpiralX burner grids are manufactured in-house with stainless steel for corrosion resistance and durability. A single coupling housing facilitates gas supply hook-up as well.

4 | PERFORMANCE



Flow capacity curve of BTEX for 30” diameter combustor as a function of pressure.

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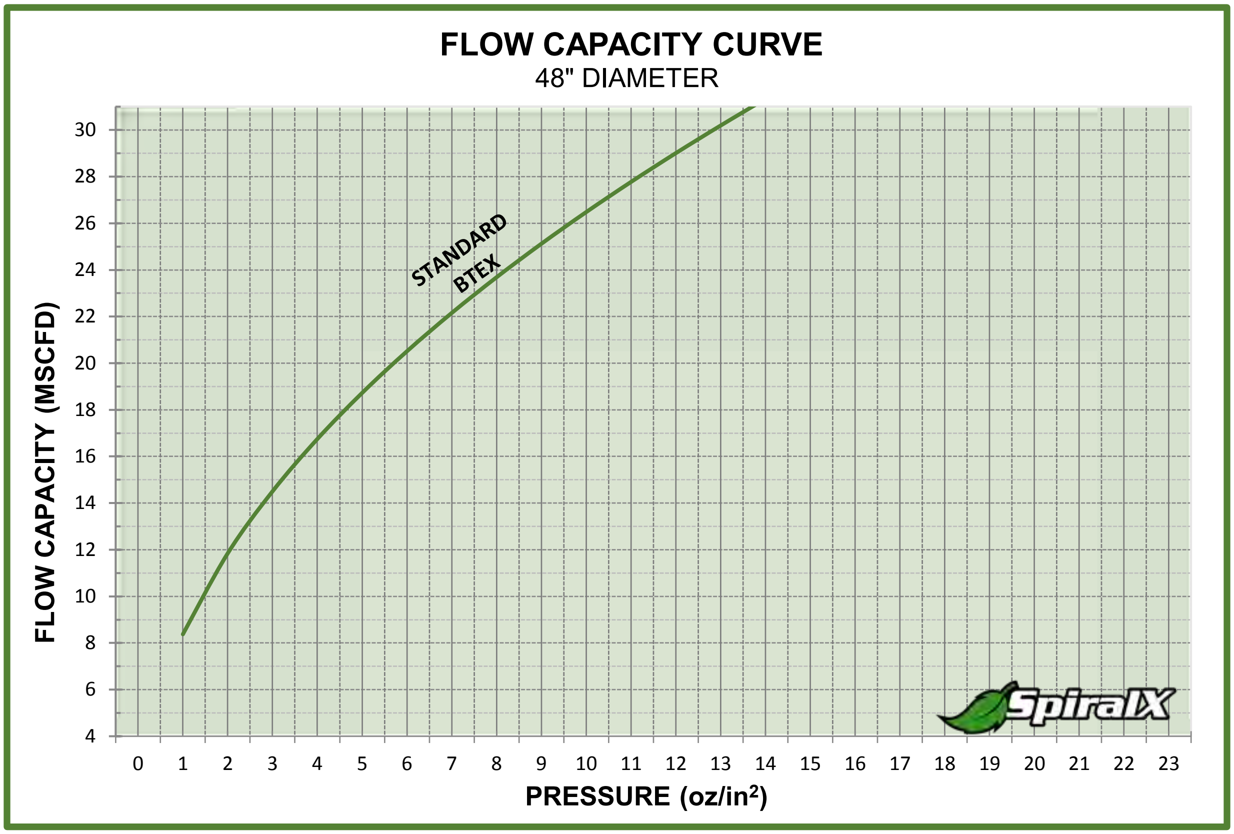

Flow capacity curve of BTEX for 48” diameter combustor as a function of pressure.

5 | DIAGRAMS & DRAWINGS

The following diagrams are typical for stand-alone combustors only. The dimensions and layouts of combustors on skid with condenser systems can vary based on system needs and series model.

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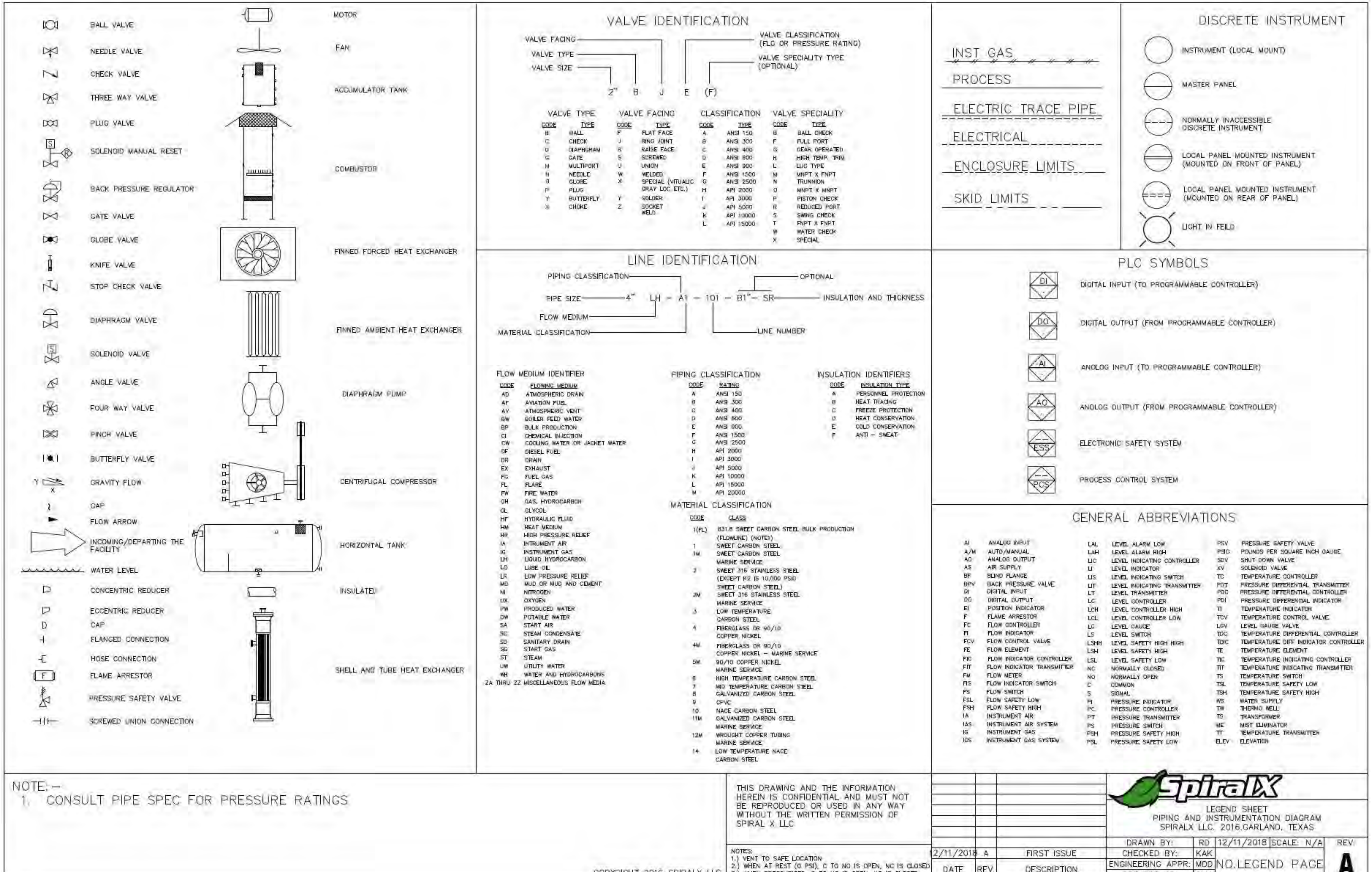

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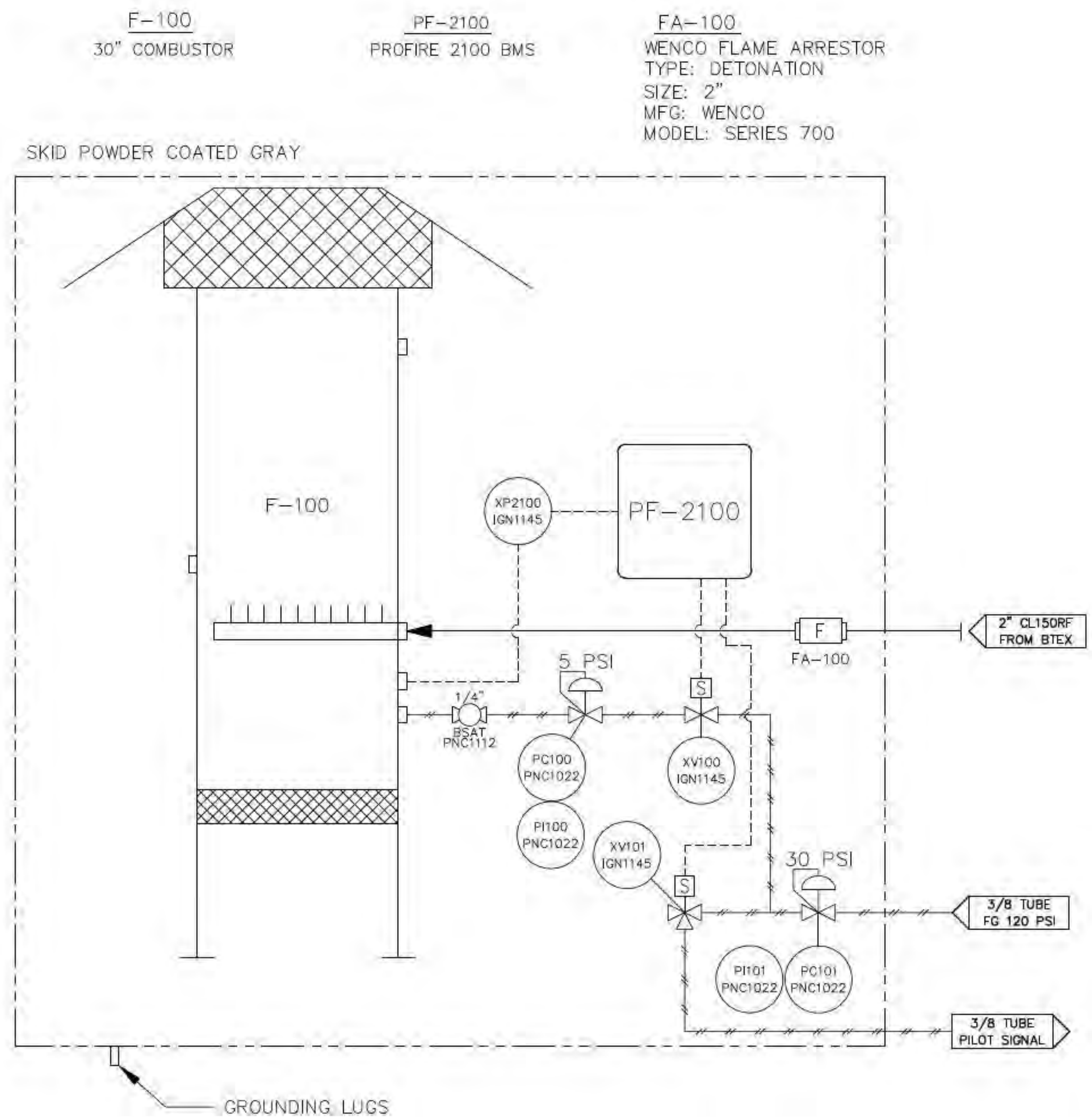
SALESBRO_05, REV. A, www.spiralxllc.com

P&ID for 30" combustor shown. 48" combustor will be similar.



VALVE TAG	PART NUMBER	DESCRIPTION
XP-2100	IGN1145	IGNITION COIL
PC-100	PNC1022	PRESSURE CONTROLLER
PI-100	PNC1022	PRESSURE INDICATOR
PC-101	PNC1022	PRESSURE CONTROLLER
PI-101	PNC1022	PRESSURE INDICATOR
XV100	IGN1145	TWO-WAY SOLENOID VALVE
XV101	IGN1145	THREE-WAY SOLENOID VALVE

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NOTES:
1.) VENT TO SAFE LOCATION
2.) WHEN AT REST (0 PSI), C TO NO IS OPEN, NC IS CLOSED
3.) WHEN PRESSURIZED, C TO NC IS OPEN, NO IS CLOSED

DATE	REV.	DESCRIPTION
2/14/2019	A	FIRST ISSUE

SpiralX
PIPING AND INSTRUMENTATION DIAGRAM
SPIRALX LLC. 2016
GARLAND, TEXAS

DRAWN BY:	RD	2/14/2019	SCALE: N/A
CHECKED BY:	KAK		
ENGINEERING APPR:	MDD	NO. SK300PFC	
PROJECT NO.	****		

REV. A

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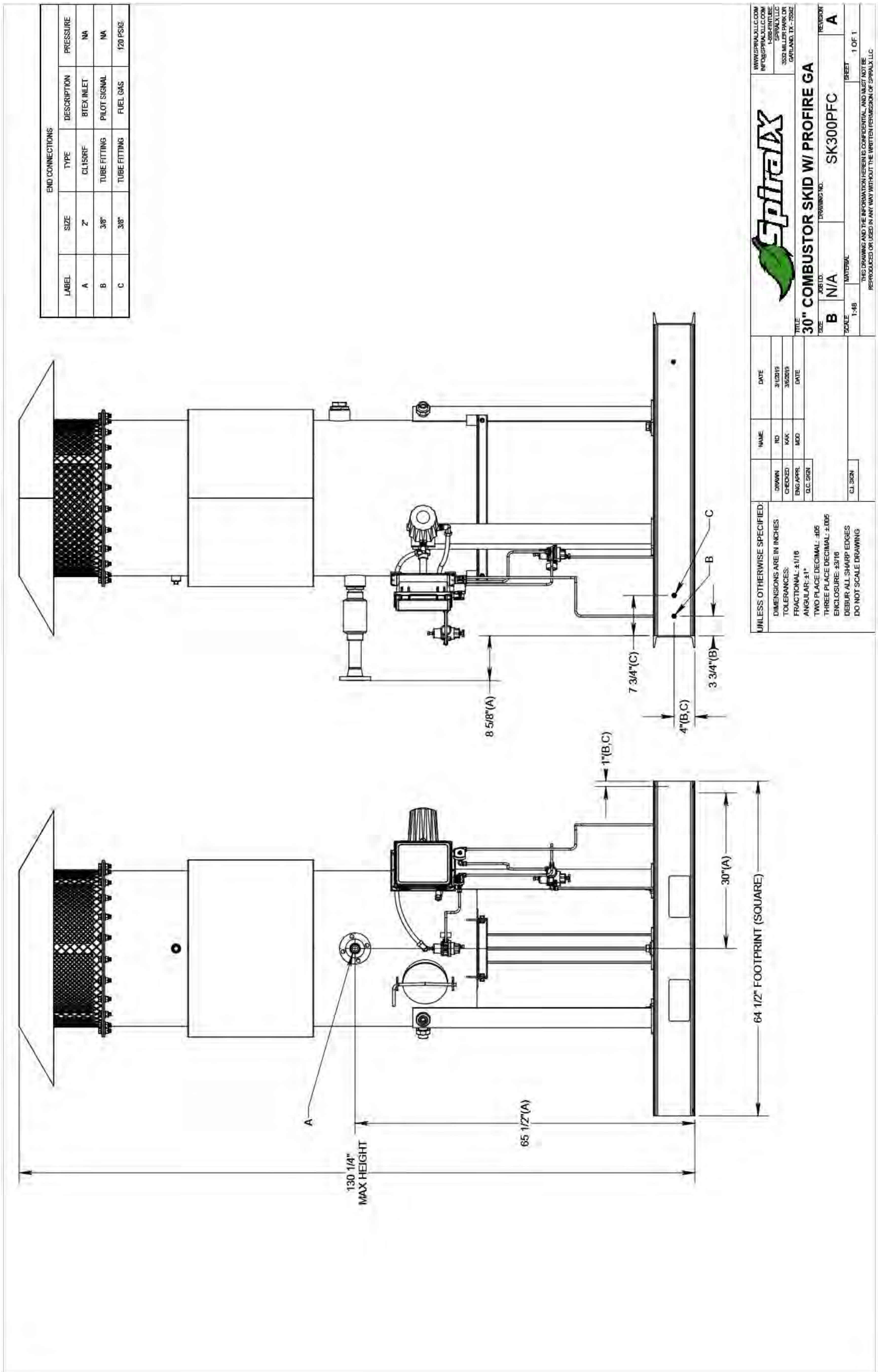
SALESBRO_05, REV. A, www.spiralxllc.com

5.2 | General Arrangement of Unit

For standalone skid. 30” (with rain cap, no leg or body extension) and 48” (no rain cap, leg or body extension).



END CONNECTIONS

LABEL	SIZE	TYPE	DESCRIPTION	PRESSURE
A	2"	CL150RF	BTEX INLET	NA
B	3/8"	TUBE FITTING	PILOT SIGNAL	NA
C	3/8"	TUBE FITTING	FUEL GAS	120 PSIG

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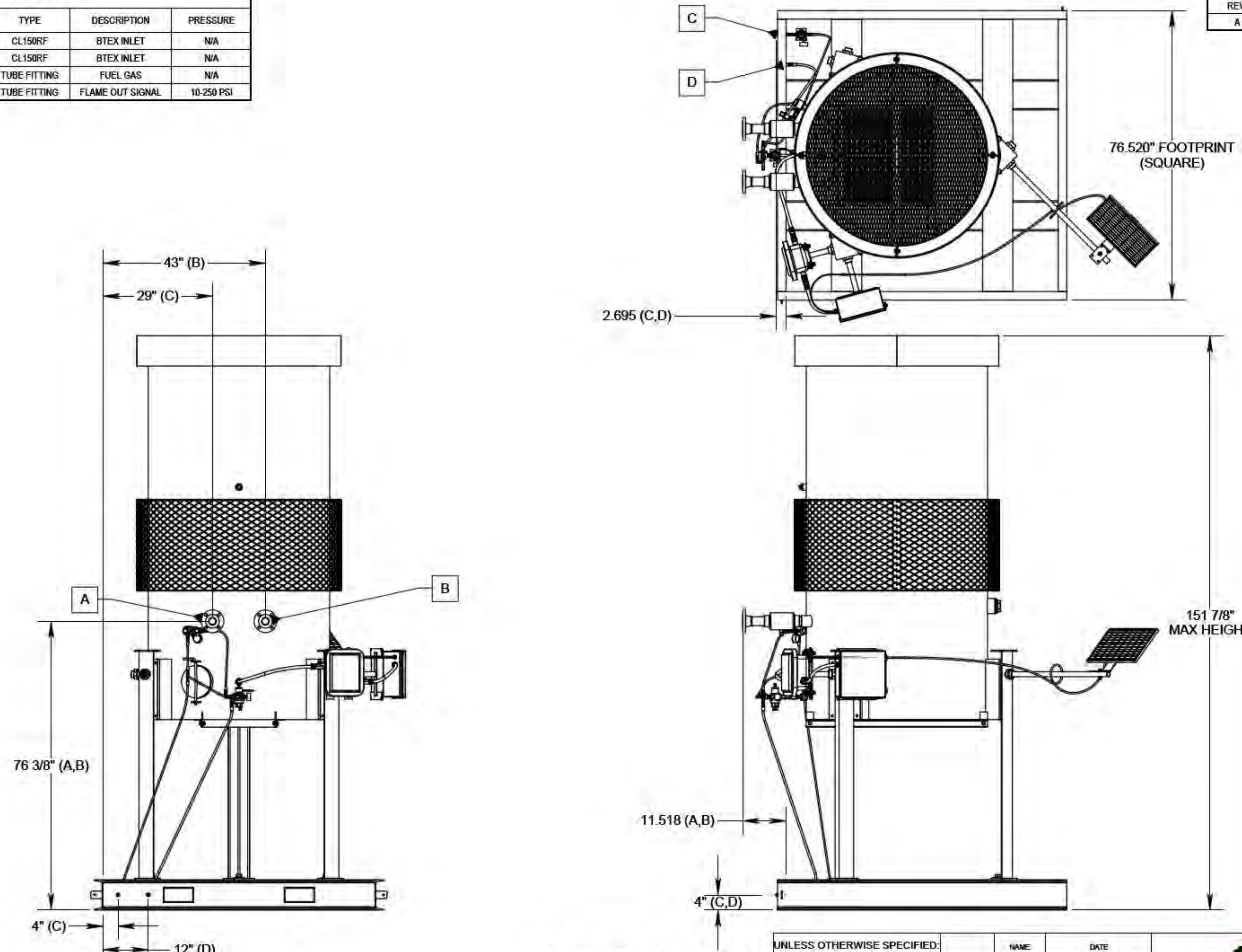
CONNECTIONS

LABEL	SIZE	TYPE	DESCRIPTION	PRESSURE
A	2"	CL150RF	BTEX INLET	N/A
B	2"	CL150RF	BTEX INLET	N/A
C	1/4"	TUBE FITTING	FUEL GAS	N/A
D	3/8"	TUBE FITTING	FLAME OUT SIGNAL	10-250 PSI

REVISIONS

REV.	DESCRIPTION	DATE	APPROVED
A	FIRST ISSUE	3/4/2019	MDD



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UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/16
ANGULAR: ±1°
TWO PLACE DECIMAL: ±05
THREE PLACE DECIMAL: ±.005
ENCLOSURE: ±3/16
DEBUR ALL SHARP EDGES
DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	KAK	3/4/2019
CHECKED	RD	DATE
ENG APPR.	MDD	DATE
Q.C. SIGN		
C.I. SIGN		

WWW.SPIRALXLLC.COM
INFO@SPIRALXLLC.COM
1-888-FINTUBE
SPIRALX LLC
3532 MILLER PARK DR
GARLAND, TX - 75042

TITLE
48" COMBUSTOR SKID GA

SIZE	JOB I.D.	DRAWING NO.	REVISION
B	N/A	48600	A

SCALE	MATERIAL	SHEET
1:28		1 OF 1

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October 2000
RG-109 (Draft)

TNRCC

Air Permit Technical Guidance for Chemical Sources:

Flares and Vapor Oxidizers

printed on recycled paper

Air Permits Division

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Waste Stream	Destruction/Removal Efficiency (DRE)		
VOC	98 percent (generic)		
	99 percent for compounds containing no more than 3 carbons that contain no elements other than carbon and hydrogen in addition to the following compounds: methanol, ethanol, propanol, ethylene oxide and propylene oxide		
H_2S	98 percent		
NH_3	case by case		
CO	case by case		
Air Contaminants	**Emission Factors**		
thermal NO_x	steam-assist:	high Btu	0.0485 lb/MMBtu
		low Btu	0.068 lb/MMBtu
	other:	high Btu	0.138 lb/MMBtu
		low Btu	0.0641 lb/MMBtu
fuel NO_x	NO_x is 0.5 wt percent of inlet NH_3, other fuels case by case		
CO	steam-assist:	high Btu	0.3503 lb/MMBtu
		low Btu	0.3465 lb/MMBtu
	other:	high Btu	0.2755 lb/MMBtu
		low Btu	0.5496 lb/MMBtu
PM	none, required to be smokeless		
SO_2	100 percent S in fuel to SO_2		

*The only exeption ot this is if inorganics might be emitted from the flare. In the case of landfills, the AP-42 PM factor may be used. In other cases, the emissions should be based on the composition of the waste stream routed to the flare.

ZEECO

- Burners
- Flares
- Incinerators
- Combustion Rentals
- Aftermarket Products and Services

22151 East 91st Street
Broken Arrow, OK 74014 USA
Ph: +1-918-258-8551
Fx: +1-918-251-5519
www.zeeco.com
sales@zeeco.com

April 13, 2016

Enterprise Products
1100 Louisiana St
Houston, TX 77002

Attention: Jing Li

RE: South Carlsbad Flare
Zeeco Ref.: 2016-00271RE-01 Rev 1

Dear Mr. Li,

The hydrocarbon destruction efficiency for the UF-24-38 Flare system proposed in quote number 2016-00271RE-01 Rev 1 will be 99% or higher for C1-C3 compounds and 98% or higher for all other compounds given as long as the flare is operated and maintained within the design operating parameters and accepted industry standard practices for this type of equipment.

Sincerely,

Andrew Grider
Applications Engineer
Zeeco Combustion Rental & Rapid Response Group

Zeeco, Inc.
22151 E. 91st St.
Broken Arrow, Oklahoma 74014
Phone: (918) 258-8551 Fax: (918) 251-5519

DELIVER TO: **Jenessa Duncan** **DATE:** February 10, 2016

COMPANY: **Enterprise Products**

SENDERS NAME: Andrew Grider / Andrew_Grider@zeeco.com **PHONE:** (918) 893-8448

YOUR REFERENCE: Budgetary Low BTU Flare Quote **QUOTE #:** 2016-00271RE-01 Rev 1

Design Information (Estimated):

	Design - Upset Condition 1	Fuel Gas-Normal	Fuel Gas-High BTU	Fuel Gas-Low BTU	Design + Fuel Gas Low BTU
Gas MW (lb/mol)	33.27	19.42	20.58	18.76	30.40
Gas LHV (Btu/Scf)	6	1,033	1,086	986	200
Flow Rate (MScfd)	7,690*	1,793*	1,685*	1,901*	9,591*
Available Pressure (psig)	6.97	>6.97	>6.97	>6.97	6.97

Scope of Supply:

1. (1) 38' OAH guy supported flare stack
2. (1) Utility (UF) flare tip w/ Integral Purge Reducing Velocity Seal
3. (1) Shepherd Ring
4. (1) Low Btu Windshield
5. (3) HSLF-Z-HEI Electric Ignition Pilot assembly with Retractable HEI & Type K Thermocouple
6. (1) Nema 4, Skid Mounted Pilot Ignition and Monitoring Panel
7. *(1) Optional Manual Knock Out Drum*

Required Utilities:

Pilot Fuel Gas:	65 Scfh Natural Gas at 15 Psig OR 25 Scfh Propane at 7 psig (per pilot)
Electricity:	120V / 1 Phase / 60 Hz
Shepherd Ring:	3.016 MMBtu/hr
*Enrichment Gas:	Flow rates for the 3 different fuel gas compositions are listed in the design information above. For the fuel gas that is being used, the specified flow rate is to be added to the gas being flared as far as possible upstream in the header in order to enrich the combined stream to a minimum required heating value of 200 Btu/SCF
Purge Gas:	435 Scfh of a gas that does not contain oxygen and will not go to its dew point at jobsite conditions

Equipment Description:

- Skid Mounted Guy Supported Flare Stack: The stack is mounted on a carbon steel skid that eliminates the need for a concrete foundation. The skid only needs to be set on firm, flat soil and anchored with the provided guy wires and screw anchors. Design wind speed for this type of installation is 90 mph.

- UF Flare Tip: The UF style flare tip provides high stability flaring while also ensuring reliability of the flame from purge all the way to max flow rates. Components located in the high heat zone will be made of 310SS or equivalent casting material. The flare tip will provide a VOC destruction efficiency of at least 98 wt%. An integral purge reducing velocity seal is also included to reduce the quantity of purge gas to prevent oxygen ingress through the flare tip at low rates.

- Shepherd Ring: A major key to obtaining high destruction efficiency with low Btu gases is to have a consistent ignition source circumferentially around the flare tip to ignite gases exiting the tip. High Btu flares usually have 3 pilots equally spaced around the tip and this is more than adequate. However, with low Btu flares three pilots are insufficient. This is a special concern with flares that are being enriched upstream. Not only do three pilots not provide the coverage required to ensure a cross sectional light off of flames across the tip. But with enriched gases, there is further danger of inadequate mixing of the gases and enrichment gas which can result in pilots being located in areas that do not have sufficient heating value to ignite. Addition of a Shepherd Ring to the flare tip has the same effect as adding an infinite number of pilots. The ring completely surrounds the exit of the tip and is drilled with burner ports that establish a "ring of fire" around the flare tip. The ring itself is lit with pilots but once the Shepherd Ring's fire has been established, it becomes the primary ignition source for the gases.

- Low BTU Windshield: Since gases have to be burned at very low velocities to ensure stable flames and meet national and state guidelines, the resultant flames are extremely vulnerable to atmospheric wind conditions. Even with only light to moderate wind conditions, flames can become unstable or be blown out. Addition of a Low Btu Windshield reduces the impact of wind on the flames. The addition of the low Btu windshield also helps capture a portion of the heat emitted as the gases are burned. This heat in turn helps produce higher destruction efficiencies by increasing the heat present at the tip exit which in turn promotes more consistent ignition of the gases.

- HSLF-HEI Ignition Pilot: The pilot is proven to stay lit in hurricane force weather conditions. Testing has shown that a stable flame is present even in wind speeds greater than 150 mph in addition to rainfall of over 10 inches per hour. The pilot will be equipped with a Type K thermocouple for continuous monitoring of the pilot status. The pilot also meets API 537 design requirements.

- Retractable Pilot Components: For ease of service, instead of retracting the entire pilot, only the components that need service are made retractable. This ensures that the location of the pilot with relation to the flare tip is maintained, ensuring proper ignition every time. The ignition probe and thermocouple are the only components that can need maintenance. Both components will be retractable so that maintenance can be performed without needing a shutdown of the flare or any special equipment.

- Automatic Ignition/Monitoring Panel: The automatic pilot ignition and monitoring panel will continuously monitor the pilot and attempt to relight if a pilot failure signal is received. The control panel (Nema 4 enclosure) will also be skid mounted.

- *Knock Out (KO) Drum* - For areas where liquid entrainment is possible in the flare header, we can offer a separate KO drum. The knock out drum will separate any liquids that condense as the flare gas moves through the header. The KO drum vessel comes complete with level gage and manual drain line. As an option, the drum can also be equipped with automatic liquid level monitoring, alarming and draining capabilities.

COMMERCIAL

BUDGETARY PURCHASE PRICING (+/- 15%): **Unit**

Guy-Supported 38' Tall Flare as Detailed (UF-24-38)	$100,000

OPTIONAL EQUIPMENT BUDGETARY PURCHASE PRICING (+/- 15%)

4' dia x 8' length Manual KOD	$30,000

Freight: Prepaid and added to our invoice at cost + 15%

Shipping: Ex-works (Point of Manufacture) per Incoterms 2010

Schedule: The flare equipment offered can be readied for shipment within 6-8 weeks ARO. *Please contact Zeeco if your project requires a faster delivery.*

Storage: Zeeco will provide space for storage of each unit up to 2 months after notification of readiness to ship free of charge. If you require storage periods longer than 2 months, a fee of 1% of the equipment value will be charged per month until the equipment is moved off site.

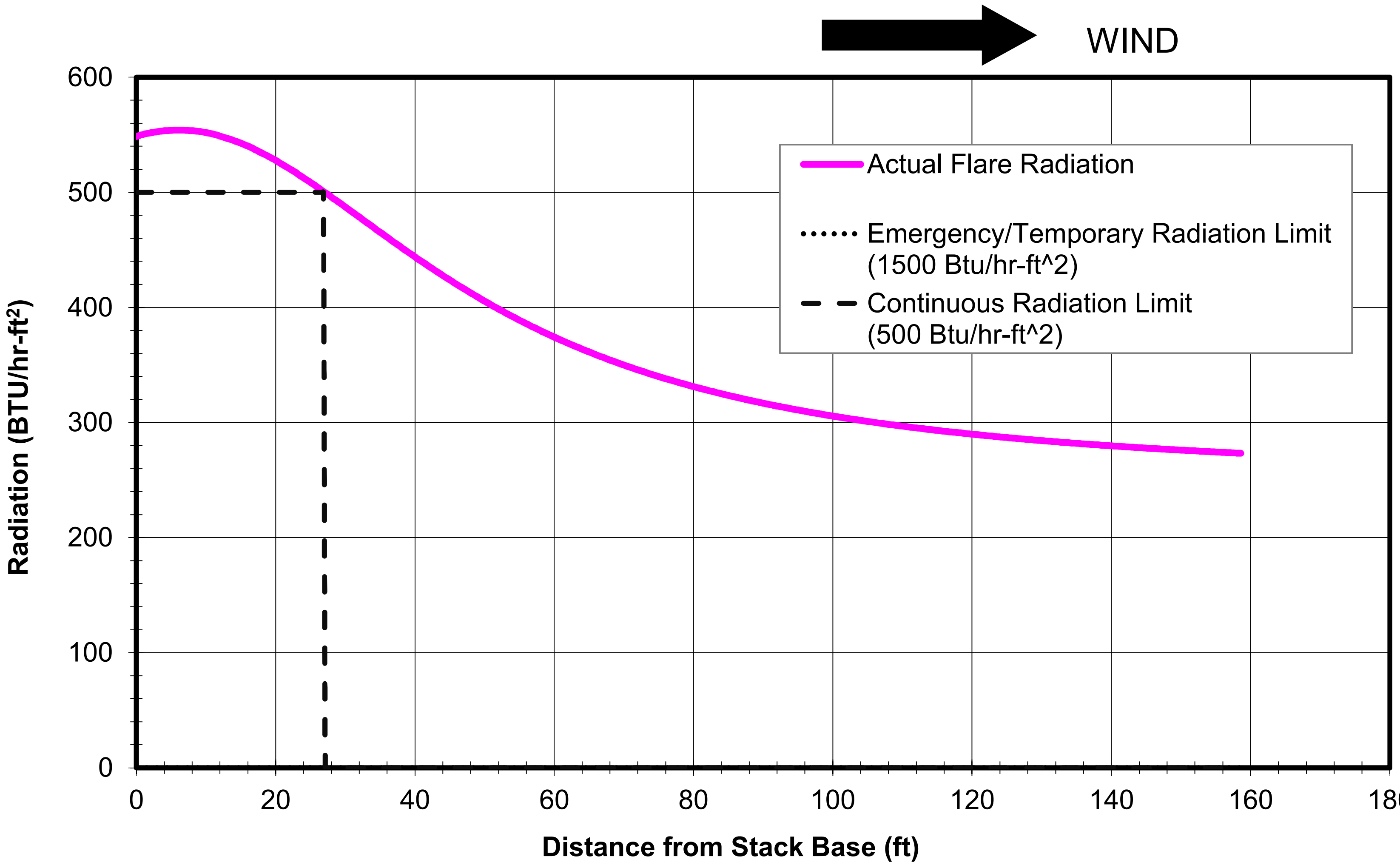
Warranty: Length; 18 months from date of shipment or 12 months after startup, whichever condition occurs first. Refer to Zeeco terms and conditions of sale for further clarifications.

Pricing Validity: Pricing quoted is valid for 30 days.

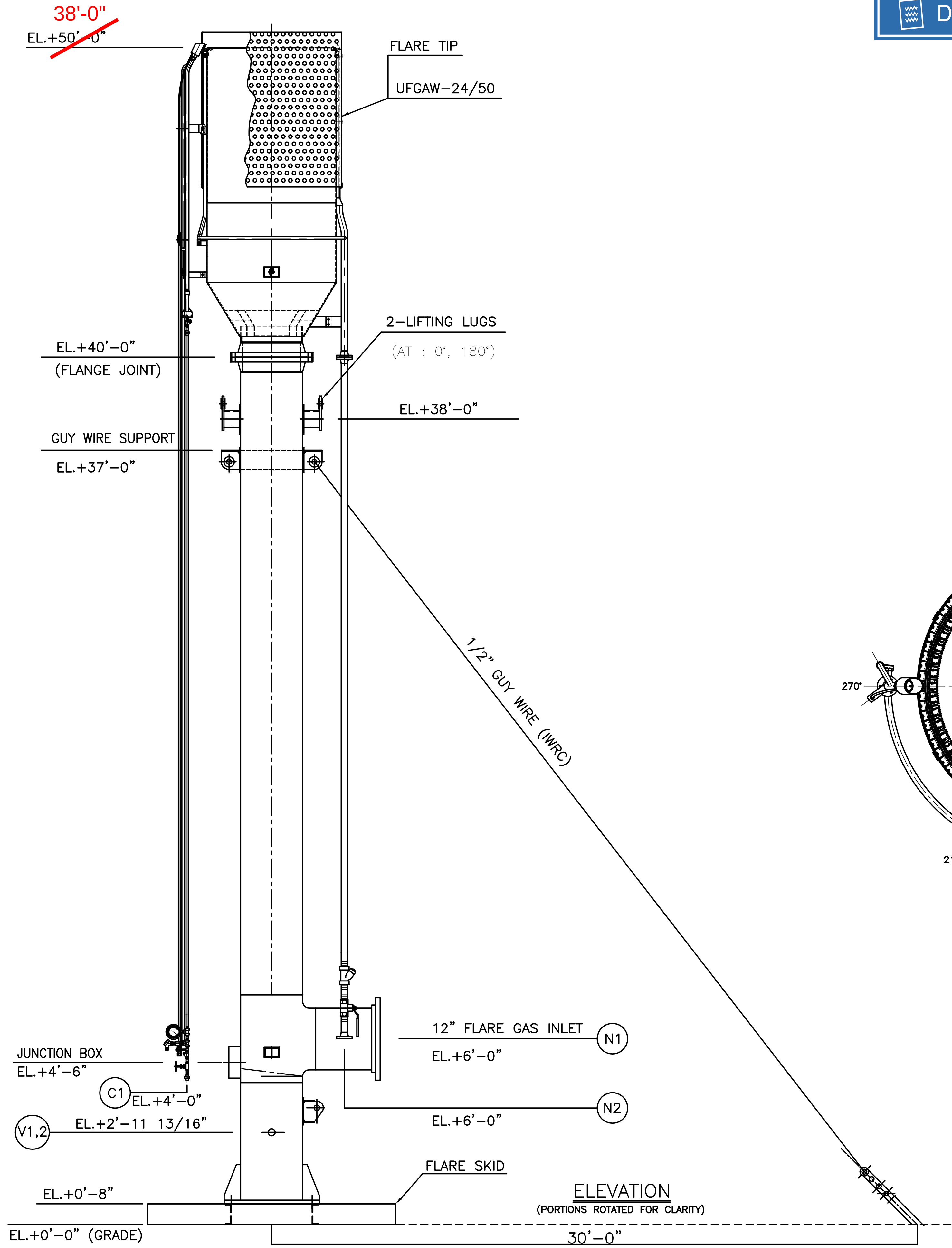
Payment Schedule: Net 60 – 25% Upon Order Placement
75% Upon Notification of Readiness to Ship

Terms and Conditions: This proposal is contingent upon acceptance of Zeeco, Inc Standard Terms and Conditions of Sale (attached).

Zeeco Quotation Ref: 2016-00271RE-01 Rev. 0
Radiation At Grade Versus Distance From Stack Base
Stack Height = 38 ft ; Relative Humidity = 85%
Solar Radiation Included = 250 BTU/hr-ft^2 ; Wind Speed = 30 ft/s
Flare Tag No. = F-1 ; Operating Case = Upset Condition 1 + Fuel Gas Low BTU (9591 MSCFD)
Max Radiation = 554 BTU/hr-ft^2 @ 6 ft From Stack Base

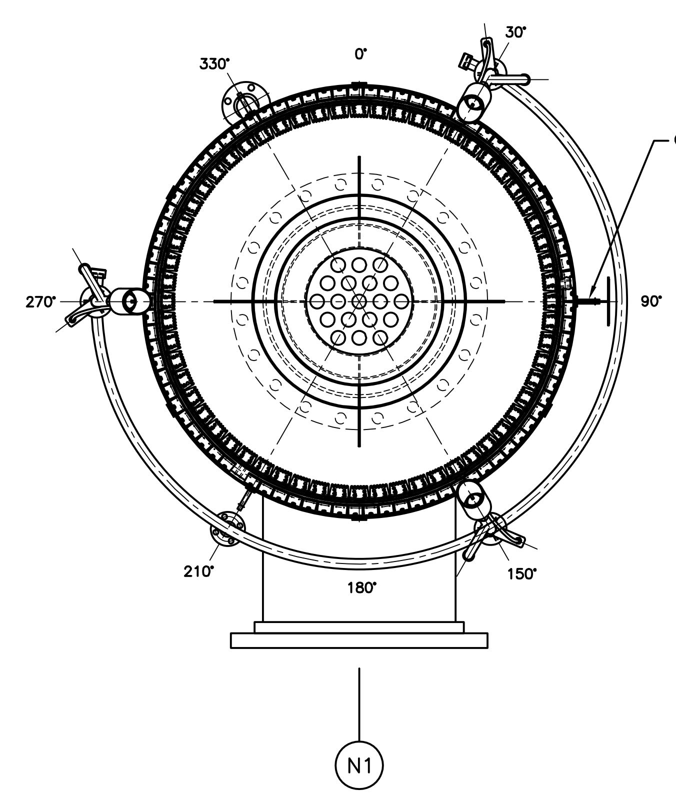


DRAFT



ELEVATION
(PORTIONS ROTATED FOR CLARITY)

PLAN VIEW
(TRUE ORIENTATION)



MATERIAL SPECIFICATIONS

STACK RISER	A106-B	FLARE SKID	A36
SKIRT	A106-B		
FLARE TIP	SEE FLARE TIP		
FLANGE	A105		
STUD BOLT/NUT	A193-B7/A194-2H		
GASKET	C4401		
BASE BLOCK	A36		
SETTING BOLT	A307-B		
EARTH LUG	304 S.S		
NAME PLATE	304 S.S		
LIFTING LUG	A36		
TAILING LUG	-		
GUY WIRE LUG	A36		
GUY WIRE	IWRC		
UTILITY LINE	A106-B		
CONDUIT LINE	C.S (GALV.)		

DESIGN DATA

TYPE	GUY WIRE SUPPORT TYPE	
DESIGN CODE	ASME STS-1	
WIND LOAD	ASCE 7-05	
SEISMIC LOAD	-	
FLUID	FLARE GAS	
DESIGN PRESS.	N/A	psig
DESIGN TEMP.	0° ~ 350°	°F
M.A.W.P.(NEW & COLD)	-	psig
OPERATING PRESS.	-	psig
OPERATING TEMP.	-	°F
HYDRO'C TEST PRESS.	-	psig
PNEUM'C TEST PRESS.	-	psig
P.W.H.T.	NO	
RADIOGRAPH	AS PER ITP, SPOT	
JOINT EFFICIENCY	85	%
CORROSION ALLOWANCE	N/A	
PAINTING	SEE NOTE 6	

NOZZLE AND CONNECTIONS

MARK	Q'TY	SIZE	SCH.	RATING	FACING	SERVICE	REMARKS	℄ TO FACE	PIPING SPEC.
N1	1	12"	STD.	ASME #150	WN, RF	FLARE GAS INLET		SEE DWG.	
N2	1	2"	STD.	ASME #150	WN, RF	ASSIST GAS INLET	ORIEN.: 180°	SEE DWG.	
V1,2	2	4"	40	-	-	VENT		SEE DWG.	
C1	1	1"	40	ASME #150	SW, RF	PILOT GAS		SEE DWG.	

NOTE

1. PILOT MIXER ORIFICE DRILLED: 3/64" DIA
2. PILOT GAS CONSUMPTION: 65 SCFH @ 15 PSIG PER PILOT
3. PILOT ORIFICE DRILLING BASED ON 1000 BTU/SCF (LHV) GAS WITH 0.6 SP. GR.
4. THE FLARE TIP REQUIRES A MINIMUM CONTINUOUS PURGE RATE OF 45 SCFH OF A GAS THAT WILL NOT GO TO DEW POINT AT OPERATING TEMPERATURES TO ENSURE AIR DOES NOT MIGRATE DOWN THE FLARE STACK. IT SHOULD BE NOTED THAT DEPENDING UPON THE TURNDOWN OPERATION OF THE FAN AND THE TYPE OF PURGE GAS USED IT MAY BENECESSARY TO INCREASE THIS MINIMUM PURGE RATE TO ENSURE PROPER COMBUSTION OF THE PURGE GAS DURING IDLE OPERATION.
5. ALL FLANGE BOLTING TO STRADDLE NORMAL CENTERLINES.
6. ALL EXTERNAL CARBON STEEL SURFACES TO BE PREPARED PER SSPC-SP6. PRIME WITH ONE COAT INORGANIC ZINC (2 1/2 MILS DFT MIN.) PAINT ONE COAT HIGH TEMP ALUMINUM (1 MIL DFT MIN.)
7. THE PILOT THERMOCOUPLE IS FOR ON/OFF INDICATION ONLY, NOT FOR ACCURATE PILOT FLAME MEASUREMENT.
8. FLAME ARRESTOR (IF APPLICABLE) SHALL BE MOUNTED DIRECTLY TO GAS INLET NOZZLE - NO PIPING ALLOWED BETWEEN FLAME ARRESTOR AND FLARE GAS INLET NOZZLE.

NO.	DATE	REVISION DESCRIPTION	BY	CKD.	APP.
1	21OCT15	REVISED PER AS BUILT	JTO	CJM	JTO

ZEECO, INC.
22151 EAST 91st STREET
BROKEN ARROW, OK 74014
PHONE: (918) 258-8551
FAX: (918) 251-5519
www.zeeco.com
sales@zeeco.com

ZEECO®

PROPRIETARY DATA IS INCLUDED IN THE INFORMATION DISCLOSED HEREIN AND IS THE PROPERTY OF ZEECO,INC. THIS INFORMATION IS SUBMITTED IN CONFIDENCE AND MUST BE USED IN CONNECTION WITH WORK DONE FOR ZEECO, INC. AND ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED. UNAUTHORIZED DISCLOSURE OR USE IS PROHIBITED BY LAW.

GUY WIRE SUPPORTED FLARE STACK SYSTEM GENERAL ARRANGEMENT

FOR:

DRAWN SK	DATE 01SEP15
CHK MN	APP JO
SCALE NTS	REV 1
DRAWING NUMBER SD-3224 SHT. 1 OF 2	

THE SALE OF EQUIPMENT, PARTS, MATERIALS, SUPPLIES, SOFTWARE AND OTHER GOODS (THE "GOODS") OR SERVICES (THE "SERVICES"), AS DESCRIBED IN SELLER'S QUOTATION OR PROPOSAL (THE "PROPOSAL"), ARE EXPRESSLY CONDITIONED UPON BUYER'S AGREEMENT TO THESE TERMS & CONDITIONS. ANY ADDITIONAL OR DIFFERENT TERMS PROPOSED BY BUYER ARE EXPRESSLY OBJECTED TO AND WILL NOT BE BINDING UPON SELLER UNLESS AGREED TO IN WRITING BY SELLER. ANY PURCHASE ORDER (THE "ORDER") ISSUED BY BUYER FOR THE PURCHASE OF GOODS OR SERVICES SHALL CONSTITUTE BUYER'S AGREEMENT TO THESE TERMS & CONDITIONS. UNLESS OTHERWISE SPECIFIED IN THE PROPOSAL OR THE ORDER, ANY PROPOSAL BY SELLER SHALL EXPIRE THIRTY (30) DAYS FROM ITS DATE AND MAY BE MODIFIED OR WITHDRAWN BY SELLER BEFORE RECEIPT OF BUYER'S ACCEPTANCE. THE GOODS AND SERVICES ARE COLLECTIVELY REFERRED TO AS THE "WORK." UNLESS OTHERWISE STATED, THE SELLER SHALL BE ZEECO, INC., 22151 EAST 91ST STREET, BROKEN ARROW, OKLAHOMA 74014 (USA), AND THE BUYER SHALL BE THE PARTY IDENTIFIED AS SUCH ON THE ORDER.

1. PRICE: Unless otherwise stated in the Proposal, the price of the Order (the "Price") is fixed and firm and is exclusive of all taxes, duties, fees, charges or assessments of any nature levied by any governmental authority. Additionally, unless otherwise stated in the Proposal, the Price is contingent upon the use of sub-contractors and sub-suppliers listed on Seller's Approved Manufacturers List ("AML") as may be amended from time-to-time, and the manufacture of Goods pursuant to Seller's standard painting procedures. Payment terms shall be as stated in the Proposal and Seller's acceptance of the Order is subject to credit approval that may include payment by means of an irrevocable documentary letter of credit issued by a first-class U.S. bank acceptable to Seller with funds payable upon delivery of customary presentation documents. The form of the letter of credit shall be negotiated by the parties and submitted to Seller for approval prior to issuance. All costs and fees of the letter of credit shall be to Buyer's account. Seller shall not be required to obtain any form of payment or performance security in favor of the Buyer, including but not limited to, bank guarantees, standby letters of credit, or surety bonds. Buyer's breach of agreed payment terms may result in: (a) Seller's suspension of the Work; (b) Seller's termination of the Order due to Buyer's default; (c) Buyer's liability for Seller's mobilization and demobilization costs in the event of suspension or termination by Seller, in addition to other damages; (d) Seller's demand for further assurances of performance by Buyer which may include, without limitation: (i) alteration of payment terms or milestones; (ii) full payment prior to shipment; (iii) additional payment security; (iv) or a delay in shipment that may exceed the length of Buyer's delay in payment.

2. CHANGES: Order changes by Buyer may significantly and disproportionately affect both the Price and completion or delivery date(s) (the "Delivery Schedule"). If Buyer desires to make a modification to the quantity, place, Delivery Schedule, or method of delivery, or the drawings, designs, or specifications of the Work (a "Change"), then Buyer shall so notify Seller in writing and provide sufficient details and descriptions of the proposed Change so that Seller may evaluate the impact of the Change on the Price, Delivery Schedule, or both. Under no circumstances shall Seller be obligated to perform a Change without an agreement concerning modifications to the Price, Delivery Schedule, or both.

3. DELAYS BY BUYER: If Buyer delays delivery for any reason, including but not limited to technical modifications or Changes, suspension, failure to review drawings submitted by Seller within the time specified, or any other cause (whether or not within Buyer's control), such delays may significantly and disproportionately affect both the Price and Delivery Schedule, which shall then be subject to a reasonable adjustment. The impact of Buyer caused delays on the Delivery Schedule may, in some cases, be more significant or of a longer duration than the actual period of Buyer's delay. In the event of Buyer's delay for any reason Seller shall be entitled to invoice Buyer, and Buyer agrees to pay timely, for materials on hand, fabrication completed or in process, and services provided. Unless specified in the Order, or otherwise by written agreement, where the Order requires submission of certain documents (including but not limited to drawings, manuals, or other documents related to the Goods) by Seller to Buyer for approval, then Buyer shall respond to such submission with approval or rejection within fourteen (14) days after Seller's issuance of such document(s) to Buyer. The failure of Buyer to approve or reject the document(s) by such time shall result in the document(s) being deemed approved and accepted.

4. LIMITED WARRANTY FOR GOODS: Seller warrants the Goods will operate substantially in conformance with Seller's specifications stated the Proposal and will be free from defects in material and workmanship for a period of twelve (12) months from the date of initial operation, or eighteen (18) months from the date of shipment, whichever is earlier (the "Warranty Period") when subjected to normal, proper and intended usage by properly trained personnel. Seller agrees during the Warranty Period, to repair or replace, at Seller's option, defective Goods so as to cause the Goods to operate in substantial conformance with Seller's specifications; provided that Buyer shall: (a) promptly notify Seller in writing upon the discovery of any defect and specify details of the warranty claim; (b) provide Seller with all operating data that Seller may reasonably request in order for Seller to evaluate the warranty claim; and (c) after Seller's review of the warranty claim, return the defective Goods to Seller with costs prepaid by Buyer if required to do so by Seller. Replacement parts may be new or refurbished. Shipment to Buyer of repaired or replaced Goods shall be in accordance with the delivery terms of the Order. Notwithstanding any other provision of this warranty, Seller may at its option, elect to send a service technician to Buyer's site to inspect, repair or replace (if applicable) warranted Goods, or otherwise to determine whether the Goods should be returned to Seller for repair or replacement. Goods or components thereof that are obtained by Seller from an original manufacturer or third party supplier are not warranted by Seller, but Seller will, to the extent possible, assign to Buyer any warranty rights in such Goods or components that Seller received from the original manufacturer or third party supplier. Consumables such as, but not limited to, bulbs, fuses, thermocouples, gaskets, and similar items are outside the scope of this warranty. Seller's warranty assumes the Goods are "at grade," and all responsibility for and costs of removal and/or reinstallation of warranted parts or Goods as well as the cost of and responsibility for gaining access to the warranted parts or Goods, are excluded from this warranty. If the Goods are not placed into service within six (6) months after shipment, in order to validate the warranty, the Goods shall be inspected by Seller at the time of commissioning and refurbished, if necessary, to like new condition at the Buyer's expense. For any extended time of storage at the jobsite without assembly/installation, the Goods shall be stored and protected in accordance with Seller's instructions and industry standard long-term storage methods. This warranty shall be void if the Goods have been: (w) exposed to corrosion, erosion, or chemical attack; (x) operated contrary to Seller's instructions or accepted industry practices; (y) improperly maintained or operated, or subjected to accident, abuse, or vandalism; or (z) operated in conditions other than those stated in Buyer's written specifications. Additionally, this warranty shall be void if the Buyer is not in compliance with its payment obligations to Seller pursuant to the Order. Seller shall have no obligation to make repairs, replacements or corrections resulting from normal wear and tear to the Goods. If Seller determines that a warranty claim is not valid, then Buyer shall pay or reimburse Seller for all costs of investigating and responding to such claim, including non-warranty parts sold or installed, at Seller's then prevailing daily service rates and materials rates. ANY INSTALLATION, MAINTENANCE, REPAIR, SERVICE, RELOCATION OR ALTERATION OR OTHER TAMPERING WITH THE GOODS, THAT IS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN SELLER WITHOUT SELLER'S PRIOR WRITTEN APPROVAL, OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY SELLER, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE GOODS. IF THE WARRANTY BECOMES VOID, THE BUYER MAY PURCHASE FROM SELLER, IF AVAILABLE, A SERVICE AGREEMENT OR ONE-TIME SERVICE AT THEN CURRENT RATES. THE OBLIGATIONS CREATED BY THIS WARRANTY TO REPAIR OR REPLACE DEFECTIVE GOODS SHALL BE THE SOLE REMEDY OF BUYER IN THE EVENT OF A WARRANTY CLAIM. SELLER MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, OTHER THAN AS STATED HEREIN. SELLER DISCLAIMS ALL IMPLIED WARRANTIES.

5. LIMITED WARRANTY FOR SERVICES: Seller warrants the Services will conform to the specifications stated in the Proposal and will be performed in a workmanlike manner. The warranty on Services shall be for a period of three (3) months following completion of the Services (the "Service Warranty Period"). Seller agrees during the Service Warranty Period, to re-perform any defective Services; provided that Buyer shall promptly notify Seller in writing upon the discovery of any defect and specify details of the warranty claim. THE OBLIGATIONS CREATED BY THIS WARRANTY TO REPERFORM DEFECTIVE SERVICES SHALL BE THE SOLE REMEDY OF BUYER IN THE EVENT OF A WARRANTY CLAIM. SELLER MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, OTHER THAN AS STATED HEREIN. SELLER DISCLAIMS ALL IMPLIED WARRANTIES.

6. BACKCHARGES: No backcharges will be paid or allowed by Seller unless Seller is notified in writing of any claim of defect in the Goods or Services and Seller is given a minimum of thirty (30) days within which to begin remediation of such defect. All backcharges must be approved in writing by Seller before

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any Services are reperformed or any Goods are repaired, replaced, or altered in any manner by Buyer or returned to Seller.

7. CANCELLATION FEE: Buyer may cancel the Order for convenience prior to delivery upon written notice to Seller, in which case Seller will cease activity (except that related to the cancellation) and promptly terminate all related subcontracts. In such event, Buyer shall pay the greater of: (a) Seller's total costs incurred in performing the Order up to the date of receipt of notice of cancellation and all costs associated with the cancellation, including but not limited to, costs of canceling related subcontracts and any currency hedge(s) maintained by Seller relative to the Order, plus reasonable overhead and profit; or (b) a cancellation fee of twenty-five percent (25%) of the Price. However, the amount payable to Seller for cancellation will not exceed the Price.

8. TERMINATION FOR DEFAULT: Buyer may declare Seller in default only if: (a) Seller breaches a material provision of the Order; (b) Buyer provides Seller thirty (30) days written notice specifying Seller's alleged breach in detail; and (c) Seller fails to reasonably cure such alleged breach with the thirty (30) day period following Seller's receipt of Buyer's written notice. In the event of Seller's uncured default, Buyer's sole remedy shall be to terminate the Order and recover any payments made to Seller for the Order.

9. INTELLECTUAL PROPERTY INFRINGEMENT & INDEMNITY: Seller warrants the Goods do not infringe any United States patent. Seller shall, subject to the limitations herein, indemnify Buyer for reasonable damages if the Goods are held to constitute infringement of a United States patent. This indemnity shall not apply: (a) to Goods or parts thereof manufactured pursuant to Buyer's design, or to changes in Seller's design requested by Buyer; and (b) if the infringement is a result of Buyer's operation of the Goods. Buyer shall promptly notify Seller in writing of any alleged claim of infringement, permit Seller to control the defense or compromise of any such claim, and render such assistance as Seller may require. Seller shall have no indemnity obligations to Buyer under this Section if the Buyer is not in compliance with its payment obligations to Seller pursuant to the Order.

10. INDEMNITY: Seller shall be responsible for any illness, injury or death, of the employees of the Seller, its subsidiaries, and their officers, directors, employees, agents, and contractors (collectively, the "Seller Group") and for the loss or damage to the property of any member of the Seller Group, arising out of or relating to the performance of this Order and REGARDLESS OF WHETHER CAUSED OR BROUGHT ABOUT BY THE NEGLIGENCE (INCLUDING ACTIVE, PASSIVE, SOLE, JOINT OR CONCURRENT NEGLIGENCE) OF THE BUYER, ITS SUBSIDIARIES AND ITS CUSTOMER OR ULTIMATE RECIPIENT OR USER OF THE GOODS OR SERVICES AND THEIR OFFICERS, DIRECTORS, EMPLOYEES, AGENTS AND CONTRACTORS (COLLECTIVELY, THE "BUYER GROUP") OR ANY OTHER THEORY OF LEGAL LIABILITY, and Seller shall release, defend, protect, indemnify and hold harmless all members of the Buyer Group from and against any loss, cost, claim, suit, judgment, award or damage (including reasonable attorney's fees) on account of such illness, injury or death, loss or damage. In exchange, Buyer shall be responsible for any illness, injury or death, of the employees of any member of the Buyer Group and for the loss or damage to the property of any member of the Buyer Group, arising out of or relating to the performance of this Order and REGARDLESS OF WHETHER CAUSED OR BROUGHT ABOUT BY THE NEGLIGENCE (INCLUDING ACTIVE, PASSIVE, SOLE, JOINT OR CONCURRENT NEGLIGENCE) OF ANY MEMBER OF THE SELLER GROUP OR ANY OTHER THEORY OF LEGAL LIABILITY, and Buyer shall release, defend, protect, indemnify and hold harmless all members of the Seller Group from and against any loss, cost, claim, suit, judgment, award or damage (including reasonable attorney's fees) on account of such illness, injury or death, loss or damage. Seller and Buyer shall each release, defend, protect, indemnify and hold harmless each other, and the applicable members of the Seller Group or Buyer Group, from and against any loss, cost, claim, suit, judgment, award or damage (including reasonable attorney's fees) for illness, injury, death, or damage to property of third parties (not included within the definitions of Seller Group or Buyer Group) but only to the extent caused by the negligent acts or omissions of such party. Seller shall have no indemnity obligations to Buyer under this Section if the Buyer is not in compliance with its payment obligations to Seller pursuant to the Order. Should any of the preceding indemnities be judged unenforceable or be limited by applicable law, then each party's indemnity obligations to the other shall be limited to the extent that liability for any such illness, injury, death or damage to property is caused by the negligent acts or omissions of such party.

11. GOVERNING LAW: To the maximum extent permissible, this Order shall be governed and construed in accordance with the laws of the State of Oklahoma (U.S.A.), exclusive of any principles of conflicts of laws that would require application of the substantive laws of another jurisdiction. The exclusive venue for all legal actions under this Order shall be the State or Federal Courts sitting in Tulsa, Oklahoma (U.S.A.), and the parties submit to the personal jurisdiction thereof and waive any other venue that may be applicable to such action. This Order excludes the application of the United Nations Convention on Contracts for the International Sale of Goods.

12. FORCE MAJEURE: Except for Buyer's obligations to pay sums to Seller when due, neither party shall be liable for its failure to perform obligations under the Order if such failure results from fire, flood, earthquake, storm, hurricane or other natural disaster, war, invasion, act of foreign enemies, rebellion, terrorist activities, nationalization, government sanction, blockage, embargo, or interruption or failure of electricity, water, telephone or utility service.

13. ASSIGNMENT: Buyer shall not assign the Order without the prior written consent of Seller, and such consent shall not be unreasonably withheld; however, any assignment shall not relieve Buyer of its payment and indemnity obligations to Seller.

14. ENFORCEABILITY: Should a court of competent jurisdiction rule that any provision herein is invalid or unenforceable, such ruling shall not affect the validity or enforceability of any other provision.

15. WAIVER: Seller's failure to enforce any provisions herein shall not constitute a waiver of such rights, or preclude their later enforcement.

16. WAIVER OF CONSEQUENTIAL DAMAGES: SELLER SHALL NOT BE LIABLE FOR PUNITIVE, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LIABILITY FOR REMOVAL AND REINSTALLATION COSTS, LOSS OF USE, LOSS OF BUSINESS OPPORTUNITY, LOSS OF PROFIT OR REVENUE, LOSS OF PRODUCT OR OUTPUT, OR BUSINESS INTERRUPTION.

17. LIMITATION OF LIABILITY: ANYTHING TO THE CONTRARY CONTAINED IN THIS ORDER NOTWITHSTANDING, SELLER'S CUMULATIVE LIABILITY ARISING OUT OF OR IN ANY MANNER RELATED TO ITS PERFORMANCE SHALL NOT EXCEED, IN THE AGGREGATE, ONE HUNDRED PERCENT (100%) OF THE MONIES RECEIVED BY SELLER UNDER THIS ORDER. THE REMEDIES PROVIDED TO BUYER UNDER THIS ORDER ARE IN LIEU OF ALL OTHER REMEDIES WHICH MAY BE OR BECOME AVAILABLE TO BUYER AT LAW OR IN EQUITY. THE LIMITATIONS SET FORTH HEREIN APPLY WHETHER CLAIMS ARISE PURSUANT TO CONTRACT, TORT, INDEMNITY, STATUTE, EQUITY OR ANY OTHER THEORY OF LAW, INCLUDING, BUT NOT LIMITED TO, THE BREACH OF ANY LEGAL DUTY OR THE FAULT, NEGLIGENCE, PROFESSIONAL LIABILITY OR STRICT LIABILITY OF SELLER. THIS LIMITATION SHALL BE INCLUSIVE OF ALL INSURANCE, BOND, AND LETTER OF CREDIT PROCEEDS, WHICH MAY BE PAID TO THE BUYER BY THE INSURERS, SURETIES OR BANKS OF SELLER. SHOULD THESE REMEDIES BE FOUND INADEQUATE OR TO HAVE FAILED IN THEIR ESSENTIAL PURPOSE FOR ANY REASON WHATSOEVER, THEN THE BUYER AGREES THAT THE SELLER'S RETURN TO THE BUYER OF NO GREATER THAN ONE HUNDRED PERCENT (100%) OF THE MONIES RECEIVED BY SELLER UNDER THIS ORDER SHALL PREVENT THE REMEDIES FROM FAILING THEIR ESSENTIAL PURPOSE AND SHALL BE CONSIDERED BY BUYER AS A FAIR AND ADEQUATE REMEDY.

18. ENTIRE AGREEMENT: This Order contains the entire agreement of the parties and supersedes any and all prior course of dealing, agreements, understandings and communications between Buyer and Seller related to the subject matter of this Order. No amendment or modification of this Order shall be binding unless it is in writing and is signed by an authorized representative of Buyer and Seller.

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ATTACHMENT A
START-UP/MAINTENANCE SERVICES, EQUIPMENT DATA/DRAWINGS AND STANDARD TERMS AND CONDITIONS

I. START-UP/MAINTENANCE SERVICES

RATES	DOMESTIC (Within US)	FOREIGN (Outside US)
Base Rates for Start-Up/Maintenance personnel on all non-holiday (U.S Government recognized) Monday through Friday, inclusive, up to a maximum of ten (10) hours per day.	$1,600.00 per day	2,300.00 per day
Hours in Excess of ten (10) hours per day Monday through Friday, non-holiday.	$240.00 per hour	$345.00 per hour
Saturdays and Sundays - up to a maximum of ten (10) hours per day	$2,400.00	$3,450.00
Hours in Excess of ten (10) hours per day Saturday and Sunday, non-holiday	$368.00 per hour	$518.00 per hour
Holidays (U.S. Government Recognized) - up to a maximum of ten (10) hours per day	$3,200.00	$4,600.00
Hours in Excess of ten (10) hours per day Holidays	$480.00 per hour	$690.00 per hour
Air Travel (Class) **Ground Transportation**	Coach Mid-Sized Rental Car	Business Mid-Sized Rental Car
Engineering Rates	$375.00 per hour	$375.00 per hour
Design / Drafting Rates	$185.00 per hour	$185.00 per hour

*** The above Domestic and Foreign rates do not include OFFSHORE assistance. Please contact Zeeco if you are interested in obtaining a proposal for OFFSHORE assistance*

Compensable Days

Per diem rates will apply from, and including, the day the start-up/maintenance personnel leaves his basing point up to, and including, his date of return to the basing point.

Expenses

Zeeco shall be reimbursed at actual cost plus 15% for all non-Buyer provided living and travel expenses incurred, which are related to the supply of services rendered.

Engineering / Drafting Charges

Engineering and/or drafting charges will apply for all work performed by Zeeco personnel as required to support Start-Up/Maintenance personnel. These charges will apply at the rate indicated in the chart above.

Independent Contractor

Zeeco personnel shall be considered an independent contractor with respect to services provided hereunder and the start-up/maintenance personnel shall in no respect be considered an employee of the Buyer. Zeeco reserves the right to recall, replace, or return the personnel at Zeeco's sole discretion.

II. EQUIPMENT DATA/DRAWINGS

A. STANDARD QUANTITY

Priced quotation for equipment include three (3) print copies of approval drawings; three (3) print copies and one (1) reproducible copy of the final drawings; and three (3) copies of an operational manual. Additional copies of drawings will be provided at $30.00 per print and $45.00 per reproducible. Additional operational manuals will be prices on application, and based on the complexity of the equipment.

Drawings and data provided hereunder are the property of Zeeco, Inc. and may not be used for any purpose other than the repair, operation and maintenance of the equipment depicted.

III. TERMS AND CONDITIONS

A. All service and data provided under this Attachment are in accordance with Zeeco's Standard Terms and Conditions of Sale.
B. All rates quoted herein are subject to change without notice.
C. Zeeco will require a purchase order from the Buyer accepting the terms and condition set forth herein, as well as an estimate of duration and nature of the work to be done.
D. Prior to dispatch of Zeeco personnel, Buyer may be required to provide a deposit equal to the charges for the anticipated duration of service, or two weeks of service, whichever is greater. This requirement will be enforced at the discretion of Zeeco, Inc.
E. The transportation modes and carriers and all arrangements therefore, and the choice of lodgings and all arrangements therefore, will be at the sole discretion of Zeeco, Inc.
F. Where on-site room and board are furnished by the customer, Zeeco, Inc. expects their personnel to be roomed and boarded in a comfortable environment similar to Buyer's personnel or mutually agreed upon accommodations.
G. It is the Buyer's responsibility to secure all work permits, licenses, and other documents required to allow our personnel to complete their assignment in accordance with local government regulations and labor laws.
H. All tools, materials, and equipment for use by Zeeco personnel will be furnished by the Buyer, unless other mutually agreed upon arrangements have been made.
I. The service rates and expenses described herein do not include any taxes of any kind that may be assessed by any governmental department outside the U.S.A. Any such taxes that may be applicable to the service rates and expenses will be for the Buyer's account.

THE SALE OF SERVICES (THE "SERVICES"), AS DESCRIBED IN CONTRACTOR'S QUOTATION OR PROPOSAL (THE "PROPOSAL"), IS EXPRESSLY CONDITIONED UPON BUYER'S AGREEMENT TO THESE TERMS & CONDITIONS. ANY ADDITIONAL OR DIFFERENT TERMS PROPOSED BY BUYER ARE EXPRESSLY OBJECTED TO AND WILL NOT BE BINDING UPON CONTRACTOR UNLESS AGREED TO IN WRITING BY CONTRACTOR. ANY PURCHASE ORDER (THE "ORDER") ISSUED BY BUYER FOR THE PURCHASE OF SERVICES SHALL CONSTITUTE BUYER'S AGREEMENT TO THESE TERMS & CONDITIONS. UNLESS OTHERWISE SPECIFIED IN THE PROPOSAL OR THE ORDER, ANY PROPOSAL BY CONTRACTOR SHALL EXPIRE THIRTY (30) DAYS FROM ITS DATE AND MAY BE MODIFIED OR WITHDRAWN BY CONTRACTOR BEFORE RECEIPT OF BUYER'S ACCEPTANCE. UNLESS OTHERWISE STATED, THE CONTRACTOR SHALL BE ZEECO, INC., 22151 EAST 91ST STREET, BROKEN ARROW, OKLAHOMA 74014 (USA), AND THE BUYER SHALL BE THE PARTY IDENTIFIED AS SUCH ON THE ORDER.

1. PRICE: Unless otherwise stated in the Proposal, the price of the Order (the "Price") is exclusive of all taxes, duties, fees, charges or assessments of any nature levied by any governmental authority. Payment terms shall be as stated in the Proposal and Contractor's acceptance of the Order is subject to credit approval.

2. LIMITED WARRANTY: Contractor warrants the Services will be performed in a workmanlike manner. The warranty on Services shall be for a period of three (3) months following completion of the Services (the "Service Warranty Period"). Contractor agrees during the Service Warranty Period, to re-perform any defective Services; provided that Buyer shall promptly notify Contractor in writing upon the discovery of any defect and specify details of the warranty claim. Contractor warrants all parts manufactured by Contractor and sold in conjunction with the Services (the "Goods") will be free from defects in material and workmanship for a period of twelve (12) months from the date of installation (the "Goods Warranty Period") when subjected to normal, proper and intended usage by properly trained personnel. Contractor agrees during the Goods Warranty Period, to repair or replace any defective Goods; provided that Buyer shall promptly notify Contractor in writing upon the discovery of any defect and specify details of the warranty claim. Goods that are obtained by Contractor from an original manufacturer or third party supplier are not warranted by Contractor, but Contractor will, to the extent possible, assign to Buyer any warranty rights in such Goods that Contractor received from the original manufacturer or third party supplier. Consumables such as, but not limited to, bulbs, fuses, thermocouples, gaskets, and similar items are outside the scope of this warranty. All responsibility for and costs of removal and/or reinstallation of warranted Goods as well as the cost of and responsibility for gaining access to the warranted Goods, are excluded from this warranty. This warranty shall be void if the Goods have been: (a) exposed to corrosion, erosion, or chemical attack; (b) operated contrary to Contractor's instructions or accepted industry practices; (c) improperly maintained or operated, or subjected to accident, abuse, or vandalism; or (d) operated in conditions other than those stated in Buyer's written specifications. Additionally, this warranty shall be void if the Buyer is not in compliance with its payment obligations to Contractor pursuant to the Order. Contractor shall have no obligation to make repairs, replacements or corrections resulting from normal wear and tear to the Goods. If Contractor determines that a warranty claim is not valid, then Buyer shall pay or reimburse Contractor for all costs of investigating and responding to such claim, including non-warranty parts sold or installed, at Contractor's then prevailing time and materials rates. THE OBLIGATIONS CREATED BY THIS WARRANTY TO REPERFORM DEFECTIVE SERVICES, OR REPAIR OR REPLACE DEFECTIVE GOODS, SHALL BE THE SOLE REMEDY OF BUYER IN THE EVENT OF A WARRANTY CLAIM. CONTRACTOR MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, OTHER THAN AS STATED HEREIN. CONTRACTOR DISCLAIMS ALL IMPLIED WARRANTIES.

3. BACKCHARGES: No backcharges will be paid or allowed by Contractor unless Contractor is notified in writing of any claim of defect and Contractor is given a minimum of thirty (30) days within which to begin remediation of such defect. All backcharges must be approved in writing by Contractor before any Services are reperformed and charged to Contractor's account or any Goods are repaired, replaced or altered in any manner by Buyer or returned to Contractor.

4. TERMINATION FOR DEFAULT: Buyer may declare Contractor in default only if: (a) Contractor breaches a material provision of the Order; (b) Buyer provides Contractor thirty (30) days written notice specifying Contractor's alleged breach in detail; and (c) Contractor fails to reasonably cure such alleged breach with the thirty (30) day period following Contractor's receipt of Buyer's written notice. In the event of Contractor's uncured default, Buyer's sole remedy shall be to terminate the Order and recover any payments made to Contractor for the Order.

5. INDEMNITY: Contractor shall be responsible for any illness, injury or death, of the employees of the Contractor, its subsidiaries, and their officers, directors, employees, agents, and contractors (collectively, the "Contractor Group") and for the loss or damage to the property of any member of the Contractor Group, arising out of or relating to the performance of this Order and REGARDLESS OF WHETHER CAUSED OR BROUGHT ABOUT BY THE NEGLIGENCE (INCLUDING ACTIVE, PASSIVE, SOLE, JOINT OR CONCURRENT NEGLIGENCE) OF THE BUYER, ITS SUBSIDIARIES AND ITS CUSTOMER OR ULTIMATE RECIPIENT OR USER OF THE GOODS OR SERVICES AND THEIR OFFICERS, DIRECTORS, EMPLOYEES, AGENTS AND CONTRACTORS (COLLECTIVELY, THE "BUYER GROUP") OR ANY OTHER THEORY OF LEGAL LIABILITY, and Contractor shall release, defend, protect, indemnify and hold harmless all members of the Buyer Group from and against any loss, cost, claim, suit, judgment, award or damage (including reasonable attorney's fees) on account of such illness, injury or death, loss or damage. In exchange, Buyer shall be responsible for any illness, injury or death, of the employees of any member of the Buyer Group and for the loss or damage to the property of any member of the Buyer Group, arising out of or relating to the performance of this Order and REGARDLESS OF WHETHER CAUSED OR BROUGHT ABOUT BY THE NEGLIGENCE (INCLUDING ACTIVE, PASSIVE, SOLE, JOINT OR CONCURRENT NEGLIGENCE) OF ANY MEMBER OF THE CONTRACTOR GROUP OR ANY OTHER THEORY OF LEGAL LIABILITY, and Buyer shall release, defend, protect, indemnify and hold harmless all members of the Contractor Group from and against any loss, cost, claim, suit, judgment, award or damage (including reasonable attorney's fees) on account of such illness, injury or death, loss or damage. Contractor and Buyer shall each release, defend, protect, indemnify and hold harmless each other, and the applicable members of the Contractor Group or Buyer Group, from and against any loss, cost, claim, suit, judgment, award or damage (including reasonable attorney's fees) for illness, injury, death, or damage to property of third parties (not included within the definitions of Contractor Group or Buyer Group) but only to the extent caused by the negligent acts or omissions of such party. Contractor shall have no indemnity obligations to Buyer under this Section if the Buyer is not in compliance with its payment obligations to Contractor pursuant to the Order. Should any of the preceding indemnities be judged unenforceable or be limited by applicable law, then each party's indemnity obligations to the other shall be limited to the extent that liability for any such illness, injury, death or damage to property is caused by the negligent acts or omissions of such party.

6. INSURANCE: Contractor shall maintain the following insurance coverage and, at Buyer's request, shall provide Buyer with certificates evidencing such coverage: (a) Statutory Workers' Compensation and Employer's Liability Insurance with limits of USD $1,000,000 per occurrence; (b) Commercial General Liability Insurance with a combined single limit for bodily injury and property damage of USD $1,000,000 per occurrence and in the aggregate; and (c) Automobile Liability Insurance with a combined single limit for bodily injury and property damage of USD $1,000,000 per accident.

7. GOVERNING LAW: To the maximum extent permissible, this Order shall be governed and construed in accordance with the laws of the State of Oklahoma (U.S.A.), exclusive of any principles of conflicts of laws that would require application of the substantive laws of another jurisdiction. The exclusive venue for all legal actions under this Order shall be the State or Federal Courts sitting in Tulsa, Oklahoma (U.S.A.), and the parties submit to the personal jurisdiction thereof and waive any other venue that may be applicable to such action.

8. FORCE MAJEURE: Except for Buyer's obligations to pay sums to Contractor when due, neither party shall be liable for its failure to perform obligations under the Order if such failure results from fire, flood, earthquake, storm, hurricane or other natural disaster, war, invasion, act of foreign enemies, rebellion, terrorist activities, nationalization, government sanction, blockage, embargo, or interruption or failure of electricity, water, telephone or utility service.

9. ASSIGNMENT: Buyer shall not assign the Order without the prior written consent of Contractor, and such consent shall not be unreasonably withheld; however, any assignment shall not relieve Buyer of its payment and indemnity obligations to Contractor.

10. ENFORCEABILITY: Should a court of competent jurisdiction rule that any provision herein is invalid or unenforceable, such ruling shall not affect the validity or enforceability of any other provision.

11. WAIVER: Contractor's failure to enforce any provisions herein shall not constitute a waiver of such rights, or preclude their later enforcement.

12. WAIVER OF CONSEQUENTIAL DAMAGES: CONTRACTOR SHALL NOT BE LIABLE FOR PUNITIVE, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LIABILITY FOR REMOVAL AND REINSTALLATION COSTS, LOSS OF USE, LOSS OF BUSINESS OPPORTUNITY, LOSS OF PROFIT OR REVENUE, LOSS OF PRODUCT OR OUTPUT, OR BUSINESS INTERRUPTION.

13. LIMITATION OF LIABILITY: ANYTHING TO THE CONTRARY CONTAINED IN THIS ORDER NOTWITHSTANDING, CONTRACTOR'S CUMULATIVE LIABILITY ARISING OUT OF OR IN ANY MANNER RELATED TO ITS PERFORMANCE SHALL NOT EXCEED, IN THE AGGREGATE, ONE HUNDRED PERCENT (100%) OF THE MONIES RECEIVED BY CONTRACTOR UNDER THIS ORDER. THE REMEDIES PROVIDED TO BUYER UNDER THIS ORDER ARE IN LIEU OF ALL OTHER REMEDIES WHICH MAY BE OR BECOME AVAILABLE TO BUYER AT LAW OR IN EQUITY. THE LIMITATIONS SET FORTH HEREIN APPLY WHETHER CLAIMS ARISE PURSUANT TO CONTRACT, TORT, INDEMNITY, STATUTE, EQUITY OR ANY OTHER THEORY OF LAW, INCLUDING, BUT NOT LIMITED TO, THE BREACH OF ANY LEGAL DUTY OR THE FAULT, NEGLIGENCE, PROFESSIONAL LIABILITY OR STRICT LIABILITY OF CONTRACTOR. THIS LIMITATION SHALL BE INCLUSIVE OF ALL INSURANCE, BOND, AND LETTER OF CREDIT PROCEEDS, WHICH MAY BE PAID TO THE BUYER BY THE INSURERS, SURETIES OR BANKS OF CONTRACTOR. SHOULD THESE REMEDIES BE FOUND INADEQUATE OR TO HAVE FAILED IN THEIR ESSENTIAL PURPOSE FOR ANY REASON WHATSOEVER, THEN THE BUYER AGREES THAT THE CONTRACTOR'S RETURN TO THE BUYER OF NO GREATER THAN ONE HUNDRED PERCENT (100%) OF THE MONIES RECEIVED BY CONTRACTOR UNDER THIS ORDER SHALL PREVENT THE REMEDIES FROM FAILING THEIR ESSENTIAL PURPOSE AND SHALL BE CONSIDERED BY BUYER AS A FAIR AND ADEQUATE REMEDY.

14. ENTIRE AGREEMENT: This Order contains the entire agreement of the parties and supersedes any and all prior course of dealing, agreements, understandings and communications between Buyer and Contractor related to the subject matter of this Order. No amendment or modification of this Order shall be binding unless it is in writing and is signed by an authorized representative of Buyer and Contractor.

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Process Streams		11
Composition	Status:	Solved
Phase: Vapor	From Block:	MIX-102
	To Block:	Stab-Off Gas Suction
Mass Flow		**lb/h**
Hydrogen Sulfide		0
Nitrogen		6.05600
Carbon Dioxide		14.1511
Methane		302.022
Ethane		396.811
Propane		850.564
i-Butane		240.437
n-Butane		626.047
2,2-Dimethylpropane		3.96168
i-Pentane		76.2225
n-Pentane		64.1347
2,2-Dimethylbutane		0.518399
Cyclopentane		0
2,3-Dimethylbutane		3.64221
2-Methylpentane		8.53074
3-Methylpentane		4.48824
n-Hexane		7.81511
Methylcyclopentane		4.07930
Benzene		1.56366
Cyclohexane		3.33121
2-Methylhexane		0.694155
3-Methylhexane		0.775936
2,2,4-Trimethylpentane		0
n-Heptane		3.15518
Methylcyclohexane		1.66868
Toluene		0.505030
n-Octane		0.954325
Ethylbenzene		0.0252741
m-Xylene		0.0235965
p-Xylene		0.0235656
o-Xylene		0
n-Nonane		0.0981057

Process Streams		11
Properties	Status:	Solved
Phase: Vapor	From Block:	MIX-102
	To Block:	Stab-Off Gas Suction
Property	**Units**	
Temperature	°F	94.3754
Pressure	psia	114.696
Mole Fraction Vapor	%	100
Mole Fraction Light Liquid	%	0
Mole Fraction Heavy Liquid	%	0
Molecular Weight	lb/lbmol	37.8745
Mass Density	lb/ft^3	0.802495
Std Vapor Volumetric Flow	MMSCFD	0.630595
Std Liquid Volumetric Flow	sgpm	11.2189
Compressibility		0.910424
Specific Gravity		1.30770
API Gravity		
Mass Cp	Btu/(lb*°F)	0.448998
Ideal Gas CpCv Ratio		1.14048
Dynamic Viscosity	cP	0.00940355
Kinematic Viscosity	cSt	0.731524
Net Ideal Gas Heating Valu	Btu/ft^3	1985.94
Net Liquid Heating Value	Btu/lb	19758.4
Gross Ideal Gas Heating Va	Btu/ft^3	2163.24
Gross Liquid Heating Value	Btu/lb	21534.9

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Enterprise South Carlsbad
File Name: C:\Users\jzenker\Trinity Consultants, Inc\Enterprise Products - PROJECT\153201.0159 NSR Sig Rev\06 CALCULATIONS\GlyCalc\South Carlsbad GLYCalc VOC_v0.4.ddf
Date: September 04, 2020

DESCRIPTION:

Description: Updated gas analysis for dehy based on South Carlsbad Max Hourly Rate.pmx - Sweet gas stream received from Ms. Jing Li (EPCO)

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0345	0.828	0.1511
Methane	2.0630	49.511	9.0357
Ethane	4.0149	96.358	17.5854
Propane	8.3661	200.786	36.6434
Isobutane	2.2448	53.875	9.8322
n-Butane	7.0025	168.059	30.6708
Isopentane	1.8013	43.230	7.8895
n-Pentane	2.4410	58.585	10.6918
n-Hexane	0.7973	19.135	3.4922
Cyclohexane	1.5682	37.636	6.8685
Other Hexanes	1.3772	33.052	6.0320
Heptanes	0.8359	20.062	3.6613
Methylcyclohexane	1.1244	26.985	4.9248
Benzene	4.1552	99.724	18.1996
Toluene	2.5872	62.093	11.3319
Xylenes	0.2782	6.677	1.2185
C8+ Heavies	0.0125	0.300	0.0548
Total Emissions	40.7040	976.897	178.2836
Total Hydrocarbon Emissions	40.6695	976.069	178.1325
Total VOC Emissions	34.5916	830.199	151.5114
Total HAP Emissions	7.8179	187.628	34.2422
Total BTEX Emissions	7.0205	168.493	30.7500

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0371	0.890	0.1624
Methane	2.0663	49.592	9.0505
Ethane	4.0347	96.832	17.6719
Propane	8.5299	204.717	37.3609
Isobutane	2.3320	55.969	10.2143
n-Butane	7.3974	177.539	32.4008
Isopentane	2.0747	49.793	9.0871
n-Pentane	2.8323	67.976	12.4056
n-Hexane	1.1418	27.403	5.0011
Cyclohexane	2.5465	61.117	11.1538
Other Hexanes	1.8032	43.277	7.8981
Heptanes	1.8748	44.995	8.2115
Methylcyclohexane	2.5316	60.758	11.0883
Benzene	7.2972	175.133	31.9618
Toluene	8.1400	195.361	35.6534
Xylenes	2.5339	60.814	11.0986
C8+ Heavies	5.3119	127.485	23.2660
Total Emissions	62.4854	1499.650	273.6861

Total Hydrocarbon Emissions	62.4483	1498.760	273.5238
Total VOC Emissions	56.3473	1352.336	246.8013
Total HAP Emissions	19.1130	458.711	83.7148
Total BTEX Emissions	17.9712	431.308	78.7138

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0036	0.087	0.0158
Methane	19.7893	474.943	86.6771
Ethane	11.4918	275.803	50.3340
Propane	8.9269	214.245	39.0996
Isobutane	1.5885	38.123	6.9575
n-Butane	3.7218	89.323	16.3014
Isopentane	0.9009	21.622	3.9460
n-Pentane	0.9619	23.085	4.2130
n-Hexane	0.2122	5.094	0.9297
Cyclohexane	0.1358	3.260	0.5950
Other Hexanes	0.4529	10.870	1.9837
Heptanes	0.1711	4.107	0.7494
Methylcyclohexane	0.1017	2.442	0.4456
Benzene	0.0380	0.912	0.1664
Toluene	0.0270	0.647	0.1181
Xylenes	0.0030	0.073	0.0133

C8+ Heavies	0.0568	1.362	0.2486
Total Emissions	48.5832	1165.996	212.7943
Total Hydrocarbon Emissions	48.5795	1165.909	212.7784
Total VOC Emissions	17.2985	415.163	75.7673
Total HAP Emissions	0.2802	6.725	1.2274
Total BTEX Emissions	0.0680	1.631	0.2977

EQUIPMENT REPORTS:

CONDENSER

Condenser Outlet Temperature: 110.00 deg. F
Condenser Pressure: 13.10 psia
Condenser Duty: 7.69e-001 MM BTU/hr
Hydrocarbon Recovery: 1.70 bbls/day
Produced Water: 68.54 bbls/day
VOC Control Efficiency: 38.61 %
HAP Control Efficiency: 59.10 %
BTEX Control Efficiency: 60.93 %
Dissolved Hydrocarbons in Water: 643.60 mg/L

Component	Emitted	Condensed
Water	0.17%	99.83%
Carbon Dioxide	97.79%	2.21%
Hydrogen Sulfide	93.07%	6.93%
Nitrogen	99.89%	0.11%
Methane	99.84%	0.16%
Ethane	99.51%	0.49%
Propane	98.08%	1.92%
Isobutane	96.26%	3.74%
n-Butane	94.66%	5.34%
Isopentane	86.82%	13.18%
n-Pentane	86.19%	13.81%
n-Hexane	69.83%	30.17%
Cyclohexane	61.58%	38.42%
Other Hexanes	76.37%	23.63%
Heptanes	44.59%	55.41%
Methylcyclohexane	44.41%	55.59%
Benzene	56.94%	43.06%
Toluene	31.78%	68.22%
Xylenes	10.98%	89.02%
C8+ Heavies	0.24%	99.76%

ABSORBER

Calculated Absorber Stages: 2.05
Specified Dry Gas Dew Point: 7.00 lbs. H_2O/MMSCF
Temperature: 120.0 deg. F
Pressure: 750.0 psig
Dry Gas Flow Rate: 200.0000 MMSCF/day
Glycol Losses with Dry Gas: 5.8623 lb/hr
Wet Gas Water Content: Saturated
Calculated Wet Gas Water Content: 126.81 lbs. H_2O/MMSCF
Calculated Lean Glycol Recirc. Ratio: 1.20 gal/lb H_2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	5.51%	94.49%
Carbon Dioxide	99.90%	0.10%
Hydrogen Sulfide	99.46%	0.54%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.98%	0.02%
Propane	99.96%	0.04%
Isobutane	99.95%	0.05%
n-Butane	99.94%	0.06%
Isopentane	99.94%	0.06%
n-Pentane	99.92%	0.08%
n-Hexane	99.88%	0.12%
Cyclohexane	99.50%	0.50%
Other Hexanes	99.91%	0.09%
Heptanes	99.80%	0.20%
Methylcyclohexane	99.47%	0.53%
Benzene	95.72%	4.28%
Toluene	94.23%	5.77%
Xylenes	89.11%	10.89%
C8+ Heavies	99.16%	0.84%

FLASH TANK

Flash Control: Vented to atmosphere
Flash Temperature: 100.0 deg. F
Flash Pressure: 73.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.99%	0.01%
Carbon Dioxide	61.37%	38.63%
Hydrogen Sulfide	91.11%	8.89%
Nitrogen	8.57%	91.43%
Methane	9.45%	90.55%

Ethane	25.99%	74.01%
Propane	48.86%	51.14%
Isobutane	59.48%	40.52%
n-Butane	66.53%	33.47%
Isopentane	69.87%	30.13%
n-Pentane	74.77%	25.23%
n-Hexane	84.40%	15.60%
Cyclohexane	95.10%	4.90%
Other Hexanes	80.13%	19.87%
Heptanes	91.68%	8.32%
Methylcyclohexane	96.29%	3.71%
Benzene	99.51%	0.49%
Toluene	99.70%	0.30%
Xylenes	99.90%	0.10%
C8+ Heavies	99.07%	0.93%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	10.11%	89.89%
Carbon Dioxide	0.00%	100.00%
Hydrogen Sulfide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	0.72%	99.28%
n-Pentane	0.67%	99.33%
n-Hexane	0.59%	99.41%
Cyclohexane	3.37%	96.63%
Other Hexanes	1.25%	98.75%
Heptanes	0.55%	99.45%
Methylcyclohexane	4.16%	95.84%
Benzene	5.03%	94.97%
Toluene	7.93%	92.07%
Xylenes	12.99%	87.01%
C8+ Heavies	12.18%	87.82%

STREAM REPORTS:

WET GAS STREAM

Temperature: 120.00 deg. F
Pressure: 764.70 psia
Flow Rate: 8.36e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.67e-001	1.06e+003
Carbon Dioxide	3.18e-001	3.08e+003
Hydrogen Sulfide	9.97e-004	7.49e+000
Nitrogen	1.31e+000	8.08e+003
Methane	8.02e+001	2.83e+005
Ethane	1.04e+001	6.86e+004
Propane	4.63e+000	4.50e+004
Isobutane	6.07e-001	7.77e+003
n-Butane	1.34e+000	1.71e+004
Isopentane	2.98e-001	4.74e+003
n-Pentane	3.03e-001	4.82e+003
n-Hexane	5.98e-002	1.14e+003
Cyclohexane	2.89e-002	5.36e+002
Other Hexanes	1.28e-001	2.42e+003
Heptanes	4.59e-002	1.01e+003
Methylcyclohexane	2.29e-002	4.96e+002
Benzene	9.97e-003	1.72e+002
Toluene	6.98e-003	1.42e+002
Xylenes	9.97e-004	2.33e+001
C8+ Heavies	1.70e-002	6.36e+002
Total Components	100.00	4.50e+005

DRY GAS STREAM

Temperature: 120.00 deg. F
Pressure: 764.70 psia
Flow Rate: 8.33e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.47e-002	5.83e+001
Carbon Dioxide	3.19e-001	3.08e+003
Hydrogen Sulfide	9.95e-004	7.45e+000
Nitrogen	1.31e+000	8.08e+003
Methane	8.05e+001	2.83e+005
Ethane	1.04e+001	6.86e+004

Propane	4.64e+000	4.49e+004
Isobutane	6.09e-001	7.77e+003
n-Butane	1.34e+000	1.71e+004
Isopentane	2.99e-001	4.74e+003
n-Pentane	3.04e-001	4.81e+003
n-Hexane	5.99e-002	1.13e+003
Cyclohexane	2.89e-002	5.33e+002
Other Hexanes	1.28e-001	2.42e+003
Heptanes	4.59e-002	1.01e+003
Methylcyclohexane	2.29e-002	4.93e+002
Benzene	9.57e-003	1.64e+002
Toluene	6.60e-003	1.34e+002
Xylenes	8.91e-004	2.08e+001
C8+ Heavies	1.69e-002	6.31e+002
Total Components	100.00	4.49e+005

LEAN GLYCOL STREAM

Temperature: 120.00 deg. F
Flow Rate: 2.00e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.90e+001	1.11e+004
Water	1.00e+000	1.13e+002
Carbon Dioxide	2.61e-012	2.94e-010
Hydrogen Sulfide	3.61e-014	4.07e-012
Nitrogen	5.97e-013	6.72e-011
Methane	6.52e-018	7.34e-016
Ethane	6.51e-008	7.33e-006
Propane	6.31e-009	7.11e-007
Isobutane	1.04e-009	1.18e-007
n-Butane	2.45e-009	2.76e-007
Isopentane	1.33e-004	1.50e-002
n-Pentane	1.69e-004	1.91e-002
n-Hexane	6.04e-005	6.81e-003
Cyclohexane	7.87e-004	8.87e-002
Other Hexanes	2.02e-004	2.28e-002
Heptanes	9.13e-005	1.03e-002
Methylcyclohexane	9.75e-004	1.10e-001
Benzene	3.43e-003	3.86e-001
Toluene	6.23e-003	7.01e-001
Xylenes	3.36e-003	3.78e-001
C8+ Heavies	6.54e-003	7.36e-001
Total Components	100.00	1.13e+004

RICH GLYCOL STREAM

Temperature: 120.00 deg. F
Pressure: 764.70 psia
Flow Rate: 2.22e+001 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.00e+001	1.11e+004
Water	9.02e+000	1.11e+003
Carbon Dioxide	2.38e-002	2.94e+000
Hydrogen Sulfide	3.29e-004	4.07e-002
Nitrogen	5.40e-003	6.67e-001
Methane	1.77e-001	2.19e+001
Ethane	1.26e-001	1.55e+001
Propane	1.41e-001	1.75e+001
Isobutane	3.17e-002	3.92e+000
n-Butane	9.00e-002	1.11e+001
Isopentane	2.42e-002	2.99e+000
n-Pentane	3.09e-002	3.81e+000
n-Hexane	1.10e-002	1.36e+000
Cyclohexane	2.24e-002	2.77e+000
Other Hexanes	1.84e-002	2.28e+000
Heptanes	1.66e-002	2.06e+000
Methylcyclohexane	2.22e-002	2.74e+000
Benzene	6.25e-002	7.72e+000
Toluene	7.18e-002	8.87e+000
Xylenes	2.36e-002	2.92e+000
C8+ Heavies	4.94e-002	6.11e+000
Total Components	100.00	1.24e+004

FLASH TANK OFF GAS STREAM

Temperature: 100.00 deg. F
Pressure: 87.70 psia
Flow Rate: 7.59e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.41e-001	8.69e-002
Carbon Dioxide	1.29e+000	1.13e+000
Hydrogen Sulfide	5.31e-003	3.62e-003
Nitrogen	1.09e+000	6.10e-001
Methane	6.16e+001	1.98e+001

Ethane	1.91e+001	1.15e+001
Propane	1.01e+001	8.93e+000
Isobutane	1.37e+000	1.59e+000
n-Butane	3.20e+000	3.72e+000
Isopentane	6.24e-001	9.01e-001
n-Pentane	6.66e-001	9.62e-001
n-Hexane	1.23e-001	2.12e-001
Cyclohexane	8.07e-002	1.36e-001
Other Hexanes	2.63e-001	4.53e-001
Heptanes	8.53e-002	1.71e-001
Methylcyclohexane	5.18e-002	1.02e-001
Benzene	2.43e-002	3.80e-002
Toluene	1.46e-002	2.70e-002
Xylenes	1.43e-003	3.03e-003
C8+ Heavies	1.66e-002	5.68e-002
Total Components	100.00	5.04e+001

FLASH TANK GLYCOL STREAM

Temperature: 100.00 deg. F
Flow Rate: 2.21e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.04e+001	1.11e+004
Water	9.05e+000	1.11e+003
Carbon Dioxide	1.46e-002	1.80e+000
Hydrogen Sulfide	3.01e-004	3.71e-002
Nitrogen	4.65e-004	5.72e-002
Methane	1.68e-002	2.07e+000
Ethane	3.28e-002	4.03e+000
Propane	6.93e-002	8.53e+000
Isobutane	1.90e-002	2.33e+000
n-Butane	6.01e-002	7.40e+000
Isopentane	1.70e-002	2.09e+000
n-Pentane	2.32e-002	2.85e+000
n-Hexane	9.33e-003	1.15e+000
Cyclohexane	2.14e-002	2.64e+000
Other Hexanes	1.48e-002	1.83e+000
Heptanes	1.53e-002	1.89e+000
Methylcyclohexane	2.15e-002	2.64e+000
Benzene	6.24e-002	7.68e+000
Toluene	7.19e-002	8.84e+000
Xylenes	2.37e-002	2.91e+000
C8+ Heavies	4.92e-002	6.05e+000
Total Components	100.00	1.23e+004

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 2.15e+004 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.81e+001	1.00e+003
Carbon Dioxide	7.22e-002	1.80e+000
Hydrogen Sulfide	1.92e-003	3.71e-002
Nitrogen	3.60e-003	5.72e-002
Methane	2.27e-001	2.07e+000
Ethane	2.37e-001	4.03e+000
Propane	3.41e-001	8.53e+000
Isobutane	7.08e-002	2.33e+000
n-Butane	2.25e-001	7.40e+000
Isopentane	5.07e-002	2.07e+000
n-Pentane	6.93e-002	2.83e+000
n-Hexane	2.34e-002	1.14e+000
Cyclohexane	5.34e-002	2.55e+000
Other Hexanes	3.69e-002	1.80e+000
Heptanes	3.30e-002	1.87e+000
Methylcyclohexane	4.55e-002	2.53e+000
Benzene	1.65e-001	7.30e+000
Toluene	1.56e-001	8.14e+000
Xylenes	4.21e-002	2.53e+000
C8+ Heavies	5.50e-002	5.31e+000
Total Components	100.00	1.07e+003

CONDENSER VENT GAS STREAM

Temperature: 110.00 deg. F
Pressure: 13.10 psia
Flow Rate: 3.62e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.80e+000	1.68e+000
Carbon Dioxide	4.20e+000	1.76e+000
Hydrogen Sulfide	1.06e-001	3.45e-002
Nitrogen	2.14e-001	5.72e-002
Methane	1.35e+001	2.06e+000
Ethane	1.40e+001	4.01e+000
Propane	1.99e+001	8.37e+000

Isobutane	4.05e+000	2.24e+000
n-Butane	1.26e+001	7.00e+000
Isopentane	2.62e+000	1.80e+000
n-Pentane	3.55e+000	2.44e+000
n-Hexane	9.70e-001	7.97e-001
Cyclohexane	1.95e+000	1.57e+000
Other Hexanes	1.68e+000	1.38e+000
Heptanes	8.74e-001	8.36e-001
Methylcyclohexane	1.20e+000	1.12e+000
Benzene	5.58e+000	4.16e+000
Toluene	2.94e+000	2.59e+000
Xylenes	2.75e-001	2.78e-001
C8+ Heavies	7.70e-003	1.25e-002
Total Components	100.00	4.42e+001

CONDENSER PRODUCED WATER STREAM

Temperature: 110.00 deg. F
Flow Rate: 2.00e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
Water	9.99e+001	1.00e+003	999318.
Carbon Dioxide	3.65e-003	3.65e-002	37.
Hydrogen Sulfide	2.31e-004	2.31e-003	2.
Nitrogen	2.89e-006	2.89e-005	0.
Methane	2.06e-004	2.06e-003	2.
Ethane	4.67e-004	4.68e-003	5.
Propane	9.27e-004	9.27e-003	9.
Isobutane	1.37e-004	1.37e-003	1.
n-Butane	5.74e-004	5.74e-003	6.
Isopentane	1.06e-004	1.06e-003	1.
n-Pentane	1.55e-004	1.55e-003	2.
n-Hexane	4.27e-005	4.27e-004	0.
Cyclohexane	4.90e-004	4.91e-003	5.
Other Hexanes	5.90e-005	5.90e-004	1.
Heptanes	2.51e-005	2.51e-004	0.
Methylcyclohexane	1.69e-004	1.69e-003	2.
Benzene	3.86e-002	3.86e-001	386.
Toluene	2.01e-002	2.01e-001	201.
Xylenes	2.32e-003	2.32e-002	23.
C8+ Heavies	2.31e-007	2.31e-006	0.
Total Components	100.00	1.00e+003	1000000.

CONDENSER RECOVERED OIL STREAM

Temperature: 110.00 deg. F
Flow Rate: 4.97e-002 gpm

Component	Conc. (wt%)	Loading (lb/hr)
Water	3.79e-002	8.02e-003
Carbon Dioxide	1.52e-002	3.22e-003
Hydrogen Sulfide	1.20e-003	2.55e-004
Nitrogen	1.70e-004	3.59e-005
Methane	6.22e-003	1.32e-003
Ethane	7.13e-002	1.51e-002
Propane	7.31e-001	1.55e-001
Isobutane	4.06e-001	8.59e-002
n-Butane	1.84e+000	3.89e-001
Isopentane	1.29e+000	2.72e-001
n-Pentane	1.84e+000	3.90e-001
n-Hexane	1.63e+000	3.44e-001
Cyclohexane	4.60e+000	9.73e-001
Other Hexanes	2.01e+000	4.25e-001
Heptanes	4.91e+000	1.04e+000
Methylcyclohexane	6.65e+000	1.41e+000
Benzene	1.30e+001	2.76e+000
Toluene	2.53e+001	5.35e+000
Xylenes	1.06e+001	2.23e+000
C8+ Heavies	2.51e+001	5.30e+000
Total Components	100.00	2.11e+001

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Displaying title 40, up to date as of 9/05/2023. Title 40 was last amended 9/05/2023.

Title 40 —Protection of Environment
Chapter I —Environmental Protection Agency
Subchapter C —Air Programs
Part 98 —Mandatory Greenhouse Gas Reporting
Subpart A —General Provision

Table A–1 to Subpart A of Part 98—Global Warming Potentials

[100-Year Time Horizon]

Name	CAS No.	Chemical formula	Global warming potential (100 yr.)
Chemical-Specific GWPs			
Carbon dioxide	124–38–9	CO_2	1
Methane	74–82–8	CH_4	[a] 25
Nitrous oxide	10024–97–2	N_2O	[a] 298
Fully Fluorinated GHGs			
Sulfur hexafluoride	2551–62–4	SF_6	[a] 22,800
Trifluoromethyl sulphur pentafluoride	373–80–8	SF_5CF_3	17,700
Nitrogen trifluoride	7783–54–2	NF_3	17,200
PFC–14 (Perfluoromethane)	75–73–0	CF_4	[a] 7,390
PFC–116 (Perfluoroethane)	76–16–4	C_2F_6	[a] 12,200
PFC–218 (Perfluoropropane)	76–19–7	C_3F_8	[a] 8,830
Perfluorocyclopropane	931–91–9	$C-C_3F_6$	17,340
PFC–3–1–10 (Perfluorobutane)	355–25–9	C_4F_{10}	[a] 8,860
PFC–318 (Perfluorocyclobutane)	115–25–3	$C-C_4F_8$	[a] 10,300
PFC–4–1–12 (Perfluoropentane)	678–26–2	C_5F_{12}	[a] 9,160
PFC–5–1–14 (Perfluorohexane, FC–72)	355–42–0	C_6F_{14}	[a] 9,300
PFC–6–1–12	335–57–9	C_7F_{16}; $CF_3(CF_2)_5CF_3$	[b] 7,820

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Title 40 —Protection of Environment
Chapter I —Environmental Protection Agency
Subchapter C —Air Programs
Part 98 —Mandatory Greenhouse Gas Reporting
Subpart C —General Stationary Fuel Combustion Sources

Table C–1 to Subpart C of Part 98—Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel

Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel

Fuel type	Default high heat value	Default CO_2 emission factor
Coal and coke	mmBtu/short ton	kg CO_2/mmBtu
Anthracite	25.09	103.69
Bituminous	24.93	93.28
Subbituminous	17.25	97.17
Lignite	14.21	97.72
Coal Coke	24.80	113.67
Mixed (Commercial sector)	21.39	94.27
Mixed (Industrial coking)	26.28	93.90
Mixed (Industrial sector)	22.35	94.67
Mixed (Electric Power sector)	19.73	95.52
Natural gas	mmBtu/scf	kg CO_2/mmBtu
(Weighted U.S. Average)	1.026×10^{-3}	53.06
Petroleum products—liquid	mmBtu/gallon	kg CO_2/mmBtu
Distillate Fuel Oil No. 1	0.139	73.25
Distillate Fuel Oil No. 2	0.138	73.96
Distillate Fuel Oil No. 4	0.146	75.04
Residual Fuel Oil No. 5	0.140	72.93
Residual Fuel Oil No. 6	0.150	75.10
Used Oil	0.138	74.00
Kerosene	0.135	75.20
Liquefied petroleum gases (LPG)[1]	0.092	61.71

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Title 40 —Protection of Environment
Chapter I —Environmental Protection Agency
Subchapter C —Air Programs
Part 98 —Mandatory Greenhouse Gas Reporting
Subpart C —General Stationary Fuel Combustion Sources

Table C–2 to Subpart C of Part 98—Default CH_4 and N_2O Emission Factors for Various Types of Fuel

Fuel type	Default CH_4 emission factor (kg CH_4/mmBtu)	Default N_2O emission factor (kg N_2O/mmBtu)
Coal and Coke (All fuel types in Table C–1)	1.1×10^{-02}	1.6×10^{-03}
Natural Gas	1.0×10^{-03}	1.0×10^{-04}
Petroleum Products (All fuel types in Table C–1)	3.0×10^{-03}	6.0×10^{-04}
Fuel Gas	3.0×10^{-03}	6.0×10^{-04}
Other Fuels—Solid	3.2×10^{-02}	4.2×10^{-03}
Blast Furnace Gas	2.2×10^{-05}	1.0×10^{-04}
Coke Oven Gas	4.8×10^{-04}	1.0×10^{-04}
Biomass Fuels—Solid (All fuel types in Table C–1, except wood and wood residuals)	3.2×10^{-02}	4.2×10^{-03}
Wood and wood residuals	7.2×10^{-03}	3.6×10^{-03}
Biomass Fuels—Gaseous (All fuel types in Table C–1)	3.2×10^{-03}	6.3×10^{-04}
Biomass Fuels—Liquid (All fuel types in Table C–1)	1.1×10^{-03}	1.1×10^{-04}

Note: Those employing this table are assumed to fall under the IPCC definitions of the “Energy Industry” or “Manufacturing Industries and Construction”. In all fuels except for coal the values for these two categories are identical. For coal combustion, those who fall within the IPCC “Energy Industry” category may employ a value of 1g of CH_4/mmBtu.

[78 FR 71952, Nov. 29, 2013, as amended at 81 FR 89252, Dec. 9, 2016]

Section 7

Subsection 2 – Information Used to Determine Emissions for All Other Units Since Acquisition

For clarity, this Subsection 2 contains information used to determine emissions for all other units at this facility that were not affected by this application (i.e. all units except for Units 1, 2, 6, 7, 8, 9, 10, 3a, 3b, T-007, LOAD_SLOP, ECD, Flare , F-001, and MALF). For information pertinent to the units added or modified with this application, please refer to Subsection 1.

Table 3.1-2a. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM STATIONARY GAS TURBINES

Emission Factors[a] - Uncontrolled				
Pollutant	Natural Gas-Fired Turbines[b]		Distillate Oil-Fired Turbines[d]	
	(lb/MMBtu)[c] (Fuel Input)	Emission Factor Rating	(lb/MMBtu)[e] (Fuel Input)	Emission Factor Rating
CO_2[f]	110	A	157	A
N_2O	0.003[g]	E	ND	NA
Lead	ND	NA	1.4 E-05	C
SO_2	0.94S[h]	B	1.01S[h]	B
Methane	8.6 E-03	C	ND	NA
VOC	2.1 E-03	D	4.1 E-04[j]	E
TOC[k]	1.1 E-02	B	4.0 E-03[l]	C
PM (condensible)	4.7 E-03[l]	C	7.2 E-03[l]	C
PM (filterable)	1.9 E-03[l]	C	4.3 E-03[l]	C
PM (total)	6.6 E-03[l]	C	1.2 E-02[l]	C

[a] Factors are derived from units operating at high loads ($\geq$80 percent load) only. For information on units operating at other loads, consult the background report for this chapter (Reference 16), available at "www.epa.gov/ttn/chief". ND = No Data, NA = Not Applicable.

[b] SCCs for natural gas-fired turbines include 2-01-002-01, 2-02-002-01 & 03, and 2-03-002-02 & 03.

[c] Emission factors based on an average natural gas heating value (HHV) of 1020 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 1020. Similarly, these emission factors can be converted to other natural gas heating values.

[d] SCCs for distillate oil-fired turbines are 2-01-001-01, 2-02-001-01, 2-02-001-03, and 2-03-001-02.

[e] Emission factors based on an average distillate oil heating value of 139 MMBtu/10^3 gallons. To convert from (lb/MMBtu) to (lb/10^3 gallons), multiply by 139.

[f] Based on 99.5% conversion of fuel carbon to CO_2 for natural gas and 99% conversion of fuel carbon to CO_2 for distillate oil. CO_2 (Natural Gas) [lb/MMBtu] = (0.0036 scf/Btu)(%CON)(C)(D), where %CON = weight percent conversion of fuel carbon to CO_2, C = carbon content of fuel by weight, and D = density of fuel. For natural gas, C is assumed at 75%, and D is assumed at 4.1 E+04 lb/10^6scf. For distillate oil, CO_2 (Distillate Oil) [lb/MMBtu] = (26.4 gal/MMBtu) (%CON)(C)(D), where C is assumed at 87%, and the D is assumed at 6.9 lb/gallon.

[g] Emission factor is carried over from the previous revision to AP-42 (Supplement B, October 1996) and is based on limited source tests on a single turbine with water-steam injection (Reference 5).

[h] All sulfur in the fuel is assumed to be converted to SO_2. S = percent sulfur in fuel. Example, if sulfur content in the fuel is 3.4 percent, then S = 3.4. If S is not available, use 3.4 E-03 lb/MMBtu for natural gas turbines, and 3.3 E-02 lb/MMBtu for distillate oil turbines (the equations are more accurate).

[j] VOC emissions are assumed equal to the sum of organic emissions.

[k] Pollutant referenced as THC in the gathered emission tests. It is assumed as TOC, because it is based on EPA Test Method 25A.

[l] Emission factors are based on combustion turbines using water-steam injection.

Table 13.2.2-1. TYPICAL SILT CONTENT VALUES OF SURFACE MATERIAL ON INDUSTRIAL UNPAVED ROADS[a]

Industry	Road Use Or Surface Material	Plant Sites	No. Of Samples	Silt Content (%)	
				Range	Mean
Copper smelting	Plant road	1	3	16 - 19	17
Iron and steel production	Plant road	19	135	0.2 - 19	6.0
Sand and gravel processing	Plant road	1	3	4.1 - 6.0	4.8
	Material storage area	1	1	-	7.1
Stone quarrying and processing	Plant road	2	10	2.4 - 16	10
	Haul road to/from pit	4	20	5.0-15	8.3
Taconite mining and processing	Service road	1	8	2.4 - 7.1	4.3
	Haul road to/from pit	1	12	3.9 - 9.7	5.8
Western surface coal mining	Haul road to/from pit	3	21	2.8 - 18	8.4
	Plant road	2	2	4.9 - 5.3	5.1
	Scraper route	3	10	7.2 - 25	17
	Haul road (freshly graded)	2	5	18 - 29	24
Construction sites	Scraper routes	7	20	0.56-23	8.5
Lumber sawmills	Log yards	2	2	4.8-12	8.4
Municipal solid waste landfills	Disposal routes	4	20	2.2 - 21	6.4

[a]References 1,5-15.

The following empirical expressions may be used to estimate the quantity in pounds (lb) of size-specific particulate emissions from an unpaved road, per vehicle mile traveled (VMT):

For vehicles traveling on unpaved surfaces at industrial sites, emissions are estimated from the following equation:

$$E = k\ (s/12)^a (W/3)^b \tag{1a}$$

and, for vehicles traveling on publicly accessible roads, dominated by light duty vehicles, emissions may be estimated from the following:

$$E = \frac{k\ (s/12)^a (S/30)^d}{(M/0.5)^c} - C \tag{1b}$$

where k, a, b, c and d are empirical constants (Reference 6) given below and

E = size-specific emission factor (lb/VMT)
s = surface material silt content (%)
W = mean vehicle weight (tons)
M = surface material moisture content (%)
S = mean vehicle speed (mph)
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

The source characteristics s, W and M are referred to as correction parameters for adjusting the emission estimates to local conditions. The metric conversion from lb/VMT to grams (g) per vehicle kilometer traveled (VKT) is as follows:

1 lb/VMT = 281.9 g/VKT

The constants for Equations 1a and 1b based on the stated aerodynamic particle sizes are shown in Tables 13.2.2-2 and 13.2.2-4. The PM-2.5 particle size multipliers (k-factors) are taken from Reference 27.

Table 13.2.2-2. CONSTANTS FOR EQUATIONS 1a AND 1b

Constant	Industrial Roads (Equation 1a)			Public Roads (Equation 1b)		
	PM-2.5	PM-10	PM-30*	PM-2.5	PM-10	PM-30*
k (lb/VMT)	0.15	1.5	4.9	0.18	1.8	6.0
a	0.9	0.9	0.7	1	1	1
b	0.45	0.45	0.45	-	-	-
c	-	-	-	0.2	0.2	0.3
d	-	-	-	0.5	0.5	0.3
Quality Rating	B	B	B	B	B	B

*Assumed equivalent to total suspended particulate matter (TSP)
"-" = not used in the emission factor equation

Table 13.2.2-2 also contains the quality ratings for the various size-specific versions of Equation 1a and 1b. The equation retains the assigned quality rating, if applied within the ranges of source conditions, shown in Table 13.2.2-3, that were tested in developing the equation:

Table 13.2.2-3. RANGE OF SOURCE CONDITIONS USED IN DEVELOPING EQUATION 1a AND 1b

Emission Factor	Surface Silt Content, %	Mean Vehicle Weight		Mean Vehicle Speed		Mean No. of Wheels	Surface Moisture Content, %
		Mg	ton	km/hr	mph		
Industrial Roads (Equation 1a)	1.8-25.2	1.8-260	2-290	8-69	5-43	4-17[a]	0.03-13
Public Roads (Equation 1b)	1.8-35	1.4-2.7	1.5-3	16-88	10-55	4-4.8	0.03-13

[a] See discussion in text.

As noted earlier, the models presented as Equations 1a and 1b were developed from tests of traffic on unpaved surfaces. Unpaved roads have a hard, generally nonporous surface that usually dries quickly after a rainfall or watering, because of traffic-enhanced natural evaporation. (Factors influencing how fast a road dries are discussed in Section 13.2.2.3, below.) The quality ratings given above pertain to the mid-range of the measured source conditions for the equation. A higher mean vehicle weight and a higher than normal traffic rate may be justified when performing a worst-case analysis of emissions from unpaved roads.

The emission factors for the exhaust, brake wear and tire wear of a 1980's vehicle fleet (*C*) was obtained from EPA's MOBILE6.2 model [23]. The emission factor also varies with aerodynamic size range average uncontrolled conditions (but including natural mitigation) under the simplifying assumption that annual average emissions are inversely proportional to the number of days with measurable (more than 0.254 mm [0.01 inch]) precipitation:

$$E_{ext} = E \; [(365 - P)/365] \tag{2}$$

where:

E_{ext} = annual size-specific emission factor extrapolated for natural mitigation, lb/VMT

E = emission factor from Equation 1a or 1b

P = number of days in a year with at least 0.254 mm (0.01 in) of precipitation (see below)

Figure 13.2.2-1 gives the geographical distribution for the mean annual number of "wet" days for the United States.

Equation 2 provides an estimate that accounts for precipitation on an annual average basis for the purpose of inventorying emissions. It should be noted that Equation 2 does not account for differences in the temporal distributions of the rain events, the quantity of rain during any event, or the potential for the rain to evaporate from the road surface. In the event that a finer temporal and spatial resolution is desired for inventories of public unpaved roads, estimates can be based on a more complex set of assumptions. These assumptions include:

1. The moisture content of the road surface material is increased in proportion to the quantity of water added;
2. The moisture content of the road surface material is reduced in proportion to the Class A pan evaporation rate;
3. The moisture content of the road surface material is reduced in proportion to the traffic volume; and
4. The moisture content of the road surface material varies between the extremes observed in the area. The CHIEF Web site (http://www.epa.gov/ttn/chief/ap42/ch13/related/c13s02-2.html) has a file which contains a spreadsheet program for calculating emission factors which are temporally and spatially resolved. Information required for use of the spreadsheet program includes monthly Class A pan evaporation values, hourly meteorological data for precipitation, humidity and snow cover, vehicle traffic information, and road surface material information.

It is emphasized that <u>the simple assumption underlying Equation 2 and the more complex set of assumptions underlying the use of the procedure which produces a finer temporal and spatial resolution</u> have not been verified in any rigorous manner. For this reason, the quality ratings for either approach should be downgraded one letter from the rating that would be applied to Equation 1.

13.2.2.3 Controls[18-22]

A wide variety of options exist to control emissions from unpaved roads. Options fall into the following three groupings:

1. <u>Vehicle restrictions</u> that limit the speed, weight or number of vehicles on the road;

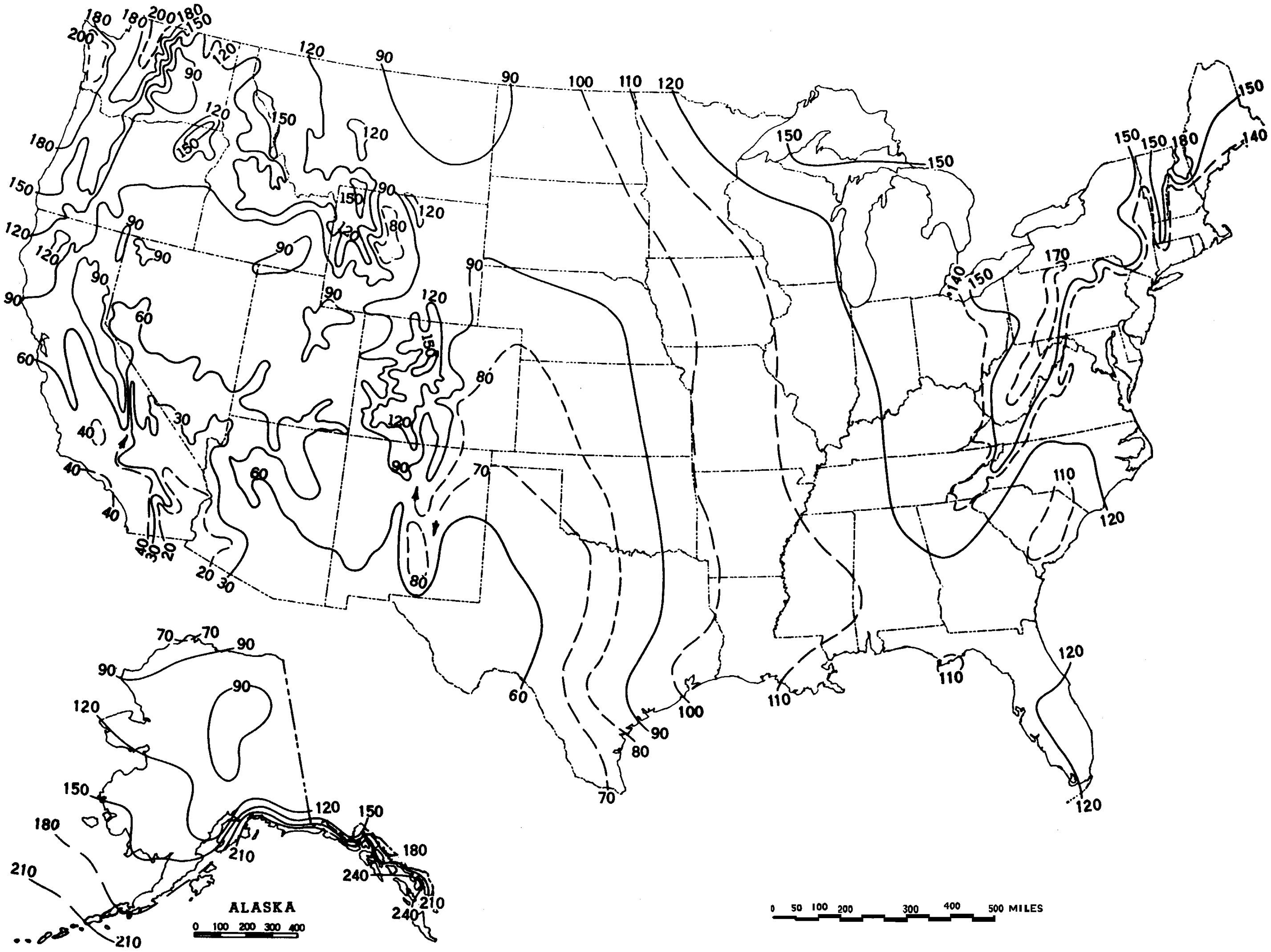


Figure 13.2.2-1. Mean number of days with 0.01 inch or more of precipitation in United States.

Since flares do not lend themselves to conventional emission testing techniques, only a few attempts have been made to characterize flare emissions. Recent EPA tests using propylene as flare gas indicated that efficiencies of 98 percent can be achieved when burning an offgas with at least 11,200 kJ/m^3 (300 Btu/ft^3). The tests conducted on steam-assisted flares at velocities as low as 39.6 meters per minute (m/min) (130 ft/min) to 1140 m/min (3750 ft/min), and on air-assisted flares at velocities of 180 m/min (617 ft/min) to 3960 m/min (13,087 ft/min) indicated that variations in incoming gas flow rates have no effect on the combustion efficiency. Flare gases with less than 16,770 kJ/m^3 (450 Btu/ft^3) do not smoke.

Table 13.5-1 presents flare emission factors, and Table 13.5-2 presents emission composition data obtained from the EPA tests.[1] Crude propylene was used as flare gas during the tests. Methane was a major fraction of hydrocarbons in the flare emissions, and acetylene was the dominant intermediate hydrocarbon species. Many other reports on flares indicate that acetylene is always formed as a stable intermediate product. The acetylene formed in the combustion reactions may react further with hydrocarbon radicals to form polyacetylenes followed by polycyclic hydrocarbons.[2]

In flaring waste gases containing no nitrogen compounds, NO is formed either by the fixation of atmospheric nitrogen (N) with oxygen (O) or by the reaction between the hydrocarbon radicals present in the combustion products and atmospheric nitrogen, by way of the intermediate stages, HCN, CN, and OCN.[2] Sulfur compounds contained in a flare gas stream are converted to SO_2 when burned. The amount of SO_2 emitted depends directly on the quantity of sulfur in the flared gases.

Table 13.5-1 (English Units). EMISSION FACTORS FOR FLARE OPERATIONS[a]

EMISSION FACTOR RATING: B

Component	Emission Factor ($lb/10^6$ Btu)
Total hydrocarbons[b]	0.14
Carbon monoxide	0.37
Nitrogen oxides	0.068
Soot[c]	0 - 274

[a] Reference 1. Based on tests using crude propylene containing 80% propylene and 20% propane.
[b] Measured as methane equivalent.
[c] Soot in concentration values: nonsmoking flares, 0 micrograms per liter (µg/L); lightly smoking flares, 40 µg/L; average smoking flares, 177 µg/L; and heavily smoking flares, 274 µg/L.

GRI-HAPCalc ® 3.01
Truck Loading Report

Facility ID:	**SOUTH CARLSBAD**	**Notes:**
Operation Type:	**COMPRESSOR STATION**	
Facility Name:	**SOUTH CARLSBAD**	
User Name:		
Units of Measure:	**U.S. STANDARD**	

Note:* *Emissions less than 5.00E-09 tons (or tonnes) per year are considered insignificant and are treated as zero. These emissions are indicated on the report with a "0". Emissions between 5.00E-09 and 5.00E-05 tons (or tonnes) per year are represented on the report with "0.0000".

Truck Loading Unit

Unit Name: LOAD

Annual Throughput: 69,350.00 bbl/yr

Control Efficiency: 0.00 %

Ambient Temperature: 74.00 °F

Loading Factor: 0

Type of Loading: 0.6 - Submerged loading, dedicated service

Is Truck Required to Pass Annual Inspection?: NO

Are Vapors Routed to Control Device?: NO

User Concentration Inputs

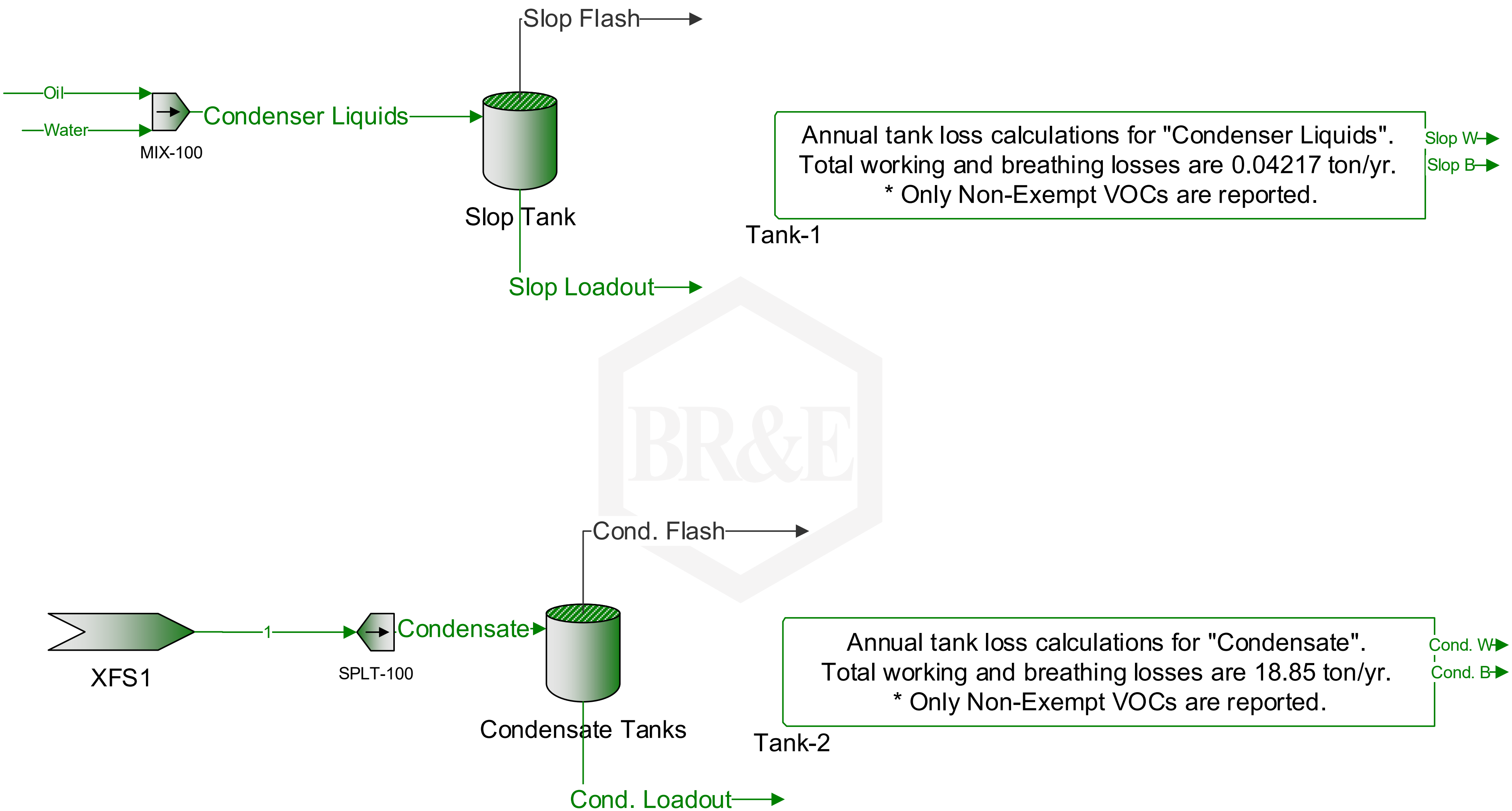
Chemical Name	Feed Wt %
Ethane	0.0000
Propane	0.0000
Butane	3.7430
Pentane	32.4470
C6+	63.8100
n-Hexane	8.7170
Benzene	1.5710
Toluene	1.7570
Ethylbenzene	0.2380
Xylenes(m,p,o)	0.5100
2,2,4-Trimethylpentane	0.0000

Calculated Emissions (ton/yr)

	Chemical Name	Emissions
HAPs		
	Benzene	0.0433
	Toluene	0.0144
	Ethylbenzene	0.0007
	Xylenes(m,p,o)	0.0012
	n-Hexane	0.3880
Total		0.4476
Criteria Pollutants		
	NMHC	9.8020
	NMEHC	9.8020

Other Pollutants

Butane	2.0418
Pentane	4.9199
C6+	2.8402



Slop Flash
Oil
Water
Condenser Liquids
MIX-100
Slop Tank
Annual tank loss calculations for "Condenser Liquids".
Total working and breathing losses are 0.04217 ton/yr.
* Only Non-Exempt VOCs are reported.
Slop W
Slop B
Tank-1
Slop Loadout
Cond. Flash
XFS1
1
SPLT-100
Condensate
Condensate Tanks
Annual tank loss calculations for "Condensate".
Total working and breathing losses are 18.85 ton/yr.
* Only Non-Exempt VOCs are reported.
Cond. W
Cond. B
Tank-2
Cond. Loadout

Process Streams		Cond. B	Cond. W	Slop B	Slop W
Composition	Status:	Solved	Solved	Solved	Solved
Phase: **Vapor**	From Block:	--	--	--	--
	To Block:	--	--	--	--
Mass Flow		lb/h	lb/h	lb/h	lb/h
Hydrogen Sulfide		0	0	0	0
Nitrogen		0	0	0	0
Carbon Dioxide		4.81714E-12	5.06326E-12	9.90791E-16	3.56382E-15
Methane		8.17987E-14	8.59780E-14	1.68244E-17	6.05164E-17
Ethane		5.61920E-08	5.90630E-08	1.15576E-11	4.15720E-11
Propane		0.000295640	0.000310745	6.08073E-08	2.18720E-07
i-Butane		0.0211533	0.0222341	4.35082E-06	1.56497E-05
n-Butane		0.562185	0.590909	0.000115631	0.000415917
2,2-Dimethylpropane		0.0126659	0.0133130	2.60512E-06	9.37047E-06
i-Pentane		0.593853	0.624194	0.000122144	0.000439345
n-Pentane		0.536838	0.564267	0.000110417	0.000397164
2,2-Dimethylbutane		0.00518274	0.00544754	1.06599E-06	3.83430E-06
Cyclopentane		0	0	0	0
2,3-Dimethylbutane		0.0363321	0.0381884	7.47281E-06	2.68793E-05
2-Methylpentane		0.0838566	0.0881411	1.72477E-05	6.20389E-05
3-Methylpentane		0.0440194	0.0462685	9.05393E-06	3.25665E-05
n-Hexane		0.0766362	0.0805517	1.57626E-05	5.66971E-05
Methylcyclopentane		0.0352034	0.0370020	7.24065E-06	2.60442E-05
Benzene		0.00854433	0.00898088	1.75740E-06	6.32127E-06
Cyclohexane		0.0239256	0.0251480	4.92102E-06	1.77006E-05
2-Methylhexane		0.00606139	0.00637108	1.24671E-06	4.48434E-06
3-Methylhexane		0.00676702	0.00711276	1.39184E-06	5.00638E-06
2,2,4-Trimethylpentane		0	0	0	0
n-Heptane		0.0251696	0.0264556	5.17689E-06	1.86210E-05
Methylcyclohexane		0.0137544	0.0144572	2.82902E-06	1.01758E-05
Toluene		0.00287912	0.00302623	5.92179E-07	2.13004E-06
n-Octane		0.00615584	0.00647036	1.26614E-06	4.55422E-06
Ethylbenzene		0.000131317	0.000138026	2.70093E-08	9.71510E-08
m-Xylene		0.000120060	0.000126194	2.46939E-08	8.88227E-08
p-Xylene		0.000125494	0.000131906	2.58117E-08	9.28432E-08
o-Xylene		0	0	0	0
n-Nonane		0.000544887	0.000572726	1.12073E-07	4.03119E-07

Process Streams		Cond. B	Cond. W	Slop B	Slop W
Properties	Status:	Solved	Solved	Solved	Solved
Phase: **Vapor**	From Block:	--	--	--	--
	To Block:	--	--	--	--
Property	**Units**				
Temperature	°F	82.6768	82.6768	82.6768	82.6768
Pressure	psia	9.75052	9.75052	0.568983	0.568983
Mole Fraction Vapor	%	100	100	100	100
Mole Fraction Light Liquid	%	0	0	0	0
Mole Fraction Heavy Liquid	%	0	0	0	0
Molecular Weight	lb/lbmol	69.6863	69.6863	19.4093	19.4093
Mass Density	lb/ft^3	0.119713	0.119713	0.00189852	0.00189852
Std Vapor Volumetric Flow	MMSCFD	0.000274772	0.000288811	2.09476E-06	7.53472E-06
Std Liquid Volumetric Flow	sgpm	0.00673106	0.00707497	9.44417E-06	3.39702E-05
Compressibility		0.975200	0.975200	0.999435	0.999435
Specific Gravity		2.40609	2.40609	0.670154	0.670154
API Gravity					
Mass Cp	Btu/(lb*°F)	0.400239	0.400239	0.444343	0.444343
Ideal Gas CpCv Ratio		1.07725	1.07725	1.29931	1.29931
Dynamic Viscosity	cP	0.00719181	0.00719181	0.0100547	0.0100547
Kinematic Viscosity	cSt	3.75039	3.75039	330.622	330.622
Net Ideal Gas Heating Value	Btu/ft^3	3576.44	3576.44	96.4902	96.4902
Net Liquid Heating Value	Btu/lb	19326.7	19326.7	914.987	914.987
Gross Ideal Gas Heating Value	Btu/ft^3	3867.34	3867.34	153.291	153.291
Gross Liquid Heating Value	Btu/lb	20911.4	20911.4	2025.59	2025.59

FESCO, Ltd.
105 Medical Dr. - Ozona,Texas 76943

For: Enterprise Field Services, LLC
P. O. Box 1508
Carlsbad, New Mexico 88221

Sample: South Carlsbad Gas Plant
Inlet to the Plant Gas
Spot Gas Sample @ 280 psig & 53 °F

Equipment: Normal Operating Conditions as per Customer
Date Sampled: 01/08/2020 @ 10:59 CST — Job Number: 200013.104

COC No.: 3560

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2286

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	1.313	
Carbon Dioxide	0.319	
Methane	80.464	
Ethane	10.387	2.771
Propane	4.642	1.276
Isobutane	0.609	0.199
n-Butane	1.341	0.422
2-2 Dimethylpropane	0.001	0.000
Isopentane	0.299	0.109
n-Pentane	0.304	0.110
Hexanes	0.163	0.067
Heptanes Plus	0.158	0.062
Totals	100.000	5.016

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity ------------------------	3.254	(Air=1)
Molecular Weight ----------------------	93.94	
Gross Heating Value -----------------	4831	BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity ------------------------	0.708	(Air=1)
Compressibility (Z) --------------------	0.9967	
Molecular Weight ----------------------	20.44	
Gross Heating Value		
Dry Basis ------------------------------	1217	BTU/CF
Saturated Basis ---------------------	1196	BTU/CF

*Hydrogen Sulfide tested on location by: Stain Tube Method (GPA 2377)
0.016 Gr/100 CF, 0.3 PPMV or <0.0001 Mol%

Detector Tube: Gastec 4LT 0.05 to 4.0 ppm (Meas. Range)
Base Conditions: 14.650 PSI & 60 Deg F

Sampled By: (08)McCollum
Analyst: JBM
Processor: BMc
Cylinder ID: X-0933

Certified: FESCO, Ltd. - Ozona, Texas

Tom Anderson 325-392-3773

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2286
TOTAL REPORT

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	1.313		1.799
Carbon Dioxide	0.319		0.687
Methane	80.464		63.138
Ethane	10.387	2.771	15.277
Propane	4.642	1.276	10.012
Isobutane	0.609	0.199	1.731
n-Butane	1.341	0.422	3.812
2,2 Dimethylpropane	0.001	0.000	0.004
Isopentane	0.299	0.109	1.055
n-Pentane	0.304	0.110	1.073
2,2 Dimethylbutane	0.005	0.002	0.021
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.018	0.007	0.076
2 Methylpentane	0.052	0.022	0.219
3 Methylpentane	0.028	0.011	0.118
n-Hexane	0.060	0.025	0.253
Methylcyclopentane	0.025	0.009	0.103
Benzene	0.010	0.003	0.038
Cyclohexane	0.029	0.010	0.119
2-Methylhexane	0.007	0.003	0.034
3-Methylhexane	0.008	0.004	0.039
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.018	0.008	0.087
n-Heptane	0.013	0.006	0.064
Methylcyclohexane	0.023	0.009	0.110
Toluene	0.007	0.002	0.032
Other C8's	0.012	0.006	0.065
n-Octane	0.003	0.002	0.017
Ethylbenzene	0.000	0.000	0.000
M & P Xylenes	0.001	0.000	0.005
O-Xylene	0.000	0.000	0.000
Other C9's	0.002	0.001	0.012
n-Nonane	0.000	0.000	0.000
Other C10's	0.000	0.000	0.000
n-Decane	0.000	0.000	0.000
Undecanes (11)	0.000	0.000	0.000
Totals	100.000	5.016	100.000

Computed Real Characteristics Of Total Sample:

Specific Gravity ---------------------------------- 0.708 (Air=1)

Compressibility (Z) ----------------------------- 0.9967

Molecular Weight ------------------------------- 20.44

Gross Heating Value

Dry Basis ------------------------------------- 1217 BTU/CF

Saturated Basis ----------------------------- 1196 BTU/CF

Process Streams		SC Vapor
Composition	Status:	Solved
Phase: **Total**	From Block:	V-8201
	To Block:	First Stage Compressor
Mole Fraction		%
Hydrogen Sulfide		0
Nitrogen		2.72040
Carbon Dioxide		1.60514
Methane		76.5858
Ethane		10.1231
Propane		5.38529
i-Butane		0.666348
n-Butane		1.56272
2,2-Dimethylpropane		0.00998088
i-Pentane		0.365680
n-Pentane		0.382158
2,2-Dimethylbutane		0.00396908
Cyclopentane		0
2,3-Dimethylbutane		0.0346373
2-Methylpentane		0.0869974
3-Methylpentane		0.0493657
n-Hexane		0.100417
Methylcyclopentane		0.0531306
Benzene		0.0236183
Cyclohexane		0.0480196
2-Methylhexane		0.0125769
3-Methylhexane		0.0144867
2,2,4-Trimethylpentane		0
n-Heptane		0.0661237
Methylcyclohexane		0.0363511
Toluene		0.0142309
n-Octane		0.0284272
Ethylbenzene		0.000866152
m-Xylene		0.000846199
p-Xylene		0.000852961
o-Xylene		0
n-Nonane		0.00366520
n-Decane		0
n-Undecane		0

Solar Turbines
A Caterpillar Company

PREDICTED EMISSION PERFORMANCE

Customer	
Job ID	
Inquiry Number	
Run By: **Javier Marquez**	Date Run: **9-Jul-20**

Engine Model: **CENTAUR 40-4700 CS/MD 80F MATCH**	
Fuel Type: **SD NATURAL GAS**	Water Injection: **NO**
Engine Emissions Data: **REV. 1.2**	

1 — 4111 HP, 100.0% Load, Elev. 3075 ft, Rel. Humidity 60.0%, Temperature 20.0 Deg. F

	NOx EMISSIONS	CO EMISSIONS	UHC EMISSIONS
PPMvd at 15% O2	165.00	50.00	50.00
ton/yr	112.54	20.76	11.89
lbm/MMBtu (Fuel LHV)	0.661	0.122	0.070
lbm/(MW-hr) (gas turbine shaft pwr)	8.38	1.55	0.89
lbm/hr	25.69	4.74	2.71

2 — 3583 HP, 100.0% Load, Elev. 3075 ft, Rel. Humidity 60.0%, Temperature 80.0 Deg. F

	NOx EMISSIONS	CO EMISSIONS	UHC EMISSIONS
PPMvd at 15% O2	165.00	50.00	50.00
ton/yr	100.38	18.52	10.61
lbm/MMBtu (Fuel LHV)	0.652	0.120	0.069
lbm/(MW-hr) (gas turbine shaft pwr)	8.58	1.58	0.91
lbm/hr	22.92	4.23	2.42

Notes

1. For short-term emission limits such as lbs/hr., Solar recommends using "worst c conditions specific to the application and the site conditions. Worst case for necessarily the same for another.
2. Solar's typical SoLoNOx warranty, for ppm values, is available for greater than and between 50% and 100% load for gas fuel, and between 65% and 100% load for the Centaur 40). An emission warranty for non-SoLoNOx equipment is available or -20 deg F and between 80% and 100% load.
3. Fuel must meet Solar standard fuel specification ES 9-98. Emissions are based composition, or, San Diego natural gas or equivalent.
4. If needed, Solar can provide Product Information Letters to address turbine ope warranty ranges, as well as non-warranted emissions of SO2, PM10/2.5, VOC, and
5. Solar can provide factory testing in San Diego to ensure the actual unit(s) mee the tolerances quoted. Pricing and schedule impact will be provided upon reque
6. Any emissions warranty is applicable only for steady-state conditions and does shut-down, malfunction, or transient event.

Solar Turbines
A Caterpillar Company

PREDICTED ENGINE PERFORMANCE

Customer	Model **CENTAUR 40-4700**
	Package Type **CS/MD**
Job ID	Match **80F MATCH**
Run By **Javier Marquez**	Date Run **9-Jul-20**
	Fuel System **GAS**
Engine Performance Code **REV. 4.20.1.25.13**	Engine Performance Data **REV. 2.1**
	Fuel Type **SD NATURAL GAS**

DATA FOR MINIMUM PERFORMANCE

Elevation	feet	3075
Inlet Loss	in H2O	3.5
Exhaust Loss	in H2O	2.0
Accessory on GP Shaft	HP	15.5

		1	2
Engine Inlet Temperature	deg F	20.0	80.0
Relative Humidity	%	60.0	60.0
Driven Equipment Speed	RPM	15500	15500
Specified Load	HP	FULL	FULL
Net Output Power	HP	4111	3583
Fuel Flow	mmBtu/hr	38.90	35.14
Heat Rate	Btu/HP-hr	9462	9809
Therm Eff	%	26.891	25.938
Engine Exhaust Flow	lbm/hr	143144	126652
PT Exit Temperature	deg F	771	850
Exhaust Temperature	deg F	771	850

Fuel Gas Composition (Volume Percent)

Methane (CH4)	92.79
Ethane (C2H6)	4.16
Propane (C3H8)	0.84
N-Butane (C4H10)	0.18
N-Pentane (C5H12)	0.04
Hexane (C6H14)	0.04
Carbon Dioxide (CO2)	0.44
Hydrogen Sulfide (H2S)	0.0001
Nitrogen (N2)	1.51

Fuel Gas Properties

LHV (Btu/Scf)	939.2	Specific Gravity	0.5970	Wobbe Index at 60F	1215.6

This performance was calculated with a basic inlet and exhaust system. Special noise silencers, special filters, heat recovery systems or cooling devices will Performance shown is "Expected" performance at the pressure drops stated, not g

Solar Turbines
A Caterpillar Company

PREDICTED EMISSION PERFORMANCE

Customer **Enterprise**	Engine Model **CENTAUR 40-4700S CS/MD 80F MATCH**
Job ID **S.Carlsbad**	
Inquiry Number	Fuel Type: **SD NATURAL GAS** — Water Injection: **NO**
Run By: **Jose Guillen** — Date Run: **1-Sep-20**	Engine Emissions Data **REV. 0.1**

	NOx EMISSIONS	CO EMISSIONS	UHC EMISSIONS
1 — 4329 HP, 100.0% Load, Elev. 3070 ft, Rel. Humidity 60.0%, Temperature 0 Deg. F			
PPMvd at 15% O2	25.00	50.00	25.00
ton/yr	17.64	21.48	6.15
lbm/MMBtu (Fuel LHV)	0.100	0.122	0.035
lbm/(MW-hr) (gas turbine shaft pwr)	1.25	1.52	0.44
lbm/hr	4.03	4.90	1.40
2 — 4056 HP, 100.0% Load, Elev. 3070 ft, Rel. Humidity 60.0%, Temperature 40.0 Deg. F			
PPMvd at 15% O2	25.00	50.00	25.00
ton/yr	16.54	20.14	5.77
lbm/MMBtu (Fuel LHV)	0.100	0.122	0.035
lbm/(MW-hr) (gas turbine shaft pwr)	1.25	1.52	0.44
lbm/hr	3.78	4.60	1.32
3 — 3666 HP, 100.0% Load, Elev. 3070 ft, Rel. Humidity 60.0%, Temperature 80.0 Deg. F			
PPMvd at 15% O2	25.00	50.00	25.00
ton/yr	15.19	18.50	5.30
lbm/MMBtu (Fuel LHV)	0.099	0.120	0.034
lbm/(MW-hr) (gas turbine shaft pwr)	1.27	1.54	0.44
lbm/hr	3.47	4.22	1.21

Notes

1. For short-term emission limits such as lbs/hr., Solar recommends using "worst c conditions specific to the application and the site conditions. Worst case for necessarily the same for another.
2. Solar's typical SoLoNOx warranty, for ppm values, is available for greater than and between 50% and 100% load for gas fuel, and between 65% and 100% load for the Centaur 40). An emission warranty for non-SoLoNOx equipment is available or -20 deg F and between 80% and 100% load.
3. Fuel must meet Solar standard fuel specification ES 9-98. Emissions are based composition, or, San Diego natural gas or equivalent.
4. If needed, Solar can provide Product Information Letters to address turbine ope warranty ranges, as well as non-warranted emissions of SO2, PM10/2.5, VOC, and
5. Solar can provide factory testing in San Diego to ensure the actual unit(s) mee the tolerances quoted. Pricing and schedule impact will be provided upon reque
6. Any emissions warranty is applicable only for steady-state conditions and does shut-down, malfunction, or transient event.

Solar Turbines
A Caterpillar Company

PREDICTED EMISSION PERFORMANCE

Customer **Enterprise**	Engine Model **CENTAUR 40-4700S** **CS/MD 80F MATCH**
Job ID **S.Carlsbad**	
Inquiry Number	Fuel Type **SD NATURAL GAS** — Water Injection **NO**
Run By **Jose Guillen** — Date Run **1-Sep-20**	Engine Emissions Data **REV. 0.1**

4	3163 HP 100.0% Load	Elev. 3070 ft	Rel. Humidity 60.0%	Temperature 105.0 Deg. F

	NOx EMISSIONS	CO EMISSIONS	UHC EMISSIONS
PPMvd at 15% O2	25.00	50.00	25.00
ton/yr	13.55	16.50	4.72
lbm/MMBtu (Fuel LHV)	0.097	0.118	0.034
lbm/(MW-hr) (gas turbine shaft pwr)	1.31	1.60	0.46
lbm/hr	3.09	3.77	1.08

Notes

1. For short-term emission limits such as lbs/hr., Solar recommends using "worst c conditions specific to the application and the site conditions. Worst case for necessarily the same for another.
2. Solar's typical SoLoNOx warranty, for ppm values, is available for greater than and between 50% and 100% load for gas fuel, and between 65% and 100% load for the Centaur 40). An emission warranty for non-SoLoNOx equipment is available or -20 deg F and between 80% and 100% load.
3. Fuel must meet Solar standard fuel specification ES 9-98. Emissions are based composition, or, San Diego natural gas or equivalent.
4. If needed, Solar can provide Product Information Letters to address turbine ope warranty ranges, as well as non-warranted emissions of SO2, PM10/2.5, VOC, and
5. Solar can provide factory testing in San Diego to ensure the actual unit(s) mee the tolerances quoted. Pricing and schedule impact will be provided upon reque
6. Any emissions warranty is applicable only for steady-state conditions and does shut-down, malfunction, or transient event.

Solar Turbines
A Caterpillar Company

PREDICTED ENGINE PERFORMANCE

Customer *Enterprise*	Model **CENTAUR 40-4700S**
Job ID **S.Carlsbad**	Package Type **CS/MD**
Run By **Jose Guillen** / Date Run **1-Sep-20**	Match **80F MATCH**
Engine Performance Code **REV. 4.20.1.25.13** / Engine Performance Data **REV. 2.2**	Fuel System **GAS** / Fuel Type **SD NATURAL GAS**

DATA FOR NOMINAL PERFORMANCE

Elevation	feet	3070
Inlet Loss	in H2O	4.0
Exhaust Loss	in H2O	4.0
Accessory on GP Shaft	HP	15.5

		1	2	3	4
Engine Inlet Temperature	deg F	0	40.0	80.0	105.0
Relative Humidity	%	60.0	60.0	60.0	60.0
Driven Equipment Speed	RPM	15500	15500	15500	15042
Specified Load	HP	FULL	FULL	FULL	FULL
Net Output Power	HP	4329	4056	3666	3163
Fuel Flow	mmBtu/hr	40.20	37.80	35.10	31.87
Heat Rate	Btu/HP-hr	9286	9321	9574	10075
Therm Eff	%	27.400	27.299	26.575	25.255
Engine Exhaust Flow	lbm/hr	147450	138006	126500	115569
PT Exit Temperature	deg F	754	800	852	876
Exhaust Temperature	deg F	754	800	852	876

Fuel Gas Composition (Volume Percent)

Methane (CH4)	92.79
Ethane (C2H6)	4.16
Propane (C3H8)	0.84
N-Butane (C4H10)	0.18
N-Pentane (C5H12)	0.04
Hexane (C6H14)	0.04
Carbon Dioxide (CO2)	0.44
Hydrogen Sulfide (H2S)	0.0001
Nitrogen (N2)	1.51

Fuel Gas Properties

LHV (Btu/Scf)	939.2	Specific Gravity	0.5970	Wobbe Index at 60F	1215.6

This performance was calculated with a basic inlet and exhaust system. Special noise silencers, special filters, heat recovery systems or cooling devices will Performance shown is "Expected" performance at the pressure drops stated, not g

Notes
3070 FT

Annual Turbine Emissions Test Report

On
Exhaust Emissions
From

One Natural Gas Fired Turbine

at the
South Carlsbad Compressor Station
Loving, NM

Prepared For
Enterprise Products Operating

May 2010

Relient Emissions Testing, Inc
Project Number: 0023

Relient Emissions Testing Inc.
Air Emissions Testing for Industry

APPENDIX

Summary of Results
Quality Assurance/Quality Control Summary
Example Calculations
Calibration Certifications
Data Logger Files

Summary of Results

Company: Enterprise Products Operating
Location: South Carlsbad Compressor Station
Source: Solar Centaur 40 S/N: 30010096
Engine Rating: 4500hp @ 15000RPM
Technician: RAT

Test Run Number	**1**	**2**	**3**	
Unit	**2**	**2**	**2**	
Date	4/20/2010	4/20/2010	4/20/2010	
Start Time	16:12	16:36	17:02	
Stop Time	16:32	16:56	17:22	
Unit Operational Data				
Engine Speed (rpm)	15000	15000	15000	
Unit Horse Power (Hp)*	4320	4320	4320	
NPT Load (%)	90.0	90.0	90.0	
NGP Load (%)	96.0	96.0	96.0	
Compressor Suction Pressure (psig)	258	258	258	
Compressor Discharge Pressure (psig)	446	446	446	
Compressor Suction Temperature (°F)	69	69	69	
Compressor Discharge Pressure (°F)	408	408	408	
T1 Temperature (°F)	95	95	95	
T5 Temperature (°F)	1155	1155	1155	
Lube Oil Pressure (psig)	46.0	46.0	46.0	
Fuel ΔP (psid)	9.0	9.0	9.0	
PCD (psig)	95.0	95.0	95.0	
Fuel Data				
Calculated Fuel Consumption (SCFH)	34000	34000	34000	
O2 F-Factor (DSCF/MMBtu, HHV basis)	8710	8710	8710	
Fuel Heating Value (Btu/SCF, HHV basis)	1093	1093	1093	
BHp Specific Fuel Rate (Btu/Hp-hr, HHV basis)	8602	8602	8602	
BHp Specific Fuel Rate (Btu/Hp-hr, LHV basis)	7750	7750	7750	
Ambient Conditions				
Pressure Altitude (MSL)	3230	3230	3230	
Atmospheric Pressure ("Hg)	26.62	26.62	26.62	
Dry Bulb Temperature (°F)	63	65	68	
Wet Bulb Temperature (°F)	55	54	52	
Humidity (lb/lb air)	0.0084	0.0073	0.0055	
Measured Exhaust Emissions (Corrected)				**Average**
O_2 (% Vol)	16.86	16.88	16.95	**16.90**
NOx (ppmv)	73.59	74.50	75.46	**74.52**
CO (ppmv)	8.30	8.11	8.06	**8.2**
Exhaust Flow Rate (DSCFH)				
Dry SCFH (dry basis, calc. from Hp/BSFR/HHV)	1.67E+06	1.68E+06	1.71E+06	**1689983.01**
Calculated Mass Emission Rates (Based on btu Specific Fuel Rate BSFR)				
NOx (lbs/hr) {Permit Limit = 27}	14.7	14.9	15.4	**15.00**
CO (lbs/hr) {Permit Limit – 7.4}	1.0	0.9	1.0	**0.97**

*Based on gas producer speed.

Quality Assurance

Method 7E Non-Dilution Measurement System Performance Test Procedures
Method 7E Calculated Emission Gas Concentration

Project No.: 0023
Technician: RAT

Date: 04/20/10
Client: Enterprise Products Operating
Location: South Carlsbad Compressor Station

Calibration Gas Certified Values	Span	Low Gas	Mid Gas	High Gas	Analyzer	Analyzer Serial Number	Gas Selection, % of Span Low (<20%)	Mid (40%-60%)
O_2 (% Vol)	20.96	0.00	11.97	20.96	AII GPR-29	001666832	0.0%	57.1%
NOx (ppmv)	98.18	0.00	50.51	98.18	TECO 42C	030400000000842	0.0%	51.4%
CO (ppmv)	100.60	0.00	50.05	100.60	TECO 48C	48C-67940-359	0.0%	49.8%

Initial Linearity Data

Calibration Error	Analyzer Calibration Response			Absolute Difference			Difference (% of Span)		
	Low	Mid	High	Low	Mid	High	Low	Mid	High
O_2 (% Vol)	0.20	12.03	20.90	0.20	0.06	0.06	0.95%	0.29%	0.29%
NOx (ppmv)	0.00	49.50	98.60	0.00	1.01	0.42	0.00%	1.03%	0.43%
CO (ppmv)	0.00	50.50	100.81	0.00	0.45	0.21	0.00%	0.45%	0.21%

Run Number 1 Start: 16:12 End: 16:32

Bias and Drift	Upscale	Cal. Response		Initial Values		Initial System Bias		Final Values		Final System Bias		Drift		Emission Calculation		
	Gas	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Raw Avg	Run Avg	
O_2 (% Vol)	20.96	0.20	20.90	0.20	20.90	0.00%	0.00%	0.20	20.90	0.00%	0.00%	0.00%	0.00%	16.85	16.86	O_2 (% Vol)
NOx (ppmv)	50.51	0.00	49.50	0.00	50.73	0.00%	1.25%	0.00	50.65	0.00%	1.17%	0.00%	-0.08%	73.85	73.59	NOx (ppmv)
CO (ppmv)	50.05	0.00	50.50	0.00	49.98	0.00%	-0.52%	0.00	49.10	0.00%	-1.39%	0.00%	-0.87%	8.22	8.30	CO (ppmv)

Run Number 2 Start: 16:36 End: 16:56

Bias and Drift	Upscale	Cal. Response		Initial Values		Initial System Bias		Final Values		Final System Bias		Drift		Emission Calculation		
	Gas	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Raw Avg	Run Avg	
O_2 (% Vol)	20.96	0.20	20.90	0.20	20.90	0.00%	0.00%	0.20	20.90	0.00%	0.00%	0.00%	0.00%	16.87	16.88	O_2 (% Vol)
NOx (ppmv)	50.51	0.00	49.50	0.00	50.73	0.00%	1.25%	0.00	50.65	0.00%	1.17%	0.00%	-0.08%	74.77	74.50	NOx (ppmv)
CO (ppmv)	50.05	0.00	50.50	0.00	49.98	0.00%	-0.52%	0.00	49.10	0.00%	-1.39%	0.00%	-0.87%	8.03	8.11	CO (ppmv)

Run Number 3 Start: 17:02 End: 17:22

Bias and Drift	Upscale	Cal. Response		Initial Values		Initial System Bias		Final Values		Final System Bias		Drift		Emission Calculation		
	Gas	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Raw Avg	Run Avg	
O_2 (% Vol)	20.96	0.20	20.90	0.20	20.90	0.00%	0.00%	0.20	20.90	0.00%	0.00%	0.00%	0.00%	16.94	16.95	O_2 (% Vol)
NOx (ppmv)	50.51	0.00	49.50	0.00	50.73	0.00%	1.25%	0.00	50.65	0.00%	1.17%	0.00%	-0.08%	75.73	75.46	NOx (ppmv)
CO (ppmv)	50.05	0.00	50.50	0.00	49.98	0.00%	-0.52%	0.00	49.10	0.00%	-1.39%	0.00%	-0.87%	7.98	8.06	CO (ppmv)

Example Calculations

Drift Corrected Emission Concentrations

Formula

$$C_{GAS} = (Ç - C_O) \times \frac{C_{MA}}{C_M - C_O} \quad \textit{(eq.7e-5)}$$

All Calculations Refer to Test Run 1 or an Average of Runs 1-3

$Ç_{NOx}$ =	Raw Concentration of NOx		= 73.85 ppmv
C_O =	Avg. of Initial and Final Zero Checks		= 0.00 ppmv
C_M =	Avg. of Initial and Final Span Checks		= 50.69 ppmv
C_{MA} =	Certified Concentration of Span Gas		= 50.51 ppmv
C_{NOx} =	**(73.85 - 0)**	**x $\frac{50.51}{(50.7 - 0)}$**	**= 73.59 ppmv**
$Ç_{CO}$ =	Raw Concentration of CO		= 8.22 ppmv
C_O =	Avg. of Initial and Final Zero Checks		= 0.00 ppmv
C_M =	Avg. of Initial and Final Span Checks		= 49.54 ppmv
C_{MA} =	Certified Concentration of Span Gas		= 50.05 ppmv
C_{CO} =	**(8.22 + 0)**	**x $\frac{50.05}{(49.5 + 0)}$**	**= 8.30 ppmv**
$Ç_{O2}$ =	Raw Concentration of O2		= 16.85%
C_O =	Avg. of initial and final zero bias checks		= 0.20%
C_M =	Avg. of initial and final span bias checks		= 20.90%
C_{MA} =	Actual concentration of span gas		= 20.96%
C_{O2} =	**(16.85 - 0.2)**	**x $\frac{20.96}{(20.9 - 0.2)}$**	**= 16.86%**

Example Calculations

Exhaust Calculations

Measured Data and Constants

C_{NOx}	=	Corrected Concentration of NOx	=	73.59	ppmv
C_{CO}	=	Corrected Concentration of CO	=	8.30	ppmv
Horsepower	=	Observed Horsepower	=	4320	Hp
lb / mole	=	EPA STP for Ideal Gas	=	385.15	SCF
lbs / hr to tpy	=	Mass Conversion Factor	=	4.38	hrs-tons / lbs-yr
C_F	=	PPMV Normalization	=	1 x e-6	1 / ppmv
MW_{NOx}	=	Molecular Weight of NOx	=	46	lb / lb-mol
MW_{CO}	=	Molecular Weight of CO	=	28	lb / lb-mol

S tack Gas Flow Rate via btu Specific Fuel Rate (BSFR)

Hp	=	Engine Horsepower	=	4320	Hp
F_{BTU}	=	btu Specific Fuel Rate	=	8602	Btu/Hp-Hr
F_{O2}	=	O2 F-Factor	=	8710	DSCF/MMBtu
C_{O2}	=	Measured Concentration of O2	=	16.86	%

$$Q_{S\ M19} = Hp \times F_{BTU} \times F_{O2} \times 10^{-6} \times \frac{20.9}{(20.9 - \%O2)} \quad \text{DSCF/H}$$

$$Q_{S\ M19} = 4320.00 \times 8602 \times 8710 \times 5.17 \times 1E\text{-}06$$

$$\mathbf{Q_{S\ M19} = 1.67E+06 \quad DSCF/H}$$

Formulas

Pounds per Hour (lbs/hr) :

$$E_X\ (lb/hr) = C_X * C_F * Q_S * \{ MW_X / (lb / mole) \}$$

Tons per Year (tpy) :

$$E_X\ (tpy) = E_X\ (lb/hr) * \{ 8760\ (hr / yr) / 2000\ (lb / ton) \}$$

Grams per Horsepower-hour (g/Hp-hr) :

$$E_X\ (g/hp\text{-}hr) = \{ E_X\ (lb/hr) / Hp \} / 454\ (g / lb) \}$$

Calculated Mass Emission Rates From Method 19 Exhaust Flow Rates

E_{NOx}

lbs/hr $= 73.59 * 1 \times e\text{-}6 * 1.67E+06 * \frac{46}{385.15} = \mathbf{14.72}$

tpy $= 14.72\ lb/hr * 4.38 \frac{hrs\text{-}ton}{lbs\text{-}yr} = \mathbf{64.46}$

g/Hp-hr $= \frac{14.72\ lb/hr}{4320\ Hp} * \frac{454\ g}{1\ lb} = \mathbf{1.55}$

E_{CO}

lbs/hr $= 8.30 * 1 \times e\text{-}6 * 1.67E+06 * \frac{28}{385.15} = \mathbf{1.01}$

tpy $= 1.01\ lb/hr * 4.38 \frac{hrs\text{-}ton}{lbs\text{-}yr} = \mathbf{4.43}$

g/Hp-hr $= \frac{1.01\ lb/hr}{4320\ Hp} * \frac{454\ g}{1\ lb} = \mathbf{0.11}$

Airgas

Airgas Specialty Gases
1075 Cinclare Drive
Port Allen, LA 70767
225.388.0900
FAX : 225.388.0959
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI74E15A3384	Reference Number:	83-124220680-1
Cylinder Number:	CC59336	Cylinder Volume:	149 Cu.Ft.
Laboratory:	ASG - Port Allen - LA	Cylinder Pressure:	2015 PSIG
Analysis Date:	May 25, 2010	Valve Outlet:	590

Expiration Date: May 25, 2013

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON DIOXIDE	4.900 %	5.110 %	G1	+/- 1% NIST Traceable
OXYGEN	21.00 %	20.96 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	06060806	cc206103	22.51% OXYGEN/NITROGEN	May 01, 2016
NTRM	10060118	CC281370	5.207% CARBON DIOXIDE/NITROGEN	Nov 01, 2015

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SCO2GM	NonDispersive Infrared	Apr 29, 2010
HO2GH	PMO2	Apr 29, 2010

Triad Data Available Upon Request

Notes:

Approved for Release

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI76E15A0295	Reference Number:	83-124237642-1
˜ linder Number:	CC318799	˜ linder Volume:	153 Cu.Ft.
Laboratory:	ASG - Port Allen - LA	˜ linder Pressure:	2015 PSIG
Analysis Date:	Oct 15, 2010	Valve Outlet:	590

Expiration Date: Oct 15, 2013

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	rotocol Method	Total Relative Uncertainty
CARBON DIOXIDE	12.00 %	11.98 %	* 1	+/- 1% NIST Traceable
OXYGEN	12.00 %	11.97 %	* 1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	00040210	CC108973	10.00% OXYGEN/NITROGEN	Oct 02, 2011
NTRM	09060612	CC262107	9.921% CARBON DIOXIDE/NITROGEN	Apr 10, 2013

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SCO2GM	NonDispersive Infrared	Sep 24, 2010
HO2GH	PMO2	) ep 16, 2010

Triad Data Available Upon Request

Notes:

Signature on file

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QA Approval

Airgas

Airgas Specialty Gases
1075 Cinclare Drive
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225.388.0900
FAX: 225.388.0959
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E04NI99E15A3530	Reference Number:	83-124198943-4
Cylinder Number:	CC265550	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Port Allen - LA	Cylinder Pressure:	2015 PSIG
Analysis Date:	Dec 02, 2009	Valve Outlet:	660

Expiration Date: Dec 02, 2011

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
PROPANE	90.00 PPM	90.89 PPM	G1	+/- 1% NIST Traceable
CARBON MONOXIDE	100.0 PPM	100.6 PPM	G1	+/- 1% NIST Traceable
NITRIC OXIDE	100.0 PPM	97.37 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			
Total oxides of nitrogen		98.18 PPM		For Reference Only

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	06060325	CC207559	490PPM NITRIC OXIDE/NITROGEN	Jan 01, 2010
NTRM	08060207	CC255258	51.26PPM CARBON MONOXIDE/NITROGEN	Jan 15, 2012
NTRM	000520	SG9105901BAL	50.5PPM PROPANE/NITROGEN	Apr 03, 2010
NTRM	06060241	CC207849	257.0PPM NITRIC OXIDE/NITROGEN	Jan 01, 2010

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR2MCO	FTIR	Nov 11, 2009
FTIR2MNO	FTIR	Nov 04, 2009
FTIR2PROPANE (50-500 ppm)	FTIR	Oct 29, 2009

Triad Data Available Upon Request

Notes:

QA Approval

Airgas

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1075 Cinclare Drive
Port Allen, LA 70767
225.388.0900
FAX 225.388.0959
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E04NI99E15A3528	Reference Number:	83-124198943-3
Cylinder Number:	SG9135772BAL	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Port Allen - LA	Cylinder Pressure:	2015 PSIG
Analysis Date:	Dec 02, 2009	Valve Outlet:	660

Expiration Date: Dec 02, 2011

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
PROPANE	45.00 PPM	44.07 PPM	G1	+/- 1% NIST Traceable
CARBON MONOXIDE	50.00 PPM	50.05 PPM	G1	+/- 1% NIST Traceable
NITRIC OXIDE	50.00 PPM	50.50 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			
Total oxides of nitrogen		50.51 PPM		For Reference Only

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	060610	CC206050	49.38PPM NITRIC OXIDE/NITROGEN	Oct 02, 2012
NTRM	08060207	CC255258	51.26PPM CARBON MONOXIDE/NITROGEN	Jan 15, 2012
NTRM	99060203	CC263030	49.62PPM PROPANE/NITROGEN	Jul 08, 2012

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR2MCO	FTIR	Nov 11, 2009
FTIR2LNO	FTIR	Nov 10, 2009
FTIR2PROPANE (10-50 PPM)	FTIR	Oct 29, 2009

Triad Data Available Upon Request

Notes:

QA Approval

Project Number	Client	Source	Run Number	Date	Time	O2 (% Vol)	NOx (ppmv)	CO (ppmv)
0116	Enterprise Products			6/22/2011	9:04:05 AM	17.70	0.00	0.00
0116	Enterprise Products			6/22/2011	9:05:05 AM	17.68	0.00	0.00
0116	Enterprise Products			6/22/2011	9:06:05 AM	17.68	0.00	0.00
0116	Enterprise Products			6/22/2011	9:07:05 AM	17.68	0.00	0.00
0116	Enterprise Products			6/22/2011	9:08:05 AM	17.68	0.00	0.00
0116	Enterprise Products			6/22/2011	9:09:05 AM	17.68	0.00	0.00
0116	Enterprise Products			6/22/2011	9:10:05 AM	17.68	0.00	0.00
0116	Enterprise Products			6/22/2011	9:10:38 AM	17.68	0.00	0.00
0116	Enterprise Products			6/22/2011	9:11:08 AM	17.63	0.00	0.00
0116	Enterprise Products			6/22/2011	9:11:38 AM	17.65	0.00	0.00
0116	Enterprise Products			6/22/2011	9:12:08 AM	1.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:12:38 AM	0.68	0.00	0.00
0116	Enterprise Products			6/22/2011	9:13:08 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:13:38 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:14:08 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:14:38 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:15:08 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:15:38 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:16:08 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:16:38 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:08 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	16.50	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	17.35	57.62	25.41
0116	Enterprise Products			6/22/2011	9:17:34 AM	20.50	99.65	50.50
0116	Enterprise Products			6/22/2011	9:17:34 AM	20.90	100.40	50.50
0116	Enterprise Products			6/22/2011	9:17:34 AM	20.90	100.40	50.50
0116	Enterprise Products			6/22/2011	9:17:34 AM	20.90	100.70	50.50
0116	Enterprise Products			6/22/2011	9:17:34 AM	20.90	98.60	50.50
0116	Enterprise Products			6/22/2011	9:17:34 AM	20.90	98.60	50.50
0116	Enterprise Products			6/22/2011	9:17:34 AM	20.90	65.12	85.02
0116	Enterprise Products			6/22/2011	9:17:34 AM	12.63	50.05	100.81
0116	Enterprise Products			6/22/2011	9:17:34 AM	12.08	49.50	100.81
0116	Enterprise Products			6/22/2011	9:17:34 AM	12.03	49.50	100.81
0116	Enterprise Products			6/22/2011	9:17:34 AM	12.03	49.50	100.81
0116	Enterprise Products			6/22/2011	9:17:34 AM	12.03	49.95	100.81
0116	Enterprise Products			6/22/2011	9:17:34 AM	12.03	0.00	100.81
0116	Enterprise Products			6/22/2011	9:17:34 AM	12.03	0.00	100.81
0116	Enterprise Products			6/22/2011	9:17:34 AM	12.03	0.00	100.46
0116	Enterprise Products			6/22/2011	9:17:34 AM	12.03	0.00	100.16
0116	Enterprise Products			6/22/2011	9:17:34 AM	1.93	0.00	96.56
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.73	0.00	15.92
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.58	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00

0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	38.21	45.87
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	49.80	50.70
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	49.90	50.80
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	49.90	50.80
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	49.90	50.80
0116	Enterprise Products			6/22/2011	9:17:34 AM	0.20	49.90	50.80
0116	Enterprise Products			6/22/2011	9:17:34 AM	19.10	3.75	1.31
0116	Enterprise Products			6/22/2011	9:17:34 AM	20.90	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	20.90	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	20.90	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	20.90	0.00	0.00
0116	Enterprise Products			6/22/2011	9:17:34 AM	14.23	1.17	1.23
0116	Enterprise Products			6/22/2011	9:17:34 AM	14.90	61.22	6.47
0116	Enterprise Products			6/22/2011	9:17:34 AM	15.25	72.33	7.23
0116	Enterprise Products			6/22/2011	9:17:34 AM	15.50	73.23	7.23
0116	Enterprise Products			6/22/2011	9:17:34 AM	15.70	73.83	7.23
0116	Enterprise Products			6/22/2011	9:17:34 AM	15.90	73.98	7.23
0116	Enterprise Products			6/22/2011	10:03:08 AM	16.05	74.28	7.23
0116	Enterprise Products			6/22/2011	10:03:17 AM	16.08	74.13	7.23
0116	Enterprise Products			6/22/2011	10:03:29 AM	16.13	74.13	7.22
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:03:59 AM	16.25	74.28	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:04:29 AM	16.33	74.13	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:04:59 AM	16.38	74.43	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:05:29 AM	16.43	74.13	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:05:59 AM	16.48	74.28	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:06:29 AM	16.50	73.83	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:06:59 AM	16.53	73.83	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:07:29 AM	16.53	74.13	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:07:59 AM	16.55	74.13	7.22
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:08:29 AM	16.55	74.28	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:08:59 AM	16.58	74.43	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:09:29 AM	16.58	74.43	7.22
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:09:59 AM	16.58	74.43	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:10:29 AM	16.60	75.03	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:10:59 AM	16.60	75.03	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:11:29 AM	16.60	75.03	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:11:59 AM	16.60	74.43	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:12:29 AM	16.60	74.73	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:12:59 AM	16.60	74.43	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:13:29 AM	16.60	74.73	7.22
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:13:59 AM	16.60	74.28	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:14:29 AM	16.60	74.58	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:14:59 AM	16.60	74.28	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:15:29 AM	16.60	74.73	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:15:59 AM	16.63	74.13	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:16:29 AM	16.60	74.43	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:16:59 AM	16.60	74.28	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:17:29 AM	16.60	74.28	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:17:59 AM	16.60	74.13	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:18:29 AM	16.63	73.98	7.07

0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:18:59 AM	16.63	73.98	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:19:29 AM	16.63	73.98	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:19:59 AM	16.63	73.98	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:20:29 AM	16.63	73.98	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:20:59 AM	16.63	73.98	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:21:29 AM	16.63	73.83	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:21:59 AM	16.63	73.83	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:22:29 AM	16.63	73.83	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:22:59 AM	16.63	73.98	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 1	6/22/2011	10:23:29 AM	16.63	73.83	7.07
		Averages				16.56	74.26	7.14
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	10:23:59 AM	16.63	73.98	6.93
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	10:24:29 AM	16.63	73.98	7.07
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	10:24:59 AM	16.60	74.13	7.07
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	10:25:29 AM	16.63	73.98	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:25:59 AM	16.63	74.13	7.08
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:26:29 AM	16.63	73.98	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:26:59 AM	16.60	74.43	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:27:29 AM	16.63	74.13	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:27:59 AM	16.63	74.28	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:28:29 AM	16.63	74.13	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:28:59 AM	16.63	74.43	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:29:29 AM	16.63	74.28	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:29:59 AM	16.60	74.58	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:30:29 AM	16.63	74.28	6.92
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:30:59 AM	16.63	74.58	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:31:29 AM	16.63	74.43	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:31:59 AM	16.63	74.58	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:32:29 AM	16.63	74.58	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:32:59 AM	16.63	74.73	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:33:29 AM	16.60	74.88	6.92
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:33:59 AM	16.63	74.88	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:34:29 AM	16.63	74.88	6.92
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:34:59 AM	16.63	74.73	6.93
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:35:29 AM	16.63	74.73	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:35:59 AM	16.63	74.58	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:36:29 AM	16.63	74.73	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:36:59 AM	16.63	74.43	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:37:29 AM	16.63	74.88	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:37:59 AM	16.63	74.58	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:38:29 AM	16.63	74.88	6.93
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:38:59 AM	16.63	74.73	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:39:29 AM	16.65	74.88	6.93
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:39:59 AM	16.63	74.73	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:40:29 AM	16.65	74.73	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:40:59 AM	16.63	74.88	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:41:29 AM	16.65	74.58	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:41:59 AM	16.65	74.58	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:42:29 AM	16.65	74.58	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:42:59 AM	16.65	74.73	8.72
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:43:29 AM	16.68	74.73	7.37
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:43:59 AM	16.65	74.73	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:44:29 AM	16.65	74.58	6.93
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:44:59 AM	16.68	74.73	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 2	6/22/2011	10:45:29 AM	16.68	74.58	7.07
		Averages				16.63	74.57	7.10
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	10:45:59 AM	16.68	74.58	7.07
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	10:46:29 AM	16.68	74.58	7.07
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	10:46:59 AM	16.68	74.88	7.07
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	10:47:29 AM	16.68	74.73	6.93
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:47:59 AM	16.68	75.03	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:48:29 AM	16.70	74.88	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:48:59 AM	16.68	74.88	6.93
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:49:29 AM	16.70	75.03	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:49:59 AM	16.70	74.88	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:50:29 AM	16.70	74.88	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:50:59 AM	16.70	74.58	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:51:29 AM	16.70	75.03	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:51:59 AM	16.70	74.88	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:52:29 AM	16.70	75.48	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:52:59 AM	16.70	75.33	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:53:29 AM	16.70	75.48	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:53:59 AM	16.70	75.33	7.07

0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:54:29 AM	16.70	75.33	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:54:59 AM	16.70	75.63	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:55:29 AM	16.70	75.48	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:55:59 AM	16.70	75.93	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:56:29 AM	16.70	75.78	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:56:59 AM	16.70	76.08	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:57:29 AM	16.70	75.78	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:57:59 AM	16.70	76.08	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:58:29 AM	16.70	76.08	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:58:59 AM	16.70	75.93	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:59:29 AM	16.70	76.23	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	10:59:59 AM	16.70	75.78	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	11:00:29 AM	16.70	76.08	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	11:00:59 AM	16.70	76.08	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	11:01:29 AM	16.70	76.08	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	11:01:59 AM	16.70	76.38	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	11:02:29 AM	16.70	76.23	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	11:02:59 AM	16.70	76.08	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	11:03:29 AM	16.70	76.08	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	11:03:59 AM	16.70	76.38	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	11:04:29 AM	16.68	76.23	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	11:04:59 AM	16.70	76.38	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	11:05:29 AM	16.68	76.38	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	11:05:59 AM	16.70	76.23	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	11:06:29 AM	16.70	76.38	7.23
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	11:06:59 AM	16.70	76.08	7.07
0116	Enterprise Products	South Carlsbad Turbine #1	Run 3	6/22/2011	11:07:29 AM	16.70	76.38	7.07
		Averages				16.70	75.71	7.06
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:07:59 AM	16.70	76.08	7.07
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:08:29 AM	16.70	75.93	7.23
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:08:59 AM	1.68	75.63	7.23
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:09:29 AM	0.20	55.33	45.77
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:09:59 AM	0.20	50..73	49.98
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:10:29 AM	0.20	50.73	49.98
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:10:59 AM	0.20	50.73	49.98
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:11:29 AM	19.98	4.43	1.77
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:11:59 AM	20.90	0.00	0.00
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:12:29 AM	20.90	0.00	0.00
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:12:59 AM	20.90	0.00	0.00
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:13:29 AM	16.68	73.98	6.17
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:13:59 AM	16.73	73.53	5.73
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:14:29 AM	16.73	72.18	5.73
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:14:59 AM	16.70	71.43	4.38
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:15:29 AM	16.70	70.98	2.13
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:15:59 AM	16.73	50.57	1.23
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:16:29 AM	16.75	27.45	0.63
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:16:59 AM	17.10	15.74	0.33
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:17:29 AM	17.93	10.49	0.33
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:17:59 AM	18.68	7.34	0.33
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:18:29 AM	19.23	5.69	0.18
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:18:59 AM	19.63	4.79	0.18
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:19:29 AM	19.90	4.34	0.18
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:19:59 AM	20.08	4.04	0.33
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:20:29 AM	20.10	4.04	0.48
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:20:59 AM	20.20	4.34	0.18
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:21:29 AM	20.28	4.04	0.17
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:21:59 AM	20.33	3.59	2.88
0116	Enterprise Products	South Carlsbad Turbine #1		6/22/2011	11:22:29 AM	20.38	3.29	5.87
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	11:22:54 AM	20.40	17.24	6.17
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	11:23:24 AM	17.10	56.12	8.12
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	11:23:54 AM	16.93	71.73	8.12
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	11:24:17 AM	16.90	73.98	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:24:47 AM	16.88	74.13	8.42
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:25:17 AM	16.88	74.28	8.27
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:25:47 AM	16.85	73.98	8.27
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:26:17 AM	16.85	73.98	8.42
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:26:47 AM	16.85	73.98	8.27
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:27:17 AM	16.85	73.98	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:27:47 AM	16.85	74.13	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:28:17 AM	16.85	73.83	8.57
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:28:47 AM	16.83	74.28	8.42
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:29:17 AM	16.83	74.13	8.27
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:29:47 AM	16.83	74.28	8.12

0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:30:17 AM	16.85	74.43	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:30:47 AM	16.85	74.13	8.27
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:31:17 AM	16.83	74.28	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:31:47 AM	16.83	74.13	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:32:17 AM	16.83	74.13	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:32:47 AM	16.85	73.98	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:33:17 AM	16.85	73.53	8.27
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:33:47 AM	16.85	73.53	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:34:17 AM	16.85	73.08	8.42
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:34:47 AM	16.85	73.23	8.87
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:35:17 AM	16.85	72.93	8.42
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:35:47 AM	16.85	72.78	8.72
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:36:17 AM	16.85	72.78	8.27
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:36:47 AM	16.85	72.63	8.27
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:37:17 AM	16.85	72.63	8.57
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:37:47 AM	16.85	72.78	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:38:17 AM	16.85	72.93	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:38:47 AM	16.85	73.08	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:39:17 AM	16.85	73.23	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:39:47 AM	16.85	73.23	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:40:17 AM	16.85	73.68	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:40:47 AM	16.85	73.38	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:41:17 AM	16.85	74.13	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:41:47 AM	16.85	74.28	8.27
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:42:17 AM	16.85	74.73	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:42:47 AM	16.85	75.33	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:43:17 AM	16.85	75.18	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:43:47 AM	16.85	75.48	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 1	6/22/2011	11:44:17 AM	16.85	75.33	8.12
		Averages				16.85	73.85	8.22
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	11:44:47 AM	16.85	75.03	7.97
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	11:45:17 AM	16.85	75.18	7.97
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	11:45:47 AM	16.85	74.73	7.97
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	11:46:17 AM	16.85	75.03	8.12
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	11:46:47 AM	16.85	75.03	8.27
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:47:17 AM	16.85	74.88	8.27
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:47:47 AM	16.85	75.18	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:48:17 AM	16.85	74.88	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:48:47 AM	16.85	75.18	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:49:17 AM	16.85	75.18	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:49:47 AM	16.85	74.88	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:50:17 AM	16.85	75.33	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:50:47 AM	16.85	74.88	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:51:17 AM	16.85	75.03	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:51:47 AM	16.85	75.03	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:52:17 AM	16.85	74.88	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:52:47 AM	16.85	74.88	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:53:17 AM	16.85	74.58	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:53:47 AM	16.85	75.03	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:54:17 AM	16.88	75.03	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:54:47 AM	16.85	74.88	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:55:17 AM	16.88	75.03	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:55:47 AM	16.88	74.88	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:56:17 AM	16.88	75.18	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:56:47 AM	16.88	75.18	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:57:17 AM	16.88	75.18	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:57:47 AM	16.88	75.48	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:58:17 AM	16.88	75.33	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:58:47 AM	16.88	75.33	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:59:17 AM	16.88	75.33	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	11:59:47 AM	16.88	75.18	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	12:00:17 PM	16.88	75.03	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	12:00:47 PM	16.88	74.73	8.27
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	12:01:17 PM	16.88	74.58	8.13
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	12:01:47 PM	16.88	74.28	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	12:02:17 PM	16.88	74.13	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	12:02:47 PM	16.88	74.28	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	12:03:17 PM	16.88	73.98	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	12:03:47 PM	16.88	74.13	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	12:04:17 PM	16.90	73.83	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	12:04:47 PM	16.90	74.13	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	12:05:17 PM	16.90	73.83	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	12:05:47 PM	16.90	73.98	7.97

0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	12:06:17 PM	16.90	74.13	7.82
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	12:06:47 PM	16.90	74.28	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 2	6/22/2011	12:07:17 PM	16.90	74.28	7.97
		Averages				16.87	74.77	8.03
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:07:47 PM	16.90	74.43	7.97
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:08:17 PM	16.90	74.58	7.97
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:08:47 PM	16.90	74.43	7.97
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:09:17 PM	16.90	74.73	7.97
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:09:47 PM	16.90	74.58	8.27
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:10:17 PM	16.90	74.73	8.27
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:10:47 PM	16.90	74.58	8.43
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:11:17 PM	16.90	74.58	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:11:47 PM	16.90	74.73	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:12:17 PM	16.93	74.28	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:12:47 PM	16.93	75.03	8.43
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:13:17 PM	16.93	74.88	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:13:47 PM	16.93	75.18	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:14:17 PM	16.93	75.33	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:14:47 PM	16.93	75.48	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:15:17 PM	16.93	75.93	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:15:47 PM	16.93	75.63	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:16:17 PM	16.93	75.93	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:16:47 PM	16.93	75.78	8.12
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:17:17 PM	16.93	75.63	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:17:47 PM	16.93	75.78	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:18:17 PM	16.93	75.48	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:18:47 PM	16.93	75.78	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:19:17 PM	16.93	75.78	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:19:47 PM	16.93	75.48	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:20:17 PM	16.93	75.78	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:20:47 PM	16.93	75.63	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:21:17 PM	16.95	75.93	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:21:47 PM	16.95	75.78	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:22:17 PM	16.95	75.48	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:22:47 PM	16.95	75.93	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:23:17 PM	16.95	75.78	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:23:47 PM	16.95	76.08	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:24:17 PM	16.95	76.23	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:24:47 PM	16.95	76.08	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:25:17 PM	16.95	76.23	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:25:47 PM	16.95	76.08	7.82
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:26:17 PM	16.98	76.08	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:26:47 PM	16.98	76.23	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:27:17 PM	16.98	76.08	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:27:47 PM	16.98	76.23	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:28:17 PM	16.98	76.23	7.82
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:28:47 PM	16.98	76.23	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:29:17 PM	16.98	76.53	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:29:47 PM	16.98	76.08	7.82
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:30:17 PM	16.98	76.08	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:30:47 PM	16.98	75.78	7.97
0116	Enterprise Products	South Carlsbad Turbine #2	Run 3	6/22/2011	12:31:17 PM	16.98	75.48	7.82
		Averages				16.94	75.73	7.98
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:31:47 PM	17.05	75.48	7.97
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:32:17 PM	9.50	52.78	7.97
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:32:47 PM	0.75	50.65	22.80
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:33:17 PM	0.20	50.65	49.10
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:33:47 PM	0.20	50.65	49.10
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:34:17 PM	19.85	29.00	26.10
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:34:47 PM	20.88	0.00	0.00
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:35:17 PM	20.90	0.00	0.00
0116	Enterprise Products	South Carlsbad Turbine #2		6/22/2011	12:35:47 PM	20.90	0.00	0.00

Nolan, Shiver

From:	Heap, James
Sent:	Monday, July 02, 2012 12:55 PM
To:	Nolan, Shiver
Cc:	Thompson, Roger
Subject:	FW: Carlsbad Testing
Attachments:	EPCO_SC_Unit_1_Report.pdf; EPCO_SC_Unit_2_Report.pdf

The annual testing for SoCarlsbad has been received. The reports are to be included with the next semi-annual report in October. These are for loading to the portal.

++++++++++++++++++++++++++++++++
Jim Heap Sr. Field Environmental Scientist
Enterprise Products, LLC
Midland, Texas USA
Office: 432-686-5404
Cell: 432-260-0239
jkheap@eprod.com

From: Ross Thompson [mailto:rthompson@relienteti.com]
Sent: Tuesday, June 26, 2012 4:37 PM
To: Heap, James
Subject: RE: Carlsbad Testing

Attached. I reduced the file size, in case your mail server is booting it due to size.

Thank you,
Ross A. Thompson
Principal Scientist
Relient Emissions Testing. Inc.
806-773-8851 Tel
806-771-2894 Fax

From: Heap, James [mailto:JKHEAP@eprod.com]
Sent: Tuesday, June 26, 2012 1:01 PM
To: 'Ross Thompson'
Subject: RE: Carlsbad Testing

This is the last email I have in my inbox from you.

Can you re-transmit?

Thanks

++++++++++++++++++++++++++++++++
Jim Heap Sr. Field Environmental Scientist
Enterprise Products, LLC
Midland, Texas USA
Office: 432-686-5404

Cell: 432-260-0239
jkheap@eprod.com

From: Ross Thompson [mailto:rthompson@relienteti.com]
Sent: Wednesday, May 23, 2012 12:04 PM
To: Heap, James
Subject: Re: Carlsbad Testing

I'll be there at 08:00 local time.

Ross Thompson
Principal Scientist
Relient Emissions Testing, Inc.
TEL: 806-773-8851
email: rthompson@relienteti.com

Connected by DROID on Verizon Wireless

From: "Heap, James" <JKHEAP@eprod.com>
Sent: Wed May 23 12:01:19 CDT 2012
To: 'Ross Thompson' <rthompson@relienteti.com>
Subject: Carlsbad Testing

Do you have an approximate arrival time for the Carlsbad testing tomorrow?

++++++++++++++++++++++++++++++++
Jim Heap Sr. Field Environmental Scientist
Enterprise Products, LLC
Midland, Texas USA
Office: 432-686-5404
Cell: 432-260-0239
jkheap@eprod.com

This message (including any attachments) is confidential and intended for a specific individual and purpose. If you are not the intended recipient, please notify the sender immediately and delete this message.

Annual Turbine Emissions TEST REPORT

ON
EXHAUST EMISSIONS
FROM

ONE NATURAL GAS FIRED TURBINE

AT THE
SOUTH CARLSBAD COMPRESSOR STATION
LOVING, NM

PREPARED FOR
SEMINOLE PIPELINE COMPANY

MAY 2012

Relient Emissions Testing, Inc
Project Number: 0181

Relient Emissions Testing Inc.
Air Emissions Testing for Industry®

Mr. Jim Heap 05/21/2012
Enterprise Products, LLC
Midland, TX
(432) 686-5404

Re: Annual emissions testing at the South Carlsbad Compressor Station on unit 1

Mr. Heap,

Exhaust emissions from one compressor turbine was tested at the South Carlsbad compressor station near Loving, New Mexico on. Testing was conducted to demonstrate compliance with emission limits set forth by NMED permit. The engine is identified as follows:

Engine Information	
Unit Number:	Unit 1
Manufacturer:	Solar
Serial Number:	49240
Model:	CENTAUR 40
Mfr. Rated Hp:	4500hp
Mfr. Rated Speed:	15,000

This is a natural gas fired turbine used for compression of natural gas for transportation through the pipeline.

The test matrix consisted of three 60-minute test runs on the turbine in accordance with NMED requirements. For each test, the average emission concentrations of nitrogen oxides (NO_X), oxygen (O_2), and carbon monoxide (CO) were measured using analytical instrumentation. Operational data such as Gas Producer Speed, Turbine Speed, and suction and discharge pressures were recorded during each run from available operational data on the unit.

Results of the tests are presented in tabular format in this report. Included in this table are engine operational data, ambient conditions, emission concentrations, and mass emission rates.

Continuous emission monitors housed in an air-conditioned mobile laboratory were used to measure the exhaust concentrations of NO_X, CO and O_2. This testing utilized the following analytical methods:

EPA Reference Method 3a	O_2 concentration
EPA Reference Method 7e	NO_X concentration
EPA Reference Method 10	CO concentration
EPA Reference Method 19	Mass emission rates

A computerized data recorder was used to record output from the analyzers. The data logger record provides documentation of the emission measurements and the instrument calibrations. The data logger records are also useful for indicating trends in the data.

Mass emission rates were calculated using EPA Method 19 calculations (combustion stoichiometry). Emission rates in terms of lbs/hr and TPY were calculated using the pollutant concentration (ppmv), the oxygen F-factor ($DSCF_{ex}$/MMBtu) and the horsepower specific fuel consumption rate (Btu/Hp-hr). The O_2 F-Factor used in this test series was 8710 ($DSCF_{ex}$/MMBtu), the EPA default value for engines burning natural gas.

A summary of the quality assurance procedures associated with the EPA test methods is presented in tabular format in the appendix of this report. Examples of these procedures include daily multipoint calibrations, zero and span checks between each test run, NO_2 to NO converter efficiency check results, sample system bias check results, and analyzer interference test results.

The appendix of this report also includes supporting test documentation, example calculations, and data logger records.

If you have any questions, please feel free to contact me at (806) 773-8851.

Sincerely,

Ross Thompson
Principal Scientist
Relient Emissions Testing, Inc

APPENDIX

Summary of Results
Quality Assurance/Quality Control Summary
Example Calculations
Calibration Certifications
Data Logger Files

Company:	Enterprise Products Operating		
Location:	South Carlsbad Compressor Station		
Source:	Solar Centaur 40	S/N: 49240	
Engine Rating:	4500hp @ 15000RPM		
Technician:	RAT		

Test Run Number	**1**	**2**	**3**	
Unit	**1**	**1**	**1**	
Date	5/24/2012	5/24/2012	5/24/2012	
Start Time	8:48	9:53	11:55	
Stop Time	9:48	10:53	12:55	
Unit Operational Data				
Engine Speed (rpm)	15000	15000	15000	
Unit Horse Power (Hp)*	4307	4307	4307	
NPT Load (%)	91.6	91.6	91.6	
NGP Load (%)	95.7	95.7	95.7	
Compressor Suction Pressure (psig)	385	385	385	
Compressor Discharge Pressure (psig)	634	634	634	
T5 Temperature (°F)	1173	1173	1173	
PCD (psig)	96	96	96	
Fuel Data				
Calculated Fuel Consumption (SCFH)	35440	35440	35440	
O2 F-Factor (DSCF/MMBtu, HHV basis)	8710	8710	8710	
Fuel Heating Value (Btu/SCF, HHV basis)	1093	1093	1093	
BHp Specific Fuel Rate (Btu/Hp-hr, HHV basis)	8995	8995	8995	
BHp Specific Fuel Rate (Btu/Hp-hr, LHV basis)	8103	8103	8103	
Ambient Conditions				
Pressure Altitude (MSL)	3250	3250	3250	
Atmospheric Pressure ("Hg)	26.60	26.60	26.60	
Dry Bulb Temperature (°F)	78	81	85	
Wet Bulb Temperature (°F)	61	63	65	
Humidity (lb/lb air)	0.0087	0.0094	0.0099	
Measured Exhaust Emissions (Corrected)				**Average**
O_2 (% Vol)	16.73	16.58	16.52	**16.61**
NOx (ppmv)	74.36	84.53	85.65	**81.51**
CO (ppmv)	10.12	9.21	9.02	**9.5**
Exhaust Flow Rate (DSCFH)				
Dry SCFH (dry basis, calc. from Hp/BSFR/HHV)	1.69E+06	1.63E+06	1.61E+06	**1644398.03**
Calculated Mass Emission Rates (Based on btu Specific Fuel Rate BSFR)				
NOx (lbs/hr) **{Permit Limit = 27 lb/hr}**	15.0	16.4	16.4	**15.93**
CO (lbs/hr) **{Permit Limit = 7.4 lb/hr}**	1.2	1.0	1.0	**1.07**

*** Based on gas producer speed**

Quality Assurance

Method 7E Non-Dilution Measurement System Performance Test Procedures
Method 7E Calculated Emission Gas Concentration

Project No.: 0023
Technician: RAT

Date: 05/24/12
Client: Enterprise Products Operating
Location: South Carlsbad Compressor Station

Calibration Gas Certified Values	Span	Low Gas	Mid Gas	High Gas	Analyzer	Analyzer Serial Number	Gas Selection, % of Span Low (<20%)	Gas Selection, % of Span Mid (40%-60%)
O_2 (% Vol)	20.90	0.00	11.70	20.90	AII GPR-29	001666832	0.0%	56.0%
NOx (ppmv)	251.40	0.00	90.00	251.40	TECO 42C	030400000000842	0.0%	35.8%
CO (ppmv)	257.00	0.00	99.00	257.00	TECO 48C	48C-67940-359	0.0%	38.5%

Initial Linearity Data

Calibration Error	Analyzer Calibration Response			Absolute Difference			Difference (% of Span)		
	Low	Mid	High	Low	Mid	High	Low	Mid	High
O_2 (% Vol)	-0.01	11.70	20.87	0.01	0.00	0.03	0.05%	0.00%	0.14%
NOx (ppmv)	-0.05	91.00	251.55	0.05	1.00	0.15	0.02%	0.40%	0.06%
CO (ppmv)	0.00	101.20	255.95	0.00	2.20	1.05	0.00%	0.86%	0.41%

Run Number 1 Start: 8:48 End: 9:48

Bias and Drift	Upscale	Cal. Response		Initial Values		Initial System Bias		Final Values		Final System Bias		Drift		Emission Calculation		
	Gas	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Raw Avg	Run Avg	
O_2 (% Vol)	20.90	-0.01	20.87	-0.01	20.77	0.00%	-0.48%	0.09	20.87	0.48%	0.00%	0.48%	0.48%	16.67	16.73	O_2 (% Vol)
NOx (ppmv)	90.00	-0.05	91.00	-0.55	87.45	-0.20%	-1.41%	0.00	86.45	0.02%	-1.81%	0.22%	-0.40%	71.79	74.36	NOx (ppmv)
CO (ppmv)	99.00	0.00	101.20	-0.50	97.95	-0.19%	-1.26%	0.00	99.45	0.00%	-0.68%	0.19%	0.58%	9.86	10.12	CO (ppmv)

Run Number 2 Start: 9:53 End: 10:53

Bias and Drift	Upscale	Cal. Response		Initial Values		Initial System Bias		Final Values		Final System Bias		Drift		Emission Calculation		
	Gas	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Raw Avg	Run Avg	
O_2 (% Vol)	20.90	-0.01	20.87	0.09	20.87	0.48%	0.00%	0.00	20.80	0.05%	-0.33%	-0.43%	-0.33%	16.54	16.58	O_2 (% Vol)
NOx (ppmv)	90.00	-0.05	91.00	0.00	86.45	0.02%	-1.81%	0.50	90.40	0.22%	-0.24%	0.20%	1.57%	83.07	84.53	NOx (ppmv)
CO (ppmv)	99.00	0.00	101.20	0.00	99.45	0.00%	-0.68%	0.00	99.35	0.00%	-0.72%	0.00%	-0.04%	9.25	9.21	CO (ppmv)

Run Number 3 Start: 11:55 End: 12:55

Bias and Drift	Upscale	Cal. Response		Initial Values		Initial System Bias		Final Values		Final System Bias		Drift		Emission Calculation		
	Gas	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Raw Avg	Run Avg	
O_2 (% Vol)	20.90	-0.01	20.87	0.00	20.80	0.05%	-0.33%	-0.01	20.90	0.00%	0.14%	-0.05%	0.48%	16.48	16.52	O_2 (% Vol)
NOx (ppmv)	90.00	-0.05	91.00	0.50	90.40	0.22%	-0.24%	0.00	90.21	0.02%	-0.31%	-0.20%	-0.08%	85.95	85.65	NOx (ppmv)
CO (ppmv)	99.00	0.00	101.20	0.00	99.35	0.00%	-0.72%	0.00	99.45	0.00%	-0.68%	0.00%	0.04%	9.06	9.02	CO (ppmv)

Example Calculations

Drift Corrected Emission Concentrations

Formula

$$C_{GAS} = (\bar{C} - C_O) \times \frac{C_{MA}}{C_M - C_O} \quad \textit{(eq.7e-5)}$$

All Calculations Refer to Test Run 1 or an Average of Runs 1-3

$\bar{C}_{NOx}$ =	Raw Concentration of NOx	= 71.79 ppmv	
C_O =	Avg. of Initial and Final Zero Checks	= -0.28 ppmv	
C_M =	Avg. of Initial and Final Span Checks	= 86.95 ppmv	
C_{MA} =	Certified Concentration of Span Gas	= 90.00 ppmv	
C_{NOx} =	**$(71.79 - -0.28) \times \frac{90}{(87 -- 0.3)}$**	**= 74.36 ppmv**	
$\bar{C}_{CO}$ =	Raw Concentration of CO	= 9.86 ppmv	
C_O =	Avg. of Initial and Final Zero Checks	= -0.25 ppmv	
C_M =	Avg. of Initial and Final Span Checks	= 98.70 ppmv	
C_{MA} =	Certified Concentration of Span Gas	= 99.00 ppmv	
C_{CO} =	**$(9.86 + 0.25) \times \frac{99}{(98.7 + 0.3)}$**	**= 10.12 ppmv**	
$\bar{C}_{O2}$ =	Raw Concentration of O2	= 16.67%	
C_O =	Avg. of initial and final zero bias checks	= 0.04%	
C_M =	Avg. of initial and final span bias checks	= 20.82%	
C_{MA} =	Actual concentration of span gas	= 20.90%	
C_{O2} =	**$(16.67 - 0.04) \times \frac{20.9}{(20.8 - 0.04)}$**	**= 16.73%**	

Example Calculations

Exhaust Calculations

Measured Data and Constants

C_{NOx}	=	Corrected Concentration of NOx	=	74.36	ppmv
C_{CO}	=	Corrected Concentration of CO	=	10.12	ppmv
Horsepower	=	Observed Horsepower	=	4307	Hp
lb / mole	=	EPA STP for Ideal Gas	=	385.15	SCF
lbs / hr to tpy	=	Mass Conversion Factor	=	4.38	hrs-tons / lbs-yr
C_F	=	PPMV Normalization	=	1 x e-6	1 / ppmv
MW_{NOx}	=	Molecular Weight of NOx	=	46	lb / lb-mol
MW_{CO}	=	Molecular Weight of CO	=	28	lb / lb-mol

S tack Gas Flow Rate via btu Specific Fuel Rate (BSFR)

Hp	=	Engine Horsepower	=	4307	Hp
F_{BTU}	=	btu Specific Fuel Rate	=	8995	Btu/Hp-Hr
F_{O2}	=	O2 F-Factor	=	8710	DSCF/MMBtu
C_{O2}	=	Measured Concentration of O2	=	16.73	%

$$Q_{S\,M19} = Hp \times F_{BTU} \times F_{O2} \times 10^{6} \times \frac{20.9}{(20.9 - \%O2)} \text{ DSCF/H}$$

$Q_{S\,M19}$ = 4306.50 x 8995 x 8710 x 5.01 x 1E-06

$Q_{S\,M19}$ = 1.69E+06 DSCF/H

Formulas

Pounds per Hour (lbs/hr) :

$$E_X \text{ (lb/hr)} = C_X * C_F * Q_S * \{ MW_X / \text{(lb / mole)} \}$$

Tons per Year (tpy) :

$$E_X \text{ (tpy)} = E_X \text{ (lb/hr)} * \{ 8760 \text{ (hr / yr)} / 2000 \text{ (lb / ton)} \}$$

Grams per Horsepower-hour (g/Hp-hr) :

$$E_X \text{ (g/hp-hr)} = \{ E_X \text{ (lb/hr)} / Hp \} / 454 \text{ (g / lb)} \}$$

Oxygen Correction (Cx @ 15%O_2)

$$(Cx\ @\ 15\%O_2) = (X^* (20.9-15)/(20.9-O_2 \text{ measured})$$

Calculated Mass Emission Rates From Method 19 Exhaust Flow Rates

E_{NOx}

lbs/hr = $74.36 * 1 \times e\text{-}6 * 1.69E{+}06 * \frac{46}{385.15}$ = **15.02**

tpy = $15.02 \text{ lb/hr} * 4.38 \frac{\text{hrs-ton}}{\text{lbs-yr}}$ = **65.78**

g/Hp-hr = $\frac{15.02 \text{ lb/hr}}{4307 \text{ Hp}} * \frac{454 \text{ g}}{1 \text{ lb}}$ = **1.58**

E_{CO}

lbs/hr = $10.12 * 1 \times e\text{-}6 * 1.69E{+}06 * \frac{28}{385.15}$ = **1.24**

tpy = $1.24 \text{ lb/hr} * 4.38 \frac{\text{hrs-ton}}{\text{lbs-yr}}$ = **5.45**

g/Hp-hr = $\frac{1.24 \text{ lb/hr}}{4307 \text{ Hp}} * \frac{454 \text{ g}}{1 \text{ lb}}$ = **0.13**

Project Number	Client	Source	Run Number	Date	Time	O2 (% Vol)	NOX (ppmvd)	CO (ppmvd)
0181	Enterprise Products			5/24/2012	8:52:04 AM	0.18	0.00	0.00
0181	Enterprise Products			5/24/2012	8:53:04 AM	-0.01	0.00	0.00
0181	Enterprise Products			5/24/2012	8:54:04 AM	-0.01	0.00	0.00
0181	Enterprise Products			5/24/2012	8:55:04 AM	-0.01	0.00	0.00
0181	Enterprise Products			5/24/2012	8:56:04 AM	-0.01	-0.05	0.00
0181	Enterprise Products			5/24/2012	8:57:04 AM	-0.01	-0.05	0.00
0181	Enterprise Products			5/24/2012	8:58:04 AM	-0.01	-0.05	0.00
0181	Enterprise Products			5/24/2012	8:59:04 AM	-0.01	0.00	0.00
0181	Enterprise Products			5/24/2012	9:00:04 AM	-0.01	0.00	0.00
0181	Enterprise Products			5/24/2012	9:01:04 AM	-0.01	0.00	-0.05
0181	Enterprise Products			5/24/2012	9:02:04 AM	-0.01	-0.05	0.00
0181	Enterprise Products			5/24/2012	9:03:04 AM	-0.01	-0.05	0.00
0181	Enterprise Products			5/24/2012	9:04:04 AM	-0.01	0.00	0.00
0181	Enterprise Products			5/24/2012	9:05:04 AM	-0.01	0.00	0.00
0181	Enterprise Products			5/24/2012	9:06:04 AM	***-0.01***	***-0.05***	***0.00***
0181	Enterprise Products			5/24/2012	9:07:04 AM	-0.01	-0.05	0.90
0181	Enterprise Products			5/24/2012	9:08:04 AM	21.16	70.00	255.45
0181	Enterprise Products			5/24/2012	9:09:04 AM	***20.87***	90.50	***255.95***
0181	Enterprise Products			5/24/2012	9:10:04 AM	12.19	***91.00***	***101.20***
0181	Enterprise Products			5/24/2012	9:11:04 AM	11.70	251.44	38.00
0181	Enterprise Products			5/24/2012	9:12:04 AM	***11.70***	***251.55***	0.00
0181	Enterprise Products			5/24/2012	9:13:04 AM	11.70	76.95	0.00
0181	Enterprise Products			5/24/2012	9:14:04 AM	11.80	-0.50	-0.05
0181	Enterprise Products			5/24/2012	9:15:04 AM	11.80	-0.50	-0.05
0181	Enterprise Products			5/24/2012	9:16:04 AM	11.80	218.10	0.00
0181	Enterprise Products			5/24/2012	9:17:04 AM	11.90	254.10	0.00
0181	Enterprise Products			5/24/2012	9:18:04 AM	11.90	128.50	0.00
0181	Enterprise Products			5/24/2012	9:19:04 AM	11.90	28.45	0.00
0181	Enterprise Products			5/24/2012	9:20:04 AM	11.90	418.70	0.00
0181	Enterprise Products			5/24/2012	9:21:04 AM	11.90	499.75	-0.05
0181	Enterprise Products			5/24/2012	9:22:04 AM	11.90	300.15	0.00
0181	Enterprise Products			5/24/2012	9:23:04 AM	11.99	104.50	0.00
0181	Enterprise Products			5/24/2012	9:24:04 AM	12.00	89.50	0.00
0181	Enterprise Products			5/24/2012	9:25:04 AM	12.00	89.00	0.00
0181	Enterprise Products			5/24/2012	9:26:04 AM	12.00	19.95	-0.05
0181	Enterprise Products			5/24/2012	9:27:04 AM	12.00	5.95	0.00
0181	Enterprise Products			5/24/2012	9:28:04 AM	12.00	4.95	0.00
0181	Enterprise Products			5/24/2012	9:29:04 AM	12.10	4.95	0.00
0181	Enterprise Products			5/24/2012	9:30:04 AM	12.09	4.95	0.00
0181	Enterprise Products			5/24/2012	9:31:04 AM	12.09	4.95	0.00
0181	Enterprise Products			5/24/2012	9:32:04 AM	12.09	4.90	0.00
0181	Enterprise Products			5/24/2012	9:33:04 AM	12.19	4.45	0.00
0181	Enterprise Products			5/24/2012	9:34:04 AM	12.19	4.45	-0.05
0181	Enterprise Products			5/24/2012	9:35:04 AM	12.19	4.45	0.00
0181	Enterprise Products			5/24/2012	9:36:04 AM	12.19	4.40	0.00
0181	Enterprise Products			5/24/2012	9:37:04 AM	12.19	4.40	0.90
0181	Enterprise Products			5/24/2012	9:38:04 AM	20.68	2.90	0.00
0181	Enterprise Products			5/24/2012	9:39:04 AM	20.68	-0.55	-0.05
0181	Enterprise Products			5/24/2012	9:40:04 AM	20.68	-0.55	-0.55
0181	Enterprise Products			5/24/2012	9:41:04 AM	***20.77***	***-0.55***	***-0.50***
0181	Enterprise Products			5/24/2012	9:42:04 AM	20.68	-0.55	20.25
0181	Enterprise Products			5/24/2012	9:43:04 AM	17.55	1.40	5.90
0181	Enterprise Products			5/24/2012	9:44:04 AM	16.77	67.00	11.30
0181	Enterprise Products			5/24/2012	9:45:04 AM	16.77	71.50	10.80
0181	Enterprise Products			5/24/2012	9:46:04 AM	0.28	71.00	85.10
0181	Enterprise Products			5/24/2012	9:47:04 AM	***-0.01***	***87.45***	***97.95***
0181	Enterprise Products	South Carlsbad #1		5/24/2012	9:47:43 AM	13.46	87.45	62.30
0181	Enterprise Products	South Carlsbad #1		5/24/2012	9:48:13 AM	16.67	81.45	11.85
0181	Enterprise Products	South Carlsbad #1		5/24/2012	9:48:43 AM	16.67	73.00	10.30
0181	Enterprise Products	South Carlsbad #1		5/24/2012	9:48:46 AM	16.67	73.00	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:49:16 AM	16.67	72.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:49:46 AM	16.67	72.45	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:50:16 AM	16.67	72.45	10.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:50:46 AM	16.67	72.45	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:51:16 AM	16.67	72.45	10.80
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:51:46 AM	16.67	72.50	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:52:16 AM	16.67	72.00	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:52:46 AM	16.67	71.95	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:53:16 AM	16.67	72.00	9.85

Project Number	Client	Source	Run Number	Date	Time	O2 (% Vol)	NOX (ppmvd)	CO (ppmvd)
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:53:46 AM	16.67	72.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:54:16 AM	16.67	72.00	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:54:46 AM	16.67	72.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:55:16 AM	16.67	73.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:55:46 AM	16.67	72.95	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:56:16 AM	16.67	73.00	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:56:46 AM	16.67	73.50	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:57:16 AM	16.67	73.45	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:57:46 AM	16.67	73.00	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:58:16 AM	16.67	72.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:58:46 AM	16.67	71.95	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:59:16 AM	16.67	71.95	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	9:59:46 AM	16.67	71.45	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:00:16 AM	16.67	71.50	10.80
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:00:46 AM	16.67	71.45	10.80
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:01:16 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:01:46 AM	16.67	72.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:02:16 AM	16.67	71.50	10.80
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:02:46 AM	16.67	71.45	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:03:16 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:03:46 AM	16.67	71.45	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:04:16 AM	16.67	72.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:04:46 AM	16.67	72.50	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:05:16 AM	16.67	72.00	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:05:46 AM	16.67	71.95	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:06:16 AM	16.67	72.00	10.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:06:46 AM	16.67	72.00	10.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:07:16 AM	16.67	72.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:07:46 AM	16.67	71.50	10.80
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:08:16 AM	16.67	71.45	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:08:46 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:09:16 AM	16.67	71.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:09:46 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:10:16 AM	16.67	71.45	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:10:46 AM	16.67	71.50	10.80
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:11:16 AM	16.67	71.50	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:11:46 AM	16.67	72.00	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:12:16 AM	16.67	71.95	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:12:46 AM	16.67	72.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:13:16 AM	16.67	72.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:13:46 AM	16.67	72.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:14:16 AM	16.67	72.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:14:46 AM	16.67	72.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:15:16 AM	16.67	71.95	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:15:46 AM	16.67	71.95	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:16:16 AM	16.67	72.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:16:46 AM	16.67	72.00	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:17:16 AM	16.67	72.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:17:46 AM	16.67	72.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:18:16 AM	16.67	72.00	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:18:46 AM	16.67	72.00	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:19:16 AM	16.67	72.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:19:46 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:20:16 AM	16.67	72.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:20:46 AM	16.67	72.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:21:16 AM	16.67	71.45	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:21:46 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:22:16 AM	16.67	71.50	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:22:46 AM	16.67	71.50	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:23:16 AM	16.67	71.45	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:23:46 AM	16.67	71.50	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:24:16 AM	16.67	72.00	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:24:46 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:25:16 AM	16.67	71.50	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:25:46 AM	16.67	72.00	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:26:16 AM	16.67	71.95	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:26:46 AM	16.67	71.95	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:27:16 AM	16.67	71.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:27:46 AM	16.67	72.00	9.35

Project Number	Client	Source	Run Number	Date	Time	O2 (% Vol)	NOX (ppmvd)	CO (ppmvd)
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:28:16 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:28:46 AM	16.67	71.50	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:29:16 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:29:46 AM	16.67	71.45	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:30:16 AM	16.67	71.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:30:46 AM	16.67	71.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:31:16 AM	16.67	71.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:31:46 AM	16.67	71.00	9.75
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:32:16 AM	16.67	71.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:32:46 AM	16.67	71.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:33:16 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:33:46 AM	16.67	71.50	10.80
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:34:16 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:34:46 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:35:16 AM	16.67	71.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:35:46 AM	16.67	71.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:36:16 AM	16.67	70.95	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:36:46 AM	16.67	71.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:37:16 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:37:46 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:38:16 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:38:46 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:39:16 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:39:46 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:40:16 AM	16.67	71.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:40:46 AM	16.67	71.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:41:16 AM	16.67	71.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:41:46 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:42:16 AM	16.67	71.45	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:42:46 AM	16.67	71.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:43:16 AM	16.67	71.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:43:46 AM	16.67	71.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:44:16 AM	16.67	71.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:44:46 AM	16.67	71.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:45:16 AM	16.67	71.50	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:45:46 AM	16.67	71.45	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:46:16 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:46:46 AM	16.67	71.45	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:47:16 AM	16.67	71.50	10.30
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:47:46 AM	16.67	71.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:48:16 AM	16.67	71.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 1	5/24/2012	10:48:46 AM	16.58	71.50	9.35
		Run Averages				16.67	71.79	9.86
0181	Enterprise Products	South Carlsbad #1		5/24/2012	10:49:16 AM	16.57	71.45	9.85
0181	Enterprise Products	South Carlsbad #1		5/24/2012	10:49:46 AM	16.58	71.95	9.85
0181	Enterprise Products	South Carlsbad #1		5/24/2012	10:50:16 AM	20.87	0.00	0.00
0181	Enterprise Products	South Carlsbad #1		5/24/2012	10:50:46 AM	***20.87***	***0.00***	***0.00***
0181	Enterprise Products	South Carlsbad #1		5/24/2012	10:51:16 AM	2.04	82.00	49.35
0181	Enterprise Products	South Carlsbad #1		5/24/2012	10:51:46 AM	***0.09***	86.45	***99.45***
0181	Enterprise Products	South Carlsbad #1		5/24/2012	10:52:16 AM	9.55	***86.45***	75.20
0181	Enterprise Products	South Carlsbad #1		5/24/2012	10:52:46 AM	16.48	84.50	13.80
0181	Enterprise Products	South Carlsbad #1		5/24/2012	10:52:58 AM	16.58	77.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	10:53:28 AM	16.58	72.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	10:53:58 AM	16.58	72.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	10:54:28 AM	16.58	72.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	10:54:58 AM	16.58	72.00	10.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	10:55:28 AM	16.57	71.45	10.30
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	10:55:58 AM	16.58	71.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	10:56:28 AM	16.57	72.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	10:56:58 AM	16.58	71.95	10.30
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	10:57:28 AM	16.58	72.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	10:57:58 AM	16.58	72.00	10.30
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	10:58:28 AM	16.58	72.00	10.30
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	10:58:58 AM	16.57	72.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	10:59:28 AM	16.58	72.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	10:59:58 AM	16.58	72.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:00:28 AM	16.58	72.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:00:58 AM	16.58	72.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:01:28 AM	16.57	72.00	8.85

Project Number	Client	Source	Run Number	Date	Time	O2 (% Vol)	NOX (ppmvd)	CO (ppmvd)
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:01:58 AM	16.57	71.45	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:02:28 AM	16.58	71.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:02:58 AM	16.58	71.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:03:28 AM	16.57	71.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:03:58 AM	16.57	72.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:04:28 AM	16.58	72.00	10.30
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:04:58 AM	16.57	77.50	10.30
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:05:28 AM	16.58	84.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:05:58 AM	16.58	84.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:06:28 AM	16.58	84.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:06:58 AM	16.58	84.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:07:28 AM	16.58	84.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:07:58 AM	16.57	84.50	10.30
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:08:28 AM	16.58	84.50	10.30
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:08:58 AM	16.58	84.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:09:28 AM	16.58	84.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:09:58 AM	16.57	84.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:10:28 AM	16.58	84.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:10:58 AM	16.58	84.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:11:28 AM	16.57	85.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:11:58 AM	16.48	85.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:12:28 AM	16.48	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:12:58 AM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:13:28 AM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:13:58 AM	16.48	86.50	8.30
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:14:28 AM	16.48	86.50	8.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:14:58 AM	16.48	86.50	8.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:15:28 AM	16.48	86.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:15:58 AM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:16:28 AM	16.57	86.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:16:58 AM	16.57	86.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:17:28 AM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:17:58 AM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:18:28 AM	16.48	86.00	8.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:18:58 AM	16.48	86.00	8.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:19:28 AM	16.58	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:19:58 AM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:20:28 AM	16.57	86.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:20:58 AM	16.58	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:21:28 AM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:21:58 AM	16.48	86.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:22:28 AM	16.48	86.50	8.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:22:58 AM	16.48	87.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:23:28 AM	16.58	86.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:23:58 AM	16.48	87.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:24:28 AM	16.48	86.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:24:58 AM	16.48	87.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:25:28 AM	16.48	88.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:25:58 AM	16.48	88.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:26:28 AM	16.48	88.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:26:58 AM	16.48	87.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:27:28 AM	16.48	87.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:27:58 AM	16.48	87.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:28:28 AM	16.58	87.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:28:58 AM	16.48	87.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:29:28 AM	16.48	87.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:29:58 AM	16.48	88.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:30:28 AM	16.48	88.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:30:58 AM	16.48	87.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:31:28 AM	16.48	87.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:31:58 AM	16.48	86.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:32:28 AM	16.57	86.00	8.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:32:58 AM	16.58	86.00	8.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:33:28 AM	16.58	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:33:58 AM	16.58	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:34:28 AM	16.58	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:34:58 AM	16.58	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:35:28 AM	16.57	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:35:58 AM	16.48	85.50	9.35

Project Number	Client	Source	Run Number	Date	Time	O2 (% Vol)	NOX (ppmvd)	CO (ppmvd)
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:36:28 AM	16.48	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:36:58 AM	16.48	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:37:28 AM	16.58	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:37:58 AM	16.57	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:38:28 AM	16.58	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:38:58 AM	16.58	85.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:39:28 AM	16.57	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:39:58 AM	16.58	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:40:28 AM	16.58	85.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:40:58 AM	16.58	85.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:41:28 AM	16.48	85.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:41:58 AM	16.48	85.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:42:28 AM	16.58	85.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:42:58 AM	16.58	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:43:28 AM	16.57	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:43:58 AM	16.48	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:44:28 AM	16.58	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:44:58 AM	16.57	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:45:28 AM	16.58	85.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:45:58 AM	16.58	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:46:28 AM	16.58	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:46:58 AM	16.58	85.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:47:28 AM	16.58	85.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:47:58 AM	16.58	85.50	8.30
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:48:28 AM	16.58	85.00	8.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:48:58 AM	16.58	85.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:49:28 AM	16.58	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:49:58 AM	16.57	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:50:28 AM	16.58	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:50:58 AM	16.58	85.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:51:28 AM	16.58	85.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:51:58 AM	16.58	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:52:28 AM	16.58	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 2	5/24/2012	11:52:58 AM	16.58	85.50	9.85
		Run Averages				16.54	83.07	9.25
0181	Enterprise Products	South Carlsbad #1		5/24/2012	11:53:28 AM	***20.80***	***0.50***	***0.00***
0181	Enterprise Products	South Carlsbad #1		5/24/2012	11:53:58 AM	20.80	0.00	0.00
0181	Enterprise Products	South Carlsbad #1		5/24/2012	11:54:28 AM	***0.00***	***90.40***	***99.35***
0181	Enterprise Products	South Carlsbad #1		5/24/2012	11:54:45 AM	0.00	90.40	99.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	11:55:15 AM	16.58	85.50	8.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	11:55:45 AM	16.58	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	11:56:15 AM	16.58	85.50	8.95
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	11:56:45 AM	16.58	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	11:57:15 AM	16.57	85.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	11:57:45 AM	16.58	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	11:58:15 AM	16.48	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	11:58:45 AM	16.58	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	11:59:15 AM	16.48	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	11:59:45 AM	16.48	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:00:15 PM	16.57	85.45	8.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:00:45 PM	16.58	85.50	8.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:01:15 PM	16.58	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:01:45 PM	16.48	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:02:15 PM	16.48	85.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:02:45 PM	16.48	85.00	8.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:03:15 PM	16.48	85.50	8.30
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:03:45 PM	16.48	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:04:15 PM	16.48	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:04:45 PM	16.48	85.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:05:15 PM	16.48	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:05:45 PM	16.48	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:06:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:06:45 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:07:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:07:45 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:08:15 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:08:45 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:09:15 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:09:45 PM	16.48	86.00	9.35

Project Number	Client	Source	Run Number	Date	Time	O2 (% Vol)	NOX (ppmvd)	CO (ppmvd)
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:10:15 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:10:45 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:11:15 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:11:45 PM	16.48	86.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:12:15 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:12:45 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:13:15 PM	16.48	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:13:45 PM	16.48	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:14:15 PM	16.48	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:14:45 PM	16.48	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:15:15 PM	16.48	85.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:15:45 PM	16.48	86.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:16:15 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:16:45 PM	16.48	86.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:17:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:17:45 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:18:15 PM	16.48	85.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:18:45 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:19:15 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:19:45 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:20:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:20:45 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:21:15 PM	16.48	86.00	8.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:21:45 PM	16.48	86.00	8.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:22:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:22:45 PM	16.48	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:23:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:23:45 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:24:15 PM	16.48	86.00	8.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:24:45 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:25:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:25:45 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:26:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:26:45 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:27:15 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:27:45 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:28:15 PM	16.48	86.00	8.30
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:28:45 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:29:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:29:45 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:30:15 PM	16.48	86.00	8.30
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:30:45 PM	16.48	85.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:31:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:31:45 PM	16.48	85.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:32:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:32:45 PM	16.48	85.50	8.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:33:15 PM	16.48	86.00	8.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:33:45 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:34:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:34:45 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:35:15 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:35:45 PM	16.48	86.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:36:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:36:45 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:37:15 PM	16.48	86.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:37:45 PM	16.48	86.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:38:15 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:38:45 PM	16.48	86.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:39:15 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:39:45 PM	16.48	86.00	8.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:40:15 PM	16.48	86.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:40:45 PM	16.48	86.50	10.30
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:41:15 PM	16.48	86.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:41:45 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:42:15 PM	16.48	86.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:42:45 PM	16.48	86.50	10.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:43:15 PM	16.48	86.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:43:45 PM	16.48	86.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:44:15 PM	16.48	86.50	8.35

Project Number	Client	Source	Run Number	Date	Time	O2 (% Vol)	NOX (ppmvd)	CO (ppmvd)
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:44:45 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:45:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:45:45 PM	16.48	85.50	9.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:46:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:46:45 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:47:15 PM	16.48	86.00	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:47:45 PM	16.48	86.00	9.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:48:15 PM	16.48	86.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:48:45 PM	16.48	86.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:49:15 PM	16.48	86.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:49:45 PM	16.48	87.00	8.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:50:15 PM	16.48	86.50	8.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:50:45 PM	16.48	86.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:51:15 PM	16.48	86.50	8.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:51:45 PM	16.48	86.50	8.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:52:15 PM	16.48	86.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:52:45 PM	16.48	86.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:53:15 PM	16.48	86.50	8.85
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:53:45 PM	16.48	86.00	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:54:15 PM	16.48	86.50	9.35
0181	Enterprise Products	South Carlsbad #1	Run 3	5/24/2012	12:54:45 PM	16.48	86.00	8.85
		Run Averages				16.48	85.95	9.06
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:55:16 PM	16.48	86.50	8.85
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:55:46 PM	16.48	86.50	8.85
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:56:16 PM	-0.01	90.21	99.35
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:56:46 PM	***-0.01***	***90.21***	***99.45***
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:57:16 PM	19.99	0.50	5.90
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:57:46 PM	20.90	0.00	0.00
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:58:16 PM	***20.90***	***0.00***	***0.00***
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:58:46 PM	20.48	0.00	0.00
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:59:16 PM	20.48	0.00	0.00
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:59:46 PM	20.48	0.00	0.00
0181	Enterprise Products	South Carlsbad #1		5/24/2012	1:00:16 PM	20.48	-0.50	0.00

SPECIALTY GASES OF AMERICA, INC.
AMERICAN INDUSTRIAL GASES, INC.
AMERICAN RARE GASES, INC

6055 BRENT DR. TOLEDO, OH 43611
419-729-7732 FAX 419-729-2411

THE AMERICAN GAS GROUP

www.americangasgroup.com

ANALYTICAL REPORT

Certificate ID: 110711019 **Date:** 11/7/2011

Customer Name: B&J Welding Supply, TX

Customer Address: 1512 East 50th Street

Lubbock TX 79404

Purchase Order: 17436 **Work Order:** 127416-01

Lot Number: 1024UB11 **Product Name:** 3-Component Mixture, EPA Protocol

Size: A31 **Pressure:** 2210 psig @ 84 Deg F

Content: Ven ID# C12011

Serial #: EB0002836

Analysis Date: 11/2/2011

Shelf Life: 36 months **Expiration Date:** 11/2/2014

Component	Nominal	Actual	Accuracy	Method
Oxygen	12.0%	11.7%	+/- 1% rel	Paramagnetic
Carbon Dioxide	12.0%	12.2%	+/- 1% rel	FTIR
Nitrogen	Balance	Balance		

REFERENCE STANDARD

Std Type	Std #	Cyl #	Concentration	Exp Date
GMIS	0606JG11	EB0001508	15.1500	6/7/2013
GMIS	0625HE10	EB0023062	19.8500	6/28/2012

INSTRUMENTATION

Instrument / ID	Component
Servomex 5200	O2
MKS 2031	CO2

Note: * ANALYZED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS - SEPTEMBER 1997:G1
* DO NOT USE STANDARD WHEN PRESSURE IS BELOW 150 PSIG

Protocal
Specialty Gases of America, Inc

Issued by: Josh Jones

SPECIALTY GASES OF AMERICA, INC.
AMERICAN INDUSTRIAL GASES, INC.
AMERICAN RARE GASES, INC

6055 BRENT DR. TOLEDO, OH 43611
419-729-7732 FAX 419-729-2411

THE AMERICAN GAS GROUP

www.americangasgroup.com

ANALYTICAL REPORT

Certificate ID: 110711012 **Date:** 11/7/2011

Customer Name: B&J Welding Supply, TX

Customer Address: 1512 East 50th Street

Lubbock TX 79404

Purchase Order: 17436 **Work Order:** 127416-03

Lot Number: 1024UA11 **Product Name:** 3-Component Mixture, EPA Protocol

Size: A31 **Pressure:** 2220 psig @ 82 Deg F

Content: Ven ID# C12011

Serial #: EB0004610

Analysis Date: 11/2/2011

Shelf Life: 36 months **Expiration Date:** 11/2/2014

Component	Nominal	Actual	Accuracy	Method
Oxygen	20.9%	20.9%	+/- 1% rel	Paramagnetic
Carbon Dioxide	5.00%	5.10%	+/- 1% rel	FTIR
Nitrogen	Balance	Balance		

REFERENCE STANDARD

Std Type	Std #	Cyl #	Concentration	Exp Date
GMIS	0318XA11	EB0028214	20.9700	3/18/2013
GMIS	0625HE10	EB0023062	19.8500	6/28/2012

INSTRUMENTATION

Instrument / ID	Component
Servomex 5200	O2
MKS 2031	CO2

Note: * ANALYZED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS - SEPTEMBER 1997:G1
* DO NOT USE STANDARD WHEN PRESSURE IS BELOW 150 PSIG

Protocal
Specialty Gases of America, Inc

Issued by: Josh Jones

Global Calibration Gases LLC
1500 15th Avenue Drive East, #109
Palmetto, FL 34221
Blending Plant & Analytical Laboratory
Accreditation No: 69191
PGVP Vendor ID: N12011

EPA PROTOCOL GAS MIXTURE

Customer:	B&J Specialty Gas	Reference#:	011612 - 2
CGA:	660	Certification Date:	1/16/12
Customer PO #:		Expiration Date:	1/16/14
Cylinder #:	EB0034805	Pressure, psig:	2000

Method: This standard was analyzed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards, Procedure G1 (September 1997).

ANALYZED CYLINDER –

Components	Certified Concentration	Analytical Accuracy
NO	90.0 ppm	± 1 %
NOx	> 1 %	± 1 %
Propane	105.0 ppm	± 1 %
Methane	109.0 ppm	± 1 %
Carbon Monoxide	99.0 ppm	± 1 %
Nitrogen	BALANCE	-

REFERENCE STANDARD -

Type/SRM Sample	Cylinder#	Concentration
NO/ SRM 2735	Cal015838	784.4 ppm
NOx/ SRM 2735	Cal015838	787.5 ppm
Propane/ GMIS	EB0026425	310.9 ppm
Methane/ GMIS	EB0019166	94.6 ppm
CO/ GMIS	CC118813	95.5 ppm

INSTRUMENT -

Instrument/Model	Serial #	Last Date Calibrated	Analytical Method
California Analytical Instrument Model 600	Y09003	1/5/12	Chemiluminescence
Agilent	US02002031	1/10/12	Thermal conductivity

These mixtures were prepared gravimetrically using a high load high sensitivity electronic scale. Prior to filling the scale is verified for accuracy throughout the target mass range against applicable NIST traceable weights. We certify that the weights are calibrated to ASTM E617-97 Class 1 tolerances. This calibration is referenced by serial # 7210-1, Certificate # 511635 and NIST Inst # 822/272103-06. This report states accurately the results of the investigation made upon the material submitted to the analytical laboratory. Every effort has been made to determine objectively the information requested. However, in connection with this report, Global Calibration Gases LLC shall have no liability in excess of the established charge for this service. Assayed at Global Calibration Gases LLC, Palmetto, Florida. *Do not use this standard when cylinder pressure is below 150 psig.

Principal Analyst: [signature] Reviewer: [signature]

Date: 1/16/12 Date: 1-16-2012

B&J Welding Supply Lamesa, Tx

Accreditation No 69191

PGVP Vendor ID N12012

EPA Protocol Gas Mixture

Customer:	B&J Welding Supply	Reference#:	011112-1
CGA:	660	Certification Date:	01/11/2012
Customer PO#	17784	Expiration Date:	01/11/2014
Cylinder #:	EB0032807	Pressure, psig:	2000

Method: This standard was analyzed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards, Procedure G1 (September 1997)

Analyzed Cylinder-

Components	Certified Concentration	Analytical Accuracy
Nitric Oxide	251.4 ppm	+/-1%
NOx	<1%	+/-1%
Carbon Monoxide	257 ppm	+/-1%
Methane	248.6 ppm	+/-1%
Propane	251.6 ppm	+/-1%
Nitrogen	Balaince	-

Reference Standard-

Type/SRM Sample	Cylinder #	Concentration
NO/SRM 2735	Cal015838	784.4 ppm
Nox/ SRM 2735	Cal015838	787.5 ppm
CO/ GMIS	EB0019151	1.96%
Propane/ GMIS	CC80938	2984 ppm
Methane/ GMIS	EB0026384	146.3 ppm

Instrument-

Instrument/ Model	Serial Number	Last Date Calibrated	Analytical Method
California Analytical Instrument Model 600	Y09003	01/06/2012	Chemiluminescence
Agilent Quad Series	US02002031	01/11/12	Thermal Conductivity
Rosemount 880A	F-04300088	01/04/2012	Non-Dispersive Infrared

These mixtures were prepared gravimetrically using a high load high sensitivity electronic scale. Prior to filling the scale is verified for accuracy throughout the target mass range against applicable NIST traceable weights.

We certify that the weights are calibrated to ASTM E617-97 Class 1 tolerances. This calibration is referenced by serial # 7210-1, Certificate # 511635 and NIST Inst # 822/272103-06.

This report states accurately the results of the investigation made upon the material submitted to the analytical laboratory. Every effort has been made to determine objectively the information requested. However, in connection with this report, Global Calibration Gases LLC shall have no liability in excess of the established charge for this service. Assayed at Global Calibration Gases LLC, Palmetto, Florida.

*Do not use this standard when cylinder pressure is below 150 psig.

Produced by:

Global Calibration Gases LLC.
1500 15th Avenue Drive, East Suite# 109
Palmetto, Florida 34221
Accreditation No.: 69191
PGVP Vendor ID.: N12012

Principal Analyst: [signature]
Date: 1-11-12

Principal Reviewer: [signature]
Date: 1-11-12

Annual Turbine Emissions TEST REPORT

ON
EXHAUST EMISSIONS
FROM

ONE NATURAL GAS FIRED TURBINE

AT THE
SOUTH CARLSBAD COMPRESSOR STATION
LOVING, NM

PREPARED FOR
ENTERPRISE PRODUCTS OPERATING

MAY 2012

Relient Emissions Testing, Inc
Project Number: 0181

Relient Emissions Testing Inc.
Air Emissions Testing for Industry®

Mr. Jim Heap
Enterprise Products, LLC
(432) 686-5404
Midland, TX

May 20, 2012

Re: Annual emissions testing at the South Carlsbad Compressor Station on Unit 2

Mr. Heap,

Exhaust emissions from one compressor turbine was tested at the South Carlsbad compressor station near Loving, New Mexico on. Testing was conducted to demonstrate compliance with emission limits set forth by NMED permit. The engine is identified as follows:

Engine Information	
Unit Number:	Unit 2
Manufacturer:	Solar
Serial Number:	3001096
Model:	CENTAUR 40
Mfr. Rated Hp:	4500hp
Mfr. Rated Speed:	15,000

This is a natural gas fired turbine used for compression of natural gas for transportation through the pipeline.

The test matrix consisted of three 60-minute test runs on the turbine in accordance with NMED requirements. For each test, the average emission concentrations of nitrogen oxides (NO_X), oxygen (O_2), and carbon monoxide (CO) were measured using analytical instrumentation. Operational data such as Gas Producer Speed, Turbine Speed, and suction and discharge pressures were recorded during each run from available operational data on the unit.

Results of the tests are presented in tabular format in this report. Included in this table are engine operational data, ambient conditions, emission concentrations, and mass emission rates.

Continuous emission monitors housed in an air-conditioned mobile laboratory were used to measure the exhaust concentrations of NO_X, CO and O_2. This testing utilized the following analytical methods:

EPA Reference Method 3a	O_2 concentration
EPA Reference Method 7e	NO_X concentration
EPA Reference Method 10	CO concentration
EPA Reference Method 19	Mass emission rates

A computerized data recorder was used to record output from the analyzers. The data logger record provides documentation of the emission measurements and the instrument calibrations. The data logger records are also useful for indicating trends in the data.

Mass emission rates were calculated using EPA Method 19 calculations (combustion stoichiometry). Emission rates in terms of lbs/hr and TPY were calculated using the pollutant concentration (ppmv), the oxygen F-factor ($DSCF_{ex}$/MMBtu) and the horsepower specific fuel consumption rate (Btu/Hp-hr). The O_2 F-Factor used in this test series was 8710 ($DSCF_{ex}$/MMBtu), the EPA default value for engines burning natural gas.

A summary of the quality assurance procedures associated with the EPA test methods is presented in tabular format in the appendix of this report. Examples of these procedures include daily multipoint calibrations, zero and span checks between each test run, NO_2 to NO converter efficiency check results, sample system bias check results, and analyzer interference test results.

The appendix of this report also includes supporting test documentation, example calculations, and data logger records.

If you have any questions, please feel free to contact me at (806) 773-8851.

Sincerely,

Ross Thompson
Principal Scientist
Relient Emissions Testing, Inc

APPENDIX

Summary of Results
Quality Assurance/Quality Control Summary
Example Calculations
Calibration Certifications
Data Logger Files

Summary of Results

Company:	Enterprise Products Operating			
Location:	South Carlsbad Compressor Station			
Source:	Solar Centaur 40 S/N: 30010096			
Engine Rating:	4500hp @ 15000RPM			
Technician:	RAT			
Test Run Number	**1**	**2**	**3**	
Unit	**2**	**2**	**2**	
Date	4/20/2010	4/20/2010	4/20/2010	
Start Time	12:02	13:04	14:07	
Stop Time	12:22	13:24	14:27	
Unit Operational Data				
Engine Speed (rpm)	15000	15000	15000	
Unit Horse Power (Hp)*	4320	4320	4320	
NPT Load (%)	93.0	93.0	93.0	
NGP Load (%)	96.0	96.0	96.0	
Compressor Suction Pressure (psig)	225	225	225	
Compressor Discharge Pressure (psig)	382	382	382	
T5 Temperature (°F)	1190	1190	1190	
PCD (psig)	93.0	93.0	93.0	
Fuel Data				
Calculated Fuel Consumption (SCFH)	34000	34000	34000	
O2 F-Factor (DSCF/MMBtu, HHV basis)	8710	8710	8710	
Fuel Heating Value (Btu/SCF, HHV basis)	1093	1093	1093	
BHp Specific Fuel Rate (Btu/Hp-hr, HHV basis)	8602	8602	8602	
BHp Specific Fuel Rate (Btu/Hp-hr, LHV basis)	7750	7750	7750	
Ambient Conditions				
Pressure Altitude (MSL)	3250	3250	3250	
Atmospheric Pressure ("Hg)	26.60	26.60	26.60	
Dry Bulb Temperature (°F)	87	86	86	
Wet Bulb Temperature (°F)	65	64	64	
Humidity (lb/lb air)	0.0095	0.0090	0.0090	
Measured Exhaust Emissions (Corrected)				**Average**
O_2 (% Vol)	16.28	16.32	16.29	**16.30**
NOx (ppmv)	86.22	86.64	85.20	**86.02**
CO (ppmv)	9.60	9.51	9.67	**9.6**
Exhaust Flow Rate (DSCFH)				
Dry SCFH (dry basis, calc. from Hp/BSFR/HHV)	1.46E+06	1.48E+06	1.47E+06	**1469592.84**
Calculated Mass Emission Rates (Based on btu Specific Fuel Rate BSFR)				
NOx (lbs/hr) {Permit Limit = 27}	15.0	15.2	14.9	**15.03**
CO (lbs/hr) {Permit Limit = 7.4}	1.0	1.0	1.0	**1.00**

*Based on gas producer speed.

Quality Assurance

Method 7E Non-Dilution Measurement System Performance Test Procedures
Method 7E Calculated Emission Gas Concentration

Project No.: 0023
Technician: RAT

Date: 04/20/10
Client: Enterprise Products Operating
Location: South Carlsbad Compressor Station

Calibration Gas Certified Values	Span	Low Gas	Mid Gas	High Gas	Analyzer	Analyzer Serial Number	Gas Selection, % of Span Low (<20%)	Mid (40%-60%)
O_2 (% Vol)	20.90	0.00	11.70	20.90	AII GPR-29	001666832	0.0%	56.0%
NOx (ppmv)	251.40	0.00	90.00	251.40	TECO 42C	030400000000842	0.0%	35.8%
CO (ppmv)	257.00	0.00	99.00	257.00	TECO 48C	48C-67940-359	0.0%	38.5%

Initial Linearity Data

Calibration Error	Analyzer Calibration Response			Absolute Difference			Difference (% of Span)		
	Low	Mid	High	Low	Mid	High	Low	Mid	High
O_2 (% Vol)	-0.01	11.70	20.87	0.01	0.00	0.03	0.05%	0.00%	0.14%
NOx (ppmv)	-0.05	91.00	251.55	0.05	1.00	0.15	0.02%	0.40%	0.06%
CO (ppmv)	0.00	101.20	255.95	0.00	2.20	1.05	0.00%	0.86%	0.41%

Run Number 1 Start: 12:02 End: 12:22

Bias and Drift	Upscale	Cal. Response		Initial Values		Initial System Bias		Final Values		Final System Bias		Drift		Emission Calculation		
	Gas	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Raw Avg	Run Avg	
O_2 (% Vol)	20.90	-0.01	20.87	-0.01	20.90	0.00%	0.14%	-0.01	20.90	0.00%	0.14%	0.00%	0.00%	16.28	16.28	O_2 (% Vol)
NOx (ppmv)	90.00	-0.05	91.00	0.00	90.21	0.02%	-0.31%	0.00	90.40	0.02%	-0.24%	0.00%	0.08%	86.51	86.22	NOx (ppmv)
CO (ppmv)	99.00	0.00	101.20	0.00	99.45	0.00%	-0.68%	0.00	99.50	0.00%	-0.66%	0.00%	0.02%	9.65	9.60	CO (ppmv)

Run Number 2 Start: 13:04 End: 13:24

Bias and Drift	Upscale	Cal. Response		Initial Values		Initial System Bias		Final Values		Final System Bias		Drift		Emission Calculation		
	Gas	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Raw Avg	Run Avg	
O_2 (% Vol)	20.90	-0.01	20.87	-0.01	20.90	0.00%	0.14%	-0.01	20.85	0.00%	-0.10%	0.00%	-0.24%	16.30	16.32	O_2 (% Vol)
NOx (ppmv)	90.00	-0.05	91.00	0.00	90.40	0.02%	-0.24%	0.00	90.50	0.02%	-0.20%	0.00%	0.04%	87.07	86.64	NOx (ppmv)
CO (ppmv)	99.00	0.00	101.20	0.00	99.50	0.00%	-0.66%	0.00	99.60	0.00%	-0.62%	0.00%	0.04%	9.56	9.51	CO (ppmv)

Run Number 3 Start: 14:07 End: 14:27

Bias and Drift	Upscale	Cal. Response		Initial Values		Initial System Bias		Final Values		Final System Bias		Drift		Emission Calculation		
	Gas	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Low	Upscale	Raw Avg	Run Avg	
O_2 (% Vol)	20.90	-0.01	20.87	-0.01	20.85	0.00%	-0.10%	-0.01	20.90	0.00%	0.14%	0.00%	0.24%	16.27	16.29	O_2 (% Vol)
NOx (ppmv)	90.00	-0.05	91.00	0.00	90.50	0.02%	-0.20%	0.00	90.20	0.02%	-0.32%	0.00%	-0.12%	85.53	85.20	NOx (ppmv)
CO (ppmv)	99.00	0.00	101.20	0.00	99.60	0.00%	-0.62%	-0.50	99.30	-0.19%	-0.74%	-0.19%	-0.12%	9.49	9.67	CO (ppmv)

Example Calculations

Drift Corrected Emission Concentrations			
Formula			
$C_{GAS} = (\bar{C} - C_O) \times \dfrac{C_{MA}}{C_M - C_O}$ *(eq.7e-5)*			
All Calculations Refer to Test Run 1 or an Average of Runs 1-3			
$Ç_{NOx}$ =	Raw Concentration of NOx		= 86.51 ppmv
C_O =	Avg. of Initial and Final Zero Checks		= 0.00 ppmv
C_M =	Avg. of Initial and Final Span Checks		= 90.31 ppmv
C_{MA} =	Certified Concentration of Span Gas		= 90.00 ppmv
C_{NOx} =	**(86.51 - 0)**	**x $\dfrac{90}{(90.3 - 0)}$**	**= 86.22 ppmv**
$Ç_{CO}$ =	Raw Concentration of CO		= 9.65 ppmv
C_O =	Avg. of Initial and Final Zero Checks		= 0.00 ppmv
C_M =	Avg. of Initial and Final Span Checks		= 99.48 ppmv
C_{MA} =	Certified Concentration of Span Gas		= 99.00 ppmv
C_{CO} =	**(9.65 + 0)**	**x $\dfrac{99}{(99.5 + 0)}$**	**= 9.60 ppmv**
$Ç_{O2}$ =	Raw Concentration of O2		= 16.28%
C_O =	Avg. of initial and final zero bias checks		= -0.01%
C_M =	Avg. of initial and final span bias checks		= 20.90%
C_{MA} =	Actual concentration of span gas		= 20.90%
C_{O2} =	**(16.28 - -0.01)**	**x $\dfrac{20.9}{(20.9 - 0)}$**	**= 16.28%**

Example Calculations

Exhaust Calculations

Measured Data and Constants

C_{NOx}	=	Corrected Concentration of NOx	=	86.22	ppmv
C_{CO}	=	Corrected Concentration of CO	=	9.60	ppmv
Horsepower	=	Observed Horsepower	=	4320	Hp
lb / mole	=	EPA STP for Ideal Gas	=	385.15	SCF
lbs / hr to tpy	=	Mass Conversion Factor	=	4.38	hrs-tons / lbs-yr
C_F	=	PPMV Normalization	=	1 x e-6	1 / ppmv
MW_{NOx}	=	Molecular Weight of NOx	=	46	lb / lb-mol
MW_{CO}	=	Molecular Weight of CO	=	28	lb / lb-mol

S tack Gas Flow Rate via btu Specific Fuel Rate (BSFR)

Hp	=	Engine Horsepower	=	4320	Hp
F_{BTU}	=	btu Specific Fuel Rate	=	8602	Btu/Hp-Hr
F_{O2}	=	O2 F-Factor	=	8710	DSCF/MMBtu
C_{O2}	=	Measured Concentration of O2	=	16.28	%

$$Qs_{M19} = Hp \times F_{BTU} \times F_{O2} \times 10^{\wedge}6 \times \frac{20.9}{(20.9 - \%O2)} \quad \text{DSCF/H}$$

Qs_{M19} = 4320.00 x 8602 x 8710 x 4.52 x 1E-06

Qs_{M19} = 1.46E+06 DSCF/H

Formulas

Pounds per Hour (lbs/hr) :

$$E_x \text{ (lb/hr)} = C_x * C_F * Qs * \{ MW_x / \text{(lb / mole)} \}$$

Tons per Year (tpy) :

$$E_x \text{ (tpy)} = E_x \text{ (lb/hr)} * \{ 8760 \text{ (hr / yr)} / 2000 \text{ (lb / ton)} \}$$

Grams per Horsepower-hour (g/Hp-hr) :

$$E_x \text{ (g/hp-hr)} = \{ E_x \text{ (lb/hr)} / Hp \} / 454 \text{ (g / lb)} \}$$

Calculated Mass Emission Rates From Method 19 Exhaust Flow Rates

E_{NOx}

lbs/hr = $86.22 * 1 \text{ x e-6} * 1.46E{+}06 * \frac{46}{385.15}$ = **15.08**

tpy = $15.08 \text{ lb/hr} * 4.38 \frac{\text{hrs-ton}}{\text{lbs-yr}}$ = **66.04**

g/Hp-hr = $\frac{15.08 \text{ lb/hr}}{4320 \text{ Hp}} * \frac{454 \text{ g}}{1 \text{ lb}}$ = **1.58**

E_{CO}

lbs/hr = $9.60 * 1 \text{ x e-6} * 1.46E{+}06 * \frac{28}{385.15}$ = **1.02**

tpy = $1.02 \text{ lb/hr} * 4.38 \frac{\text{hrs-ton}}{\text{lbs-yr}}$ = **4.48**

g/Hp-hr = $\frac{1.02 \text{ lb/hr}}{4320 \text{ Hp}} * \frac{454 \text{ g}}{1 \text{ lb}}$ = **0.11**

Project Number	Client	Source	Run Number	Date	Time	O2 (% Vol)	NOX (ppmvd)	CO (ppmvd)
0181	Enterprise Products			5/24/2012	8:52:04 AM	0.18	0.00	0.00
0181	Enterprise Products			5/24/2012	8:53:04 AM	-0.01	0.00	0.00
0181	Enterprise Products			5/24/2012	8:54:04 AM	-0.01	0.00	0.00
0181	Enterprise Products			5/24/2012	8:55:04 AM	-0.01	0.00	0.00
0181	Enterprise Products			5/24/2012	8:56:04 AM	-0.01	-0.05	0.00
0181	Enterprise Products			5/24/2012	8:57:04 AM	-0.01	-0.05	0.00
0181	Enterprise Products			5/24/2012	8:58:04 AM	-0.01	-0.05	0.00
0181	Enterprise Products			5/24/2012	8:59:04 AM	-0.01	0.00	0.00
0181	Enterprise Products			5/24/2012	9:00:04 AM	-0.01	0.00	0.00
0181	Enterprise Products			5/24/2012	9:01:04 AM	-0.01	0.00	-0.05
0181	Enterprise Products			5/24/2012	9:02:04 AM	-0.01	-0.05	0.00
0181	Enterprise Products			5/24/2012	9:03:04 AM	-0.01	-0.05	0.00
0181	Enterprise Products			5/24/2012	9:04:04 AM	-0.01	0.00	0.00
0181	Enterprise Products			5/24/2012	9:05:04 AM	-0.01	0.00	0.00
0181	Enterprise Products			5/24/2012	9:06:04 AM	***-0.01***	***-0.05***	***0.00***
0181	Enterprise Products			5/24/2012	9:07:04 AM	-0.01	-0.05	0.90
0181	Enterprise Products			5/24/2012	9:08:04 AM	21.16	70.00	255.45
0181	Enterprise Products			5/24/2012	9:09:04 AM	***20.87***	90.50	***255.95***
0181	Enterprise Products			5/24/2012	9:10:04 AM	12.19	***91.00***	***101.20***
0181	Enterprise Products			5/24/2012	9:11:04 AM	11.70	251.44	38.00
0181	Enterprise Products			5/24/2012	9:12:04 AM	***11.70***	***251.55***	0.00
0181	Enterprise Products			5/24/2012	9:13:04 AM	11.70	76.95	0.00
0181	Enterprise Products			5/24/2012	9:14:04 AM	11.80	-0.50	-0.05
0181	Enterprise Products			5/24/2012	9:15:04 AM	11.80	-0.50	-0.05
0181	Enterprise Products			5/24/2012	9:16:04 AM	11.80	218.10	0.00
0181	Enterprise Products			5/24/2012	9:17:04 AM	11.90	254.10	0.00
0181	Enterprise Products			5/24/2012	9:18:04 AM	11.90	128.50	0.00
0181	Enterprise Products			5/24/2012	9:19:04 AM	11.90	28.45	0.00
0181	Enterprise Products			5/24/2012	9:20:04 AM	11.90	418.70	0.00
0181	Enterprise Products			5/24/2012	9:21:04 AM	11.90	499.75	-0.05
0181	Enterprise Products			5/24/2012	9:22:04 AM	11.90	300.15	0.00
0181	Enterprise Products			5/24/2012	9:23:04 AM	11.99	104.50	0.00
0181	Enterprise Products			5/24/2012	9:24:04 AM	12.00	89.50	0.00
0181	Enterprise Products			5/24/2012	9:25:04 AM	12.00	89.00	0.00
0181	Enterprise Products			5/24/2012	9:26:04 AM	12.00	19.95	-0.05
0181	Enterprise Products			5/24/2012	9:27:04 AM	12.00	5.95	0.00
0181	Enterprise Products			5/24/2012	9:28:04 AM	12.00	4.95	0.00
0181	Enterprise Products			5/24/2012	9:29:04 AM	12.10	4.95	0.00
0181	Enterprise Products			5/24/2012	9:30:04 AM	12.09	4.95	0.00
0181	Enterprise Products			5/24/2012	9:31:04 AM	12.09	4.95	0.00
0181	Enterprise Products			5/24/2012	9:32:04 AM	12.09	4.90	0.00
0181	Enterprise Products			5/24/2012	9:33:04 AM	12.19	4.45	0.00
0181	Enterprise Products			5/24/2012	9:34:04 AM	12.19	4.45	-0.05
0181	Enterprise Products			5/24/2012	9:35:04 AM	12.19	4.45	0.00
0181	Enterprise Products			5/24/2012	9:36:04 AM	12.19	4.40	0.00
0181	Enterprise Products			5/24/2012	9:37:04 AM	12.19	4.40	0.90
0181	Enterprise Products			5/24/2012	9:38:04 AM	20.68	2.90	0.00
0181	Enterprise Products			5/24/2012	9:39:04 AM	20.68	-0.55	-0.05
0181	Enterprise Products			5/24/2012	9:40:04 AM	20.68	-0.55	-0.55
0181	Enterprise Products			5/24/2012	9:41:04 AM	***20.77***	***-0.55***	***-0.50***
0181	Enterprise Products			5/24/2012	9:42:04 AM	20.68	-0.55	20.25
0181	Enterprise Products			5/24/2012	9:43:04 AM	17.55	1.40	5.90
0181	Enterprise Products			5/24/2012	9:44:04 AM	16.77	67.00	11.30
0181	Enterprise Products			5/24/2012	9:45:04 AM	16.77	71.50	10.80
0181	Enterprise Products			5/24/2012	9:46:04 AM	0.28	71.00	85.10
0181	Enterprise Products			5/24/2012	9:47:04 AM	***-0.01***	***87.45***	***97.95***
0181	Enterprise Products	South Carlsbad #1		5/24/2012	9:47:43 AM	13.46	87.45	62.30
0181	Enterprise Products	South Carlsbad #1		5/24/2012	9:48:13 AM	16.67	81.45	11.85
0181	Enterprise Products	South Carlsbad #1		5/24/2012	9:48:43 AM	16.67	73.00	10.30
0181	Enterprise Products	South Carlsbad #1		5/24/2012	9:48:46 AM	16.67	73.00	10.30
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:55:46 PM	16.48	86.50	8.85
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:56:16 PM	-0.01	90.21	99.35
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:56:46 PM	***-0.01***	***90.21***	***99.45***
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:57:16 PM	19.99	0.50	5.90
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:57:46 PM	20.90	0.00	0.00
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:58:16 PM	***20.90***	***0.00***	***0.00***
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:58:46 PM	20.48	0.00	0.00
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:59:16 PM	20.48	0.00	0.00
0181	Enterprise Products	South Carlsbad #1		5/24/2012	12:59:46 PM	20.48	0.00	0.00

Project Number	Client	Source	Run Number	Date	Time	O2 (% Vol)	NOX (ppmvd)	CO (ppmvd)
0181	Enterprise Products	South Carlsbad #1		5/24/2012	1:00:16 PM	20.48	-0.50	0.00
0181	Enterprise Products	South Carlsbad #1		5/24/2012	1:00:46 PM	20.48	-0.50	0.00
0181	Enterprise Products	South Carlsbad #1		5/24/2012	1:01:16 PM	20.38	0.00	0.00
0181	Enterprise Products	South Carlsbad #1		5/24/2012	1:01:46 PM	16.38	0.45	8.85
0181	Enterprise Products	South Carlsbad #2		5/24/2012	1:02:15 PM	16.28	75.50	9.35
0181	Enterprise Products	South Carlsbad #2		5/24/2012	1:02:17 PM	16.28	75.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:02:47 PM	16.28	85.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:03:17 PM	16.28	85.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:03:47 PM	16.28	85.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:04:17 PM	16.28	85.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:04:47 PM	16.28	86.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:05:17 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:05:47 PM	16.28	86.00	10.30
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:06:17 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:06:47 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:07:17 PM	16.28	87.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:07:47 PM	16.28	88.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:08:17 PM	16.28	88.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:08:47 PM	16.28	89.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:09:17 PM	16.28	89.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:09:47 PM	16.28	89.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:10:17 PM	16.28	89.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:10:47 PM	16.28	88.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:11:17 PM	16.28	89.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:11:47 PM	16.28	88.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:12:17 PM	16.28	89.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:12:47 PM	16.28	89.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:13:17 PM	16.28	88.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:13:47 PM	16.28	88.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:14:17 PM	16.28	88.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:14:47 PM	16.28	88.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:15:17 PM	16.28	88.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:15:47 PM	16.28	88.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:16:17 PM	16.28	88.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:16:47 PM	16.28	88.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:17:17 PM	16.28	88.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:17:47 PM	16.28	87.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:18:17 PM	16.28	87.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:18:47 PM	16.28	87.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:19:17 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:19:47 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:20:17 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:20:47 PM	16.28	86.50	10.30
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:21:17 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:21:47 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:22:17 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:22:47 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:23:17 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:23:47 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:24:17 PM	16.28	86.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:24:47 PM	16.28	85.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:25:17 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:25:47 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:26:17 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:26:47 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:27:17 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:27:47 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:28:17 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:28:47 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:29:17 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:29:47 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:30:17 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:30:47 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:31:17 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:31:47 PM	16.28	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:32:17 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:32:47 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:33:17 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:33:47 PM	16.28	86.00	9.85

Project Number	Client	Source	Run Number	Date	Time	O2 (% Vol)	NOX (ppmvd)	CO (ppmvd)
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:34:17 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:34:47 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:35:17 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:35:47 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:36:17 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:36:47 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:37:17 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:37:47 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:38:17 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:38:47 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:39:17 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:39:47 PM	16.28	86.00	10.30
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:40:17 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:40:47 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:41:17 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:41:47 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:42:17 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:42:47 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:43:17 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:43:47 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:44:17 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:44:47 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:45:17 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:45:47 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:46:17 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:46:47 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:47:17 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:47:47 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:48:17 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:48:47 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:49:17 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:49:47 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:50:17 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:50:47 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:51:17 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:51:47 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:52:17 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:52:47 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:53:17 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:53:47 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:54:17 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:54:47 PM	16.28	87.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:55:17 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:55:47 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:56:17 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:56:47 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:57:17 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:57:47 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:58:17 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:58:47 PM	16.38	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:59:17 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	1:59:47 PM	16.38	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	2:00:17 PM	16.38	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	2:00:47 PM	16.38	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	2:01:17 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	2:01:47 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 4	5/24/2012	2:02:17 PM	16.28	86.50	9.35
		Run Averages				16.28	86.51	9.65
0181	Enterprise Products	South Carlsbad #2		5/24/2012	2:02:47 PM	-0.01	86.50	9.35
0181	Enterprise Products	South Carlsbad #2		5/24/2012	2:03:17 PM	***-0.01***	***90.40***	***99.50***
0181	Enterprise Products	South Carlsbad #2		5/24/2012	2:03:47 PM	20.80	0.00	0.00
0181	Enterprise Products	South Carlsbad #2		5/24/2012	2:04:17 PM	***20.90***	***0.00***	***0.00***
0181	Enterprise Products	South Carlsbad #2		5/24/2012	2:04:38 PM	16.28	86.65	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:05:08 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:05:38 PM	16.28	87.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:06:08 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:06:38 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:07:08 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:07:38 PM	16.28	86.50	9.85

Project Number	Client	Source	Run Number	Date	Time	O2 (% Vol)	NOX (ppmvd)	CO (ppmvd)
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:08:08 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:08:38 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:09:08 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:09:38 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:10:08 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:10:38 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:11:08 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:11:38 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:12:08 PM	16.28	87.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:12:38 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:13:08 PM	16.28	87.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:13:38 PM	16.28	87.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:14:08 PM	16.38	86.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:14:38 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:15:08 PM	16.38	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:15:38 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:16:08 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:16:38 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:17:08 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:17:38 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:18:08 PM	16.38	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:18:38 PM	16.38	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:19:08 PM	16.38	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:19:38 PM	16.38	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:20:08 PM	16.38	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:20:38 PM	16.38	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:21:08 PM	16.38	86.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:21:38 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:22:08 PM	16.38	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:22:38 PM	16.38	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:23:08 PM	16.38	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:23:38 PM	16.38	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:24:08 PM	16.38	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:24:38 PM	16.38	87.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:25:08 PM	16.38	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:25:38 PM	16.38	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:26:08 PM	16.38	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:26:38 PM	16.38	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:27:08 PM	16.38	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:27:38 PM	16.38	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:28:08 PM	16.38	87.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:28:38 PM	16.38	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:29:08 PM	16.38	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:29:38 PM	16.38	86.50	10.30
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:30:08 PM	16.38	87.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:30:38 PM	16.38	87.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:31:08 PM	16.38	87.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:31:38 PM	16.38	87.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:32:08 PM	16.38	87.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:32:38 PM	16.28	87.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:33:08 PM	16.28	87.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:33:38 PM	16.38	87.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:34:08 PM	16.38	87.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:34:38 PM	16.38	87.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:35:08 PM	16.38	87.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:35:38 PM	16.38	87.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:36:08 PM	16.28	87.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:36:38 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:37:08 PM	16.28	87.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:37:38 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:38:08 PM	16.28	87.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:38:38 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:39:08 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:39:38 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:40:08 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:40:38 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:41:08 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:41:38 PM	16.28	87.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:42:08 PM	16.28	87.00	9.85

Project Number	Client	Source	Run Number	Date	Time	O2 (% Vol)	NOX (ppmvd)	CO (ppmvd)
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:42:38 PM	16.28	88.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:43:08 PM	16.28	88.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:43:38 PM	16.28	89.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:44:08 PM	16.28	89.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:44:38 PM	16.28	89.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:45:08 PM	16.28	89.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:45:38 PM	16.28	89.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:46:08 PM	16.28	89.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:46:38 PM	16.28	90.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:47:08 PM	16.28	90.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:47:38 PM	16.28	90.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:48:08 PM	16.28	90.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:48:38 PM	16.28	90.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:49:08 PM	16.28	90.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:49:38 PM	16.28	89.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:50:08 PM	16.28	89.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:50:38 PM	16.28	89.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:51:08 PM	16.28	89.00	10.30
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:51:38 PM	16.28	89.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:52:08 PM	16.28	89.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:52:38 PM	16.28	88.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:53:08 PM	16.28	88.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:53:38 PM	16.28	87.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:54:08 PM	16.28	87.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:54:38 PM	16.28	87.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:55:08 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:55:38 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:56:08 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:56:38 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:57:08 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:57:38 PM	16.28	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:58:08 PM	16.18	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:58:38 PM	16.18	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:59:08 PM	16.18	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	2:59:38 PM	16.18	86.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	3:00:08 PM	16.18	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	3:00:38 PM	16.18	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	3:01:08 PM	16.18	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	3:01:38 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	3:02:08 PM	16.18	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	3:02:38 PM	16.18	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	3:03:08 PM	16.18	86.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	3:03:38 PM	16.28	86.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	3:04:08 PM	16.28	86.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 5	5/24/2012	3:04:38 PM	16.28	86.00	8.85
		Run Averages				16.30	87.07	9.56
0181	Enterprise Products	South Carlsbad #2		5/24/2012	3:05:08 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2		5/24/2012	3:05:38 PM	-0.01	90.50	99.60
0181	Enterprise Products	South Carlsbad #2		5/24/2012	3:06:08 PM	***-0.01***	***90.50***	***99.60***
0181	Enterprise Products	South Carlsbad #2		5/24/2012	3:06:38 PM	20.85	0.00	0.00
0181	Enterprise Products	South Carlsbad #2		5/24/2012	3:07:08 PM	***20.85***	***0.00***	***0.00***
0181	Enterprise Products	South Carlsbad #2		5/24/2012	3:07:13 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:07:43 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:08:13 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:08:43 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:09:13 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:09:43 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:10:13 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:10:43 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:11:13 PM	16.28	86.00	9.70
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:11:43 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:12:13 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:12:43 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:13:13 PM	16.28	86.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:13:43 PM	16.28	86.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:14:13 PM	16.28	86.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:14:43 PM	16.28	86.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:15:13 PM	16.28	86.00	8.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:15:43 PM	16.28	86.00	9.35

Project Number	Client	Source	Run Number	Date	Time	O2 (% Vol)	NOX (ppmvd)	CO (ppmvd)
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:16:13 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:16:43 PM	16.28	86.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:17:13 PM	16.28	86.05	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:17:43 PM	16.28	86.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:18:13 PM	16.28	86.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:18:43 PM	16.28	86.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:19:13 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:19:43 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:20:13 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:20:43 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:21:13 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:21:43 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:22:13 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:22:43 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:23:13 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:23:43 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:24:13 PM	16.28	86.05	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:24:43 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:25:13 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:25:43 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:26:13 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:26:43 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:27:13 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:27:43 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:28:13 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:28:43 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:29:13 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:29:43 PM	16.28	86.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:30:13 PM	16.28	85.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:30:43 PM	16.28	86.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:31:13 PM	16.28	86.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:31:43 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:32:13 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:32:43 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:33:13 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:33:43 PM	16.28	85.50	10.30
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:34:13 PM	16.28	86.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:34:43 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:35:13 PM	16.28	85.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:35:43 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:36:13 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:36:43 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:37:13 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:37:43 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:38:13 PM	16.28	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:38:43 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:39:13 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:39:43 PM	16.28	85.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:40:13 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:40:43 PM	16.28	85.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:41:13 PM	16.28	85.55	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:41:43 PM	16.28	85.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:42:13 PM	16.28	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:42:43 PM	16.28	85.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:43:13 PM	16.28	85.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:43:43 PM	16.28	85.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:44:13 PM	16.28	85.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:44:43 PM	16.28	85.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:45:13 PM	16.28	85.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:45:43 PM	16.28	85.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:46:13 PM	16.28	85.50	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:46:43 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:47:13 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:47:43 PM	16.28	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:48:13 PM	16.28	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:48:43 PM	16.28	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:49:13 PM	16.28	85.55	10.30
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:49:43 PM	16.28	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:50:13 PM	16.28	85.00	9.35

Project Number	Client	Source	Run Number	Date	Time	O2 (% Vol)	NOX (ppmvd)	CO (ppmvd)
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:50:43 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:51:13 PM	16.28	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:51:43 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:52:13 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:52:43 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:53:13 PM	16.28	85.50	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:53:43 PM	16.28	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:54:13 PM	16.28	85.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:54:43 PM	16.28	85.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:55:13 PM	16.28	85.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:55:43 PM	16.28	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:56:13 PM	16.28	85.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:56:43 PM	16.28	85.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:57:13 PM	16.28	85.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:57:43 PM	16.28	85.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:58:13 PM	16.28	85.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:58:43 PM	16.18	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:59:13 PM	16.28	85.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	3:59:43 PM	16.28	85.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	4:00:13 PM	16.28	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	4:00:43 PM	16.20	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	4:01:13 PM	16.18	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	4:01:43 PM	16.28	85.00	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	4:02:13 PM	16.28	85.00	8.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	4:02:43 PM	16.28	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	4:03:13 PM	16.28	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	4:03:43 PM	16.28	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	4:04:13 PM	16.18	85.55	9.35
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	4:04:43 PM	16.28	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	4:05:13 PM	16.18	85.50	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	4:05:43 PM	16.18	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	4:06:13 PM	16.18	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	4:06:43 PM	16.18	85.00	9.85
0181	Enterprise Products	South Carlsbad #2	Run 6	5/24/2012	4:07:13 PM	16.18	85.50	9.85
		Run Averages				16.27	85.53	9.49
0181	Enterprise Products	South Carlsbad #2		5/24/2012	4:07:43 PM	16.18	85.50	9.85
0181	Enterprise Products	South Carlsbad #2		5/24/2012	4:08:13 PM	-0.01	90.20	99.30
0181	Enterprise Products	South Carlsbad #2		5/24/2012	4:08:43 PM	***-0.01***	***90.20***	***99.30***
0181	Enterprise Products	South Carlsbad #2		5/24/2012	4:09:13 PM	-0.01	90.20	99.30
0181	Enterprise Products	South Carlsbad #2		5/24/2012	4:09:43 PM	20.90	0.00	0.00
0181	Enterprise Products	South Carlsbad #2		5/24/2012	4:10:13 PM	***20.90***	***0.00***	***-0.50***
0181	Enterprise Products	South Carlsbad #2		5/24/2012	4:10:43 PM	20.90	0.00	-0.55
0181	Enterprise Products	South Carlsbad #2		5/24/2012	4:11:13 PM	20.90	0.00	-0.55
0181	Enterprise Products	South Carlsbad #2		5/24/2012	4:11:43 PM	20.90	0.00	-0.50
0181	Enterprise Products	South Carlsbad #2		5/24/2012	4:12:13 PM	20.90	0.00	-0.50
0181	Enterprise Products	South Carlsbad #2		5/24/2012	4:12:43 PM	20.90	0.00	-0.50
0181	Enterprise Products	South Carlsbad #2		5/24/2012	4:13:13 PM	20.90	0.00	-0.50

SPECIALTY GASES OF AMERICA, INC.
AMERICAN INDUSTRIAL GASES, INC.
AMERICAN RARE GASES, INC

6055 BRENT DR. TOLEDO, OH 43611
419-729-7732 FAX 419-729-2411

THE AMERICAN GAS GROUP

www.americangasgroup.com

ANALYTICAL REPORT

Certificate ID: 110711019 **Date:** 11/7/2011

Customer Name: B&J Welding Supply, TX

Customer Address: 1512 East 50th Street

Lubbock TX 79404

Purchase Order: 17436 **Work Order:** 127416-01

Lot Number: 1024UB11 **Product Name:** 3-Component Mixture, EPA Protocol

Size: A31 **Pressure:** 2210 psig @ 84 Deg F

Content: Ven ID# C12011

Serial #: EB0002836

Analysis Date: 11/2/2011

Shelf Life: 36 months **Expiration Date:** 11/2/2014

Component	Nominal	Actual	Accuracy	Method
Oxygen	12.0%	11.7%	+/- 1% rel	Paramagnetic
Carbon Dioxide	12.0%	12.2%	+/- 1% rel	FTIR
Nitrogen	Balance	Balance		

REFERENCE STANDARD

Std Type	Std #	Cyl #	Concentration	Exp Date
GMIS	0606JG11	EB0001508	15.1500	6/7/2013
GMIS	0625HE10	EB0023062	19.8500	6/28/2012

INSTRUMENTATION

Instrument / ID	Component
Servomex 5200	O2
MKS 2031	CO2

Note: * ANALYZED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS - SEPTEMBER 1997:G1
* DO NOT USE STANDARD WHEN PRESSURE IS BELOW 150 PSIG

Protocal
Specialty Gases of America, Inc

Issued by: Josh Jones

SPECIALTY GASES OF AMERICA, INC.
AMERICAN INDUSTRIAL GASES, INC.
AMERICAN RARE GASES, INC

6055 BRENT DR. TOLEDO, OH 43611
419-729-7732 FAX 419-729-2411

THE AMERICAN GAS GROUP
www.americangasgroup.com

ANALYTICAL REPORT

Certificate ID: 110711012 **Date:** 11/7/2011

Customer Name: B&J Welding Supply, TX

Customer Address: 1512 East 50th Street

Lubbock TX 79404

Purchase Order: 17436 **Work Order:** 127416-03

Lot Number: 1024UA11 **Product Name:** 3-Component Mixture, EPA Protocol

Size: A31 **Pressure:** 2220 psig @ 82 Deg F

Content: Ven ID# C12011

Serial #: EB0004610

Analysis Date: 11/2/2011

Shelf Life: 36 months **Expiration Date:** 11/2/2014

Component	Nominal	Actual	Accuracy	Method
Oxygen	20.9%	20.9%	+/- 1% rel	Paramagnetic
Carbon Dioxide	5.00%	5.10%	+/- 1% rel	FTIR
Nitrogen	Balance	Balance		

REFERENCE STANDARD

Std Type	Std #	Cyl #	Concentration	Exp Date
GMIS	0318XA11	EB0028214	20.9700	3/18/2013
GMIS	0625HE10	EB0023062	19.8500	6/28/2012

INSTRUMENTATION

Instrument / ID	Component
Servomex 5200	O2
MKS 2031	CO2

Note: * ANALYZED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS - SEPTEMBER 1997:G1
* DO NOT USE STANDARD WHEN PRESSURE IS BELOW 150 PSIG

Protocal
Specialty Gases of America, Inc

Issued by: Josh Jones

Global Calibration Gases LLC
1500 15th Avenue Drive East,
#109
Palmetto, FL 34221
Blending Plant &
Analytical Laboratory
Accreditation No: 69191
PGVP Vendor ID: N12011

EPA PROTOCOL GAS MIXTURE

Customer:	B&J Specialty Gas	Reference#:	011612 - 2
CGA:	660	Certification Date:	1/16/12
Customer PO #:		Expiration Date:	1/16/14
Cylinder #:	EB0034805	Pressure, psig:	2000

Method: This standard was analyzed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards, Procedure G1 (September 1997).

ANALYZED CYLINDER –

Components	Certified Concentration	Analytical Accuracy
NO	90.0 ppm	± 1 %
NOx	> 1 %	± 1 %
Propane	105.0 ppm	± 1 %
Methane	109.0 ppm	± 1 %
Carbon Monoxide	99.0 ppm	± 1 %
Nitrogen	BALANCE	-

REFERENCE STANDARD -

Type/SRM Sample	Cylinder#	Concentration
NO/ SRM 2735	Cal015838	784.4 ppm
NOx/ SRM 2735	Cal015838	787.5 ppm
Propane/ GMIS	EB0026425	310.9 ppm
Methane/ GMIS	EB0019166	94.6 ppm
CO/ GMIS	CC118813	95.5 ppm

INSTRUMENT -

Instrument/Model	Serial #	Last Date Calibrated	Analytical Method
California Analytical Instrument Model 600	Y09003	1/5/12	Chemiluminescence
Agilent	US02002031	1/10/12	Thermal conductivity

These mixtures were prepared gravimetrically using a high load high sensitivity electronic scale. Prior to filling the scale is verified for accuracy throughout the target mass range against applicable NIST traceable weights. We certify that the weights are calibrated to ASTM E617-97 Class 1 tolerances. This calibration is referenced by serial # 7210-1, Certificate # 511635 and NIST Inst # 822/272103-06. This report states accurately the results of the investigation made upon the material submitted to the analytical laboratory. Every effort has been made to determine objectively the information requested. However, in connection with this report, Global Calibration Gases LLC shall have no liability in excess of the established charge for this service. Assayed at Global Calibration Gases LLC, Palmetto, Florida. *Do not use this standard when cylinder pressure is below 150 psig.

Principal Analyst: [signature]

Date: 1/16/12

Reviewer: [signature]

Date: 1-16-2012

B&J Welding Supply
Lamesa, Tx

Accreditation No
69191

PGVP Vendor ID
N12012

EPA Protocol
Gas Mixture

Customer:	B&J Welding Supply	Reference#:	011112-1
CGA:	660	Certification Date:	01/11/2012
Customer PO#	17784	Expiration Date:	01/11/2014
Cylinder #:	EB0032807	Pressure, psig:	2000

Method: This standard was analyzed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards, Procedure G1 (September 1997)

Analyzed Cylinder-

Components	Certified Concentration	Analytical Accuracy
Nitric Oxide	251.4 ppm	+/-1%
NOx	<1%	+/-1%
Carbon Monoxide	257 ppm	+/-1%
Methane	248.6 ppm	+/-1%
Propane	251.6 ppm	+/-1%
Nitrogen	Balalnce	-

Reference Standard-

Type/SRM Sample	Cylinder #	Concentration
NO/SRM 2735	Cal015838	784.4 ppm
Nox/ SRM 2735	Cal015838	787.5 ppm
CO/ GMIS	EB0019151	1.96%
Propane/ GMIS	CC80938	2984 ppm
Methane/ GMIS	EB0026384	148.3 ppm

Instrument-

Instrument/ Model	Serial Number	Last Date Calibrated	Analytical Method
California Analytical Instument Model 600	Y09003	01/06/2012	Chemiluminescence
Agilent Quad Series	US02002031	01/11/12	Thermal Conductivity
Rosemount 880A	F-04300088	01/04/2012	Non-Dispersive Infrared

These mixtures were prepared gravimetrically using a high load high sensitivity electronic scale. Prior to filling the scale is verified for accuracy throughout the target mass range against applicable NIST traceable weights.

We certify that the weights are calibrated to ASTM E617-97 Class 1 tolerances. This calibration is referenced by serial # 7210-1, Certificate # 511635 and NIST Inst # 822/272103-06.

This report states accurately the results of the investigation made upon the material submitted to the analytical laboratory. Every effort has been made to determine objectively the information requested. However, in connection with this report, Global Calibration Gases LLC shall have no liability in excess of the established charge for this service. Assayed at Global Calibration Gases LLC, Palmetto, Florida.

*Do not use this standard when cylinder pressure is below 150 psig.

Produced by:

Global Calibration Gases LLC.
1500 15th Avenue Drive, East Suite# 109
Palmetto, Florida 34221
Accreditation No.: 69191
PGVP Vendor ID.: N12012

Principal Analyst: [signature]
Date: 1-11-12

Principal Reviewer: [signature]
Date: 1-11-12

Nolan, Shiver

From:	Heap, James K
Sent:	Monday, May 12, 2014 3:08 PM
To:	'stacktest.aqb@state.nm.us'; Nolan, Shiver
Cc:	Thompson, Roger A; Babinski, Dina J.; Sage, Sondra, NMENV (Sondra.Sage@state.nm.us); Morris, Allan, NMENV
Subject:	Annual Monitoring Report
Attachments:	14-0152-2_EPROD_SCarlsbad_T2_AnnualReport.pdf; 14-0152-1_EPROD_SCarlsbad_T1_AnnualReport.pdf; Test Report T1&T2 Annual monitoring MAY2014.pdf

Pursuant to Section A205 of Permit P130-R2, attached is the submittal form and Periodic Test-report for:
Enterprise Field Services LLC
South Carlsbad Compressor Station
AIRS: 350150044, Operating Permit (Title V): P130-R2

If you have any questions or require further information, please contact me using the info below.

Regards
++++++++++++++++++++++++++++++++
Jim Heap Sr. Field Environmental Scientist
Enterprise Products, LLC
Midland, Texas USA
Office: 432-686-5404
Cell: 432-260-0239
jkheap@eprod.com

New Mexico Environment Department
Air Quality Bureau
1301 Siler Road Building B
Santa Fe, NM 87507
Phone (505) 476-4300 Fax (505) 476-4375

Version 1/1/2010

NMED USE ONLY	
DTS	
TEMPO	

UNIVERSAL STACK TEST NOTIFICATION, PROTOCOL AND REPORT FORM

NMED USE ONLY	
Staff	
Admin	

Submit to: Stacktest.aqb@state.nm.us

I. DATABASE HEADER INFORMATION (drop down menus in bold)

a. AI# **0218**	**Test Report**	**Periodic Test (EPA Method)**
d. Company Name: **Enterprise Field Services LLC**		e. Facility Name: **South Carlsbad Compressor Station**
f. Emission Unit Numbers: **T1, T2**		g. Emission Unit Description (boiler, Waukesha 7042, etc) **Turbines: GE Solar T4702**
h. Reports - Tracking Number from notification response: **CMT**	i. Proposed Test Date: **30MAY2014**	j. Actual test date: **03JAN14,04JAN14**
k. Reason for test (name permit requirement, NSPS, MACT, consent decree, etc. Indicate here is this notification is a revised test date only) **Annual Performance Test of existing engines pursuant to Title V Permit A205 A.**		

II. GENERAL COMPANY AND FACILITY INFORMATION

a.Company Address: **PO Box 4324**			k.. Facility Address: **Roberson Road, Eddy County**		
b. City: **Houston**	c. State: **TX**	d. Zip: **77210**	l. City: **Loving**	m. State: **NM**	n. Zip: **88526**
e. Environmental Contact: **Jim Heap**	f. Title: **Sr. Env. Scientist**		o. Facility Contact: **Dave Kresta**	p. Title: **Area Mgr. - OPS**	
g. Phone Number: **432-686-5404**	h. Cell Number: **432-260-0239**		q. Phone Number: **432-943-1801**	r. Cell Number: **325-277-5728**	
i. Email Address: **jkheap@eprod.com**			s. Email Address: **dkresta@eprod.com**		
j. Title V Permit Number: **P-130-R2**			t. NSR Permit Number: **0220-M7**		

u. Detailed driving directions from nearest New Mexico town:
From Loving: US385N to Roberson Road West
Roberson Road west to station.

III. TESTING FIRM

a. Company: **Nordon Corporation**			g. Contact: **Shunil Jacob**	
b. Address 1: **PO Box 1415**			h. Title: **Operations Manager**	
c. Address 2:			i. Office Phone: **512-355-3786**	j. Cell Phone: **512-750-9226**
d. City: **Round Rock**	e. State: **TX**	f. Zip: **78680**	k. Email Address: **shunil@nordoncorp.com**	

UNIVERSAL STACK TEST NOTIFICATION, PROTOCOL AND REPORT FORM

IV. EMISSION UNIT

a. Emission Unit Number: **1 and 2**	b. Make & Model Number **GE Solar Centaur T-4702**
c. Serial Number: **1. OHD10C7915, 2. OHE12C7057**	d. Permitted Capacity: **3609 hp**

e Exceptions: Explain if test is late, rescheduled, related to an enforcement action:
NA

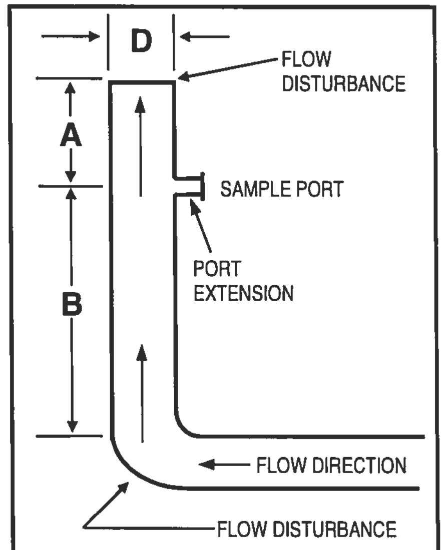
g. Emission Unit Description and brief process name or description:
Natural-gas fired turbines and compressors, processing field gas.

h. Installation Date:	i. Startup Date:	k. Date Reached Max. Capacity:

l. Control Equipment Description as listed in permit (model, ser. # etc. if applicable):
NA

STACK PARAMETERS

m. Velocity (ft/sec):
n. Temperature (ºC):
o. Stack Diameter, D (in.):
p. Distance to Stack Bends or Obstructions:
Upstream, Distance A (in.):
Downstream, Distance B (in.):



EXAMPLE VIEW SHOWING DISTANCES FROM SAMPLE PORT TO FLOW DISTURBANCES

Attach an explanation or drawing to explain any difficult or unusual stack geometry or parameters.

V. POLLUTANTS AND PROPOSED TEST METHODS

Pollutant or Parameter:		Proposed Test Methods (Deviations from approved methods require supporting documentation and prior authorization)	Deviation to Test Method Requested
☐	**Portable Analyzer Methods for NOx, CO, SO_2**		☐
☒	NOx	**EPA Method 7E**	☐
☒	CO	**EPA Method 10**	☐
☐	SO2	**EPA Method 6**	☐
☐	VOCs	**(Specify)**	☐
☐	HAPs	**(Specify)**	☐
☐	PM (TSP)	**EPA Method 5**	☐
☐	PM10	**EPA Method 201**	☐
☐	PM2.5	**(Specify)**	☐
☐	Opacity	**EPA Method 9**	☐
☐	Visual E.	**EPA Method 22**	☐
☐	Stack Flow	**EPA Methods 1 - 3**	☐
☐	Moisture	**EPA Method 4**	☐
☒	Other	**(Specify) Method 3A (O2)**	☐
☒	Other	**(Specify) Method 19 (Stack Flow)**	☐

List Specific VOC's and HAP's:

VI. PROPOSED TEST RUN AND TEST LOAD INFORMATION

a. Number of Test Runs:	b. Run Duration	c. Required by (regulation or permit number):	d. Specific Condition or Section:
3	**00:30:00**	**Title V Permit P130-R2**	**A205 A.**

PLEASE NOTE – Default run duration is 60 minutes, unless otherwise specified by an applicable regulation.

e. Expected Load:	f. Percent of Permitted Capacity:	g. Is this an opacity test?	h. If yes, no. of observation pts.:
	90-110%	Yes ☐ No ☒	

i. If expected load during test is less than 90% of capacity, explain:

NOTE – Failure to test at 90-100% of permitted load will limit unit operation to 110% of tested load until a new initial compliance test is conducted.

PLANT OR UNIT OPERATING PARAMETERS TO BE MONITORED

j. List and explain the plant operating parameters that will be monitored and applicable permit conditions or regulatory standards.

Stack emissions of NOx and CO

VII. ADDITIONAL DETAILS (where applicable)

RATA and INSTRUMENTAL ANALYZER CALIBRATION PROCEDURES

a. Do any of the methods you are proposing utilize instrumental analyzers (i.e.; EPA Methods 3A, 6C, 7E, 10, 18, 25/25A, 320 etc.)? If yes, briefly describe analyzer calibration procedures and/or calibration standard procedures. Enter the highest pollutant concentration expected and the proposed concentrations of calibration gases.	☐ Yes	☒ No

SAMPLING TRAIN LEAK CHECK PROCEDURES

b. Do any of the methods you are proposing utilize the EPA Method 5 sampling train (i.e.; EPA Methods 1-4, 5, 17, 26/26A, 29, etc.)? If yes, briefly describe sampling train and pitot tube leak check procedures:	☐ Yes	☒ No

EPA METHOD 19 IN LIEU OF EPA METHODS 1-4

c. Are you proposing to utilize EPA Method 19 in lieu of EPA Methods 1-4? If yes, explain why you believe this proposal is justified:	☒ Yes	☐ No

Method 19 is being used to avoid specific safety concerns regarding the uninsulated stack (burn hazard).

PLEASE NOTE – EPA Method 19 may be utilized in lieu of EPA Methods 1-4, subject to the approval of the Department. If you are proposing to utilize EPA Method 19 in lieu of EPA Methods 1-4, you MUST include a recent fuel gas heating value analysis as well as a recent fuel flow meter calibration certificate, preferably conducted on the day of the test, but no earlier than three months prior to the test date. If the analyses have been conducted prior to the test date, you MUST append the certificates to the protocol. If conducted on the day of the test, you MUST append the certificates to the final test report.

VIII. ATTACHMENTS (as needed to support proposed test; check all that apply)	
NOTIFICATION/PROTOCOL ATTACHMENTS	
☐	Road Map Indicating Directions from Nearest New Mexico Town to Facility
☐	Schematic of process being tested showing emission points, sampling sites and stack cross-section
☐	Copy of proposed test methods (except for those promulgated test methods found in 40 CFR 51, 60, 61 and 63)
☐	Fuel Heating Value Analysis
☐	Fuel Flow Meter Calibration Certificate
☐	Other:
☐	Other:
TEST REPORT ATTACHMENTS	
☒	**Section 2. Tables of Results**
☐	**Supporting Documents (Specify)**
Retain Report Section 3 - Test Procedures, Data, Calculations, Appendices – 2 years NSR permits, 5 years TV	

IX. CERTIFICATION		
This document has been prepared under my supervision and is accurate and complete to the best of my knowledge. I understand that acceptance of this protocol does not waive the requirements of any permit or regulation. I understand that any procedural errors or omissions are the sole responsibility of the permit holder.		
Signature: James K Heap	Print Name and Title: **James K. Heap, Senior Environmental Scientist**	Date: **12MAY2014**
Responsible Official for Title V? ☐ Yes	☒ No (R.O signature not required for routine periodic testing)	

Heap, James K

From: Sage, Sondra, NMENV <Sondra.Sage@state.nm.us>
Sent: Thursday, May 01, 2014 4:11 PM
To: Heap, James K
Cc: Morris, Allan, NMENV; Samaniego, Robert, NMENV
Subject: FW: Test Substitution Request

Mr. Heap,

Following a review of the additional information you provided regarding the previous periodic test, it appears that the test conducted for Initial GG compliance falls within the required timeframe for the Annual Monitoring test. If you wish to reformat the results and use them for the Annual Monitoring Test, please submit a test protocol showing the test as the Annual Monitoring Test , then submit the results in the appropriate format. This will essentially qualify as a case of enforcement discretion, since it will require waiving the 30 day notice for the test, as well as the requirement to report the test in a timely manner. This acceptance of the GG Initial Test results for the Annual Monitoring Test is applicable only to this instance. If, in future, you wish to use the results of a single testing event to comply with two requirements, it will be necessary to submit timely testing notifications and testing results indicating this is the case. It will not be acceptable to request this after the fact in future instances.

Sondra Sage
Compliance Specialist
NMED-Air Quality Bureau
525 Camino de los Marquez, Suite 1
Santa Fe, NM 87505
(505)476-4358
"Never cruel nor cowardly. Never give up, never give in." – the Doctor

From: Morris, Allan, NMENV
Sent: Wednesday, April 30, 2014 10:30 AM
To: Sage, Sondra, NMENV
Cc: Samaniego, Robert, NMENV
Subject: FW: Test Substitution Request

From: Heap, James K [mailto:JKHEAP@eprod.com]
Sent: Tuesday, April 29, 2014 6:11 PM
To: Morris, Allan, NMENV; Nolan, Shiver
Cc: Thompson, Roger A; Babinski, Dina J.; Shunil Jacob
Subject: Test Substitution Request

Pursuant to your request during our phone call today, I am providing you detail regarding Enterprise's desire to utilize our January Initial GG test for the permit required Annual Monitoring Test at the South Carlsbad Compressor Station (0218).

Annual Emission Test Report
for one
Solar Centaur T4702 Compressor Turbine
Unit Number T1
located at the
South Carlsbad Compressor Station

Prepared for
Enterprise Field Services, LLC
P. O. Box 4324
Houston, TX 77210

January 2014
Nordon Project No. 14-0152-1

This test report has been reviewed and approved for submittal to the New Mexico Environment Department (NMED) by the following representatives:

Donald W. Haynes Nordon Corporation	Enterprise Field Services, LLC

NORDON *CORPORATION*

P. O. Box 1415 Round Rock, Texas 78680
Phone (512) 355-3786 Fax (512) 355-3785

SUMMARY OF RESULTS

Exhaust emission testing was performed on one Solar Centaur T4702 (Unit # T1) compressor turbine for Enterprise Field Services, LLC located at the South Carlsbad Compressor Station, near Loving, Eddy County, New Mexico. The turbine is used for natural gas compression. The testing was performed to demonstrate the continued compliance with the emission limits set forth in the NMED permit. Nordon Corporation of Round Rock, Texas, performed the exhaust emissions testing on January 3, 2014.

Continuous emission instruments housed in a mobile analysis unit were used to determine the concentrations of NO_X, CO, and O_2 in the exhaust stack of the compressor turbine. The following Code of Federal Regulations, Title 40, Part 60 (40CFR60), Appendix A reference methods were used to determine stack gas concentrations: Method 7E for nitrogen oxides (NO_X), Method 10 for carbon monoxide (CO), and Method 3A for oxygen (O_2). Mass emission rates were determined stoichiometrically according to Method 19 data reduction procedures using measured fuel flow rate.

Three thirty-minute test runs were performed on the exhaust of the turbine while firing on natural gas. The results of the testing are presented in a summary of results table. This table includes all the relevant information pertaining to the turbine/compressor operations, exhaust emissions, and ambient conditions. Exhaust concentrations are presented in part per million by volume (ppmv) or percent (%) by volume. The mass emission rates are presented in pound per hour (lb/hr) and ton per year (tpy). Turbine/compressor operational data was collected during each test run.

Summary of Results

NORDON CORPORATION

P.O. Box 1415 Round Rock, Texas 78680
PHONE (512) 355-3786 • FAX (512)355-3785

Plant: South Carlsbad Compressor Station
Facility Owner:Enterprise Field Services, LLC
Location: Loving, Eddy County, New Mexico
Unit Make/Model: Solar Centaur T4702
Unit Number: T1 , Ser. No.OHD10C7915
Test Personnel: DWH / KRJ

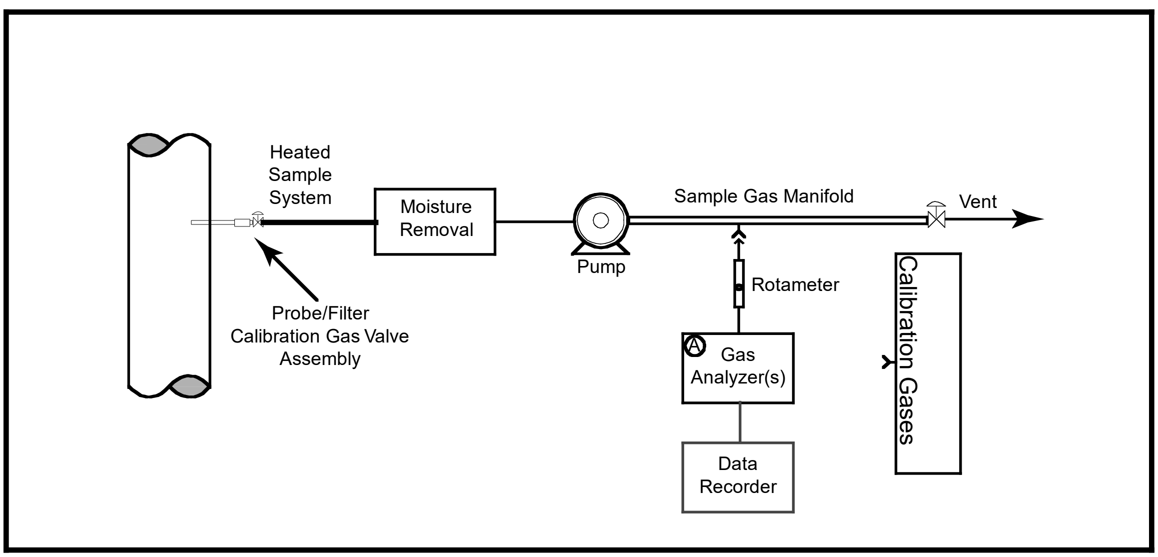
RUN NUMBER	DH-010314.01	DH-010314.02	DH-010314.03	
Date	1/3/14	1/3/14	1/3/14	
Start Time (hr)	9:23	10:12	10:49	
Stop Time (hr)	10:04	10:42	11:19	
TURBINE DATA				
Rated Horsepower (Hp)	3609	3609	3609	
Fuel Pressure (psig)	193	195	207	
Gas Producer Speed (%)	94.8	94.8	94.8	
Power Turbine Speed (%)	92.8	92.3	91.9	
Turbine Compressor Discharge Pressure (psig)	105	104	102	
Exhaust Temperature (°F)	1078	1082	1091	
Horsepower (Hp)	3508	3478	3418	
Heat Rate (MMBtu/hr)	43.0	43.0	42.4	
COMPRESSOR DATA				
Suction Pressure (psig)	293	294	295	
Suction Temperature (°F)	58	62	64	
Discharge Pressure (psig)	529	532	535	
Discharge Temperature (°F)	145	147	148	
Gas Production (MMscfd)	37	38	37	
FUEL & EXHAUST DATA				
O2 F-factor (dscf/MMBtu)	8698	8698	8698	
Fuel Heating Value (HHV Btu/scf)	1098	1098	1098	
Stoichiometric Exhaust Flow (dscfh)	1.94E+06	1.96E+06	1.96E+06	
AMBIENT CONDITIONS				
Temperature (°F): Dry bulb	39	44	47	
Temperature (°F): Wet bulb	32	37	39	
Atmospheric Pressure ("Hg)	26.90	26.88	26.84	
Humidity (lb water/lb air)	0.0026	0.0035	0.0037	
Humidity (% vol)	0.4	0.5	0.6	
MEASURED EXHAUST OUTLET CONCENTRATIONS				**AVERAGES**
NOx (ppmv)	74.0	74.1	75.0	**74.4**
CO (ppmv)	15.2	14.0	13.7	**14.3**
O2 (%)	16.9	16.9	17.0	**16.9**
EMISSION RATES				
NOx (lb/hr) LIMIT=27.0	17.14	17.36	17.57	**17.35**
CO (lb/hr) LIMIT=7.4	2.14	2.00	1.95	**2.03**
NOx (tpy, @8760 hr/yr) LIMIT=118.3	75.06	76.03	76.95	**76.01**
CO (tpy, @8760 hr/yr) LIMIT=32.5	9.39	8.77	8.55	**8.91**

PROCEDURES

Continuous emission instruments housed in the mobile analysis unit were used to determine the concentrations of pollutants found in the turbine exhaust stack. The following 40CFR60, Appendix A reference methods were used to determine stack gas concentrations: Method 7E for NO_X, Method 10 for CO, and Method 3A for O_2. Mass emission rates were determined according to data reduction procedures provided in Method 19.

As depicted in Figure 1, Sample System and Instrumentation, a stainless steel sample probe was located in the centroid of the stack. Sample gas enters the stainless steel probe into a stainless steel 3-way valve. The 3-way valve is used to perform leak checks and sample system bias checks. From the valve, the gas flows through a 3/8" Teflon® heat traced sample line to a stainless steel minimum contact condenser to dry the sample. From the condenser, a 3/8" Teflon sample line brings the exhaust gas to a manifold in the mobile analysis unit via a Teflon-lined diaphragm pump. The manifold partitions the gas through quick-connects so that each instrument can directly sample exhaust gas. Each instrument is equipped with a rotometer to maintain correct sample pressure and flow. The instruments are connected to a computer data acquisition system to document its response during quality assurance activities and testing.

Figure 1: Sample System and Instrumentation



(A) Gas Analyzers - NO_X, CO, O_2

Analyzer Make	Analyzer Model	Detection Principle
NO_X Analyzer: Thermo Environmental	42i-HL	Chemiluminescence
CO Analyzer : Thermo Environmental	48i-HL	Non-dispersive Infra-red
O_2 Analyzer: Thermo Environmental	48i-HL	Paramagnetic Cell

A continuous analyzer is used to determine NO_X concentrations according to EPA Reference Method 7E. This instrument employs a chemiluminescent detection principle. The NO_X concentration and mass emission rates are expressed as NO_2 per the reference method.

A continuous analyzer is used to determine CO concentrations according to EPA Reference Method 10. The instrument employs a nondispersive infrared detector coupled to a gas filter correlation wheel, which eliminates the interferences due to water and carbon dioxide.

A continuous analyzer is used to determine O_2 concentrations according to EPA Reference Method 3A. The instrument is equipped with either an electrochemical or paramagnetic cell.

Data obtained from the continuous emission analyzers were recorded by a National Instruments data acquisition (DAQ) system using Labview software. A copy of the DAQ records can be found in the appendix of this report.

Quality assurance activities meeting the requirements of the EPA reference methods were performed during the turbine testing. Tables documenting quality assurance procedures are located in the appendix of this report.

Exhaust flow rate was determined according to the data reduction procedures provided in EPA Method 19. The O_2 F-Factor used in the emission rate calculation was either calculated based on a recent fuel analysis or the standard 8710 value for natural gas provided by EPA Method 19.

Nordon personnel recorded turbine compressor operating parameters. Ambient conditions were collected using a wet/dry bulb sling psychrometer to measure temperature and a barometer to measure absolute atmospheric pressure.

APPENDIX

Field Data Sheets
Example Calculations
Gas Certifications
Quality Assurance Activities
DAQ Records

C_1	86.893
C_2	6.8402
C_3	2.5624
$n-C_4$	0.5497
$i-C_4$	0.2817
$n-C_5$	0.0813
$i-C_5$	0.0928
C_6	0.0534
C_7+	0.0813
N_2	1.1928
CO_2	1.4528

Plant: South Carlsbad Compressor Station
Facility Owner: Enterprise
Unit Owner: Enterprise
Location: Loving, Eddy County, New Mexico
Applicable Regulation: 40CFR60, Subpart GG
Unit Make/Model: Solar Centaur T-4702
Unit Number: T1 Ser. No. OHD10C7915
Test Personnel: DWH / KRJ
Date: 1/3/14

Run Number	01	02	03	04	05	06	07	08	09	10	11	12
Start Time / ~~Stop Time~~	~~1023~~ 923	~~1112~~ 1012	~~1449~~ 1249	~~1225~~ 1126	~~1203~~ 1203	~~1340~~ 1240	~~1417~~ 1317	~~1454~~ 1354	1431	1508	1545	1622
Turbine/Compressor Operation												
Load Condition	Max	Max	Max									
Fuel Flow (Mscfd)	941	941	926	847	871	865	652	890	884	636	741	677
Fuel Flow (scfh)												
Power Turbine Speed (%)	92.8	92.3	9.19	91.4	90.9	90.6	90.1	89.4	89.1	89.3	89.2	89.8
Gas Producer Speed (%)	94.8	94.8	94.8	94.7	94.8	94.8	94.8	94.8	94.8	94.8	94.8	94.8
Horsepower (hp)												
Rated Horsepower (hp)	3609	3609	3609	3609	3609	3609	3609	3609	3609	3609	3609	3609
% Load												
Turbine Compressor Discharge, PCD (psig)	105	104	102	102	100	99	98	98	97	98	98	100
Turbine Temperature T5 (°F)	1078	1082	1091	1092	1100	1102	1109	1111	1113	1106	1104	1103
Gas Compressor Suction Pressure (psig)	293	294	295	296	300	304	307	311	313	314	314	313
Gas Compressor Discharge Pressure (psig)	~~58~~ 529	532	535	530	523	521	523	524	526	527	529	531
Gas Compressor Suction Temperature (°F)	58	62	64	64	68	70	72	74	74	76	72	70
Gas Compressor Discharge Temperature (°F)	145	147	148	148	151	152	152	153	155	156	151	148
Fuel Gas Pressure (psig)	193	195	207	191	189	190	195	191	195	191	189	192
Gas Flow (MMscfd)	~~27~~ 37	38	37	38	37	37	37	37	37	38	39	40
Alt. ft.	2880	2900	2940	2960	3000	3020	3040	3060	3060	3080	3030	3100
Ambient Conditions												
Barometric Pressure (absolute In. Hg)	26.90	24.86	26.84	26.82	24.78	26.76	26.74	26.72	24.72			
Temperature Dry (°F)	39	44	47	49	55	60	62	67	68	65	63	55
Temperature Wet (°F)	32	37	37	40	43	46	47	49	49	48	47	44

Testing by Nordon Corporation

Certificate of Analysis

Number: 1030-14010388-001A

Houston Laboratories
8820 Interchange Drive
Houston, TX 77054
Phone 713-660-0901

Thor Olsen
Nordon Corporation
PO Box 1415
Round Rock, TX 78680

Jan. 21, 2014

Station Name:	South Calrsbad Compressor Stition	Sampled By:	
Station Location:	Loving, NM	Sample Of:	Gas Spot
Sample Point:	Turbine Fuel Gas	Sample Date:	01/04/2014 10:00
Cylinder No:	0298	Sample Conditions:	190 psig, @ 65 °F
Analyzed:	01/16/2014 05:34:22 by JD	Method:	GPA-2261M

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.65 psia
Nitrogen	1.204	1.797	
Carbon Dioxide	1.556	3.648	
Methane	86.800	74.184	
Ethane	6.877	11.016	1.834
Propane	2.516	5.911	0.691
Iso-butane	0.292	0.904	0.095
n-Butane	0.552	1.709	0.173
Iso-pentane	0.086	0.331	0.031
n-Pentane	0.072	0.277	0.026
Hexanes Plus	0.045	0.223	0.020
	100.000	100.000	2.870

GPM TOTAL C2+	2.870
GPM TOTAL C3+	1.036
GPM TOTAL iC5+	0.077

Physical Properties	**Total**	**C6+**
Relative Density Real Gas	0.6496	3.2176
Calculated Molecular Weight	18.77	93.19
Compressibility Factor	0.9973	
GPA 2172-09 Calculation:		
Calculated Gross BTU per ft³ @ 14.65 psia & 60°F		
Real Gas Dry BTU	1097	5113
Water Sat. Gas Base BTU	1078	5024

Comments: H2O Mol% : 1.750 ; Wt% : 1.681
Reran Sample Confirmed GC Analysis

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

Fuel Gas Analysis

Gross Btu/scf	**1098**
O_2 F-Factor dscf/MMBtu	**8698**
O_2 F-Factor (wscf/MMBtu)	**10660**
H_2O F-Factor (scf/MMBtu)	**1962**
CO_2 F-Factor (scf CO_2/MMBtu)	**1058**
Btu/lb	**22164**
Sp. Gr.	**0.6516**
F_o	**1.719**
Moisture Factor	**18.407**
VOC Fraction	**0.063**

Compound	**Mol. Formula**	**Mol. %**
Methane	CH4	86.800
Ethane	C2H6	6.877
Propane	C3H8	2.516
Isobutane	C4H10	0.292
n-Butane	C4H10	0.552
Isopentane	C5H12	0.086
n-Pentane	C5H12	0.072
NeoPentane	C5H12	
n-Hexane	C6H14	0.045
n-Heptane	C7H16	
n-Octane	C8H18	
Carbon dioxide	CO2	1.556
Nitrogen	N2	1.204
Total		100.000

Chain of Custody Form

REPORT TO:

Company: Nordon Corporation
Contact: Don Haynes
Contact Phone: 512-355-3786
Contact Email: don@nordoncorp.com

PROJECT INFO:

Client Name: Enterprise Products
Facility Name: South Carlsbad Compressor Station
Facility Location: Loving, NM
Project #: 14-0001

LABORATORY INFO:

Company: SPL, Inc.
Address: 8820 Interchange Dr
Address: Houston, TX 77054
Contact: Chris Staley
Contact Info: cstaley@spl-inc.com
Lab Project#:

NORDON Corporation
P.O Box 1415 Round Rock, TX 78680
PH: 512.355.3786 FAX: 512.355.3785

Turn Around Time

☒ Standard
☐ Rush
specify RUSH date(s):

Analysis Requested

Lab ID	Sample Identification	Sample Description	Collection Date	Method 323 (HCHO)	CTM-027 (NH3)	EPA Method 5	EPA Method 201a	EPA Method 202	ASTM D6667	ASTM D1945	Sample Matrix	Container Type	Remarks (volumes,special notes, etc.)
	1030-00406	natural gas	1/4/14						x	x	natural gas	cylinder	
	1030-00298	natural gas	1/4/14						x	x	natural gas	cylinder	

Relinquished By:	Date:	Relinquished By:	Date:	NOTES:
[signature]	1-13-14			
Received By: [signature]	**Date:** 1-13-14	**Received By:** JAVIERCISO2	**Date:** 1/14/14 15:07	

Page 1 of 1

Example Calculations: Method 7E Concentration Correction

Test Run #: DH-010314.01 **Component:** NOx

Observed Measurements/Data:		**Scale, Certified Concentrations**	
	Direct Calibration Results		
0.17	NOx direct zero, Cdiro	94.7	NOx chart scale, CS
95.20	NOx direct span, Cdirm	94.7	NOx actual calibration gas concentration, Cma
	System Calibration Results	0	Actual low-level gas concentration, Coa
2.74	NOx, initial zero reading, Csoi		
92.63	NOx inital span reading, Csmi		
2.72	NOx final zero reading, Cof		
91.44	NOx final span reading, Csmf		
	Run Results		
72.48	NOx run average, Caverage		

Bias Check Initial Zero (SBoi)

$$SBoi = \frac{(Csoi - Cdiro)}{CS}$$

= **2.71 (%)**

Bias Check Initial Span (SBmi)

$$SBmi = \frac{(Csmi - Cdirm)}{CS}$$

= **-2.72 (%)**

Bias Check Final Zero (SBof)

$$SBof = \frac{(Csof - Cdiro)}{CS}$$

= **2.69 (%)**

Bias Check Final Span (SBmf)

$$SBmf = \frac{(Csmf - Cdirm)}{CS}$$

= **-3.97 (%)**

Drift Check Zero (Do)

$$|SBof - SBoi|$$

= 0.03

Drift Check Span (Ds)

$$|SBmf - SBmi|$$

= 1.26

Bias- Average Zero (Coavg)

$$= \left(\frac{Csoi + Csof}{2}\right)$$

= 2.730 (ppmv)

Bias-Average Span (Cmavg)

$$= \left(\frac{CSmi + CSmf}{2}\right)$$

= 92.04 (ppmv)

NOx Concentration Correction

$$= (Caverage - Coavg) \times \left(\frac{Cma}{Cmavg - Coavg}\right)$$

74.0 (ppmv)

Example Calculations: Method 7E Concentration Correction

Test Run #: DH-010314.01 **Component:** **CO**

Observed Measurements/Data:		**Scale, Certified Concentrations**	
	Direct Calibration Results		
-0.02	CO direct zero, Cdiro	193	CO chart scale, CS
193.21	CO direct span, Cdirm	193	CO actual calibration gas concentration, Cma
	System Calibration Results	0	Actual low-level gas concentration, Coa
-0.71	CO, initial zero reading, Csoi		
192.18	CO inital span reading, Csmi		
-1.00	CO final zero reading, Cof		
191.53	CO final span reading, Csmf		
	Run Results		
14.33	CO run average, Caverage		

Bias Check Initial Zero (SBoi)

$$SBoi = \frac{(Csoi - Cdiro)}{CS}$$

= **-0.35 (%)**

Bias Check Initial Span (SBmi)

$$SBmi = \frac{(Csmi - Cdirm)}{CS}$$

= **-0.53 (%)**

Bias Check Final Zero (SBof)

$$SBof = \frac{(Csof - Cdiro)}{CS}$$

= **-0.50 (%)**

Bias Check Final Span (SBmf)

$$SBmf = \frac{(Csmf - Cdirm)}{CS}$$

= **-0.87 (%)**

Drift Check Zero (Do)

$$|SBof - SBoi|$$

= 0.15

Drift Check Span (Ds)

$$|SBmf - SBmi|$$

= 0.34

Bias- Average Zero (Coavg)

$$= \left(\frac{Csoi + Csof}{2}\right)$$

= -0.851 (ppmv)

Bias-Average Span (Cmavg)

$$= \left(\frac{CSmi + CSmf}{2}\right)$$

= 191.85 (ppmv)

CO Concentration Correction

$$= (Caverage - Coavg) \times \left(\frac{Cma}{Cmavg - Coavg}\right)$$

15.2 (ppmv)

Example Calculations: Method 7E Concentration Correction

Test Run #: DH-010314.01 **Component: O2**

Observed Measurements/Data:		**Scale, Certified Concentrations**	
	Direct Calibration Results	20.92	O2 chart scale, CS
0.05	O2 direct zero, Cdiro	10.99	O2 actual calibration gas Concentration, Cma
11.02	O2 direct span, Cdirm	0	Actual low-level gas Concentration, Coa
	System Calibration Results		
0.05	O2, initial zero reading, Csoi		
10.98	O2 inital span reading, Csmi		
0.16	O2 final zero reading, Csof		
10.99	O2 final span reading, Csmf		
	Run Results		
16.81	O2 run average, Caverage		

Bias Check Initial Zero (SBoi)

$$SBoi = \frac{(Csoi - Cdiro)}{CS}$$

= **0.03 (%)**

Bias Check Initial Span (SBmi)

$$SBmi = \frac{(Csmi - Cdirm)}{CS}$$

= **-0.18 (%)**

Bias Check Final Zero (SBof)

$$SBof = \frac{(Csof - Cdiro)}{CS}$$

= **0.55 (%)**

Bias Check Final Span (SBmf)

$$SBmf = \frac{(Csmf - Cdirm)}{CS}$$

= **-0.16 (%)**

Drift Check Zero (Do)

$$|SBof - SBoi|$$

= 0.51

Drift Check Span (Ds)

$$|SBmf - SBmi|$$

= 0.02

Bias- Average Zero (O2avg)

$$= \left(\frac{Csoi + Csof}{2}\right)$$

= 0.107 (%)

Bias-Average Span (Cmavg)

$$= \left(\frac{CSmi + CSmf}{2}\right)$$

= 10.99 (%)

O2 Concentration Correction

$$= (Caverage - Coavg) \times \left(\frac{Cma}{Cmavg - Coavg}\right)$$

16.9 (%)

Example Calculations: Method 19 Exhaust Flow

Test Run #: DH-010314.01 **Component: Stack Flow**

Observed Measurements/Data:		Standards/Constants/Conversion Factors	
39208	Fuel Flow Rate (scfh)	1000000	Btu per MMBtu
8698	Fuel O2 F-Factor (dscf/MMBtu)	20.9	O2 % in air
1098	Fuel Heating Value (Btu/scf)		
16.9	O2 final concentration (%)		

Derivation of Exhaust Flow using Equation 19-1 from Method 19

$$E\left(\frac{lb}{MMBtu}\right) = C_d\left(\frac{lb}{scf}\right)F_d\left(\frac{dscf}{MMBtu}\right)\times\frac{20.9}{\left(20.9-\%O_2\right)}$$ Eq. 19-1

divide each side of equation by Cd to obtain the following

$$\left(\frac{scf}{MMBtu}\right) = F_d\left(\frac{dscf}{MMBtu}\right)\times\frac{20.9}{\left(20.9-\%O_2\right)}$$

multiply each side of equation by heat input (MMBtu/hr)

$$\left(\frac{scf}{hr}\right) = HeatInput\left(\frac{MMBtu}{hr}\right)\times F_d\left(\frac{dscf}{MMBtu}\right)\times\frac{20.9}{\left(20.9-\%O_2\right)}$$

Fuel Gas Heat Rate/Heat Input (MMBtu/hr)

$$= \left(\text{Fuel Flow Rate }\frac{scf}{hr}\right)\times\left(\text{Fuel Heating Value }\frac{Btu}{scf}\right)\times\left(\frac{1MMBtu}{1000000\,Btu}\right)$$

= 43.04 (MMBtu/hr)

Stack Gas Volumetric Flow Rate, Q (dscfh)

$$= \left(\text{HeatInput }\frac{MMBtu}{hr}\right)\times\left(\text{Fuel O}_2\text{ F-Factor }\frac{dscf}{MMBtu}\right)\times\left(\frac{20.9}{20.9-O_2}\right)$$

= 1.94E+06 (dscfh)

Example Calculations: Emissions Calculations

Test Run #: DH-010314.01 **Component: NOx**

Observed Measurements/Data:		**Standards/Constants/Conversion Factors**	
74.0	NOx final concentration, Cd (ppmv)	528	EPA Standard Temperature, Tstd (°R)
1940680	Average Stack Gas Flow Rate, Q (DSCFH)	29.92	EPA Standard Pressure, Pstd (in. Hg)
16.9	O2 final concentration (%)	385.3	Gas Constant @ EPA STP (SCF/lb-mol)
3508	Horsepower (Hp)	28.317	Liters per Cubic Foot
8698	Fuel O2 Factor (DSCF/MMBtu)	46	NOx molecular wt. (NO2), MW (lb/lb-mol)
		0.001912	Conversion constant (NOx ppm to g/m3)
		8760	hours per year
		2000	pounds per ton
		0.028317	cubic meters per cubic feet

NOx Emissions (ppmv @ 15%O2): *Applicable* yes

$$= \text{ppmv@15\%O}_2 = Cd \times \left(\frac{20.9\text{-}15}{20.9\text{-O}_2 \text{ concentration (\%)}} \right)$$

= 108 ppmv @15% O2

NOx Emission Rate (g/hp-hr): *Applicable* no

$$= \left(\frac{\text{g}}{\text{HP} - \text{hr}} \right) = \frac{Cd \times .001912 \times Q \times \left(\frac{0.028317 m^3}{ft^3} \right)}{HP}$$

= NOT APPLICABLE

NOx Emission Rate (lb/hr): *Applicable* yes

$$= \left(\frac{ppmv}{10^6} \right) \times \text{Average Stack Flow,Q} \times \left(\frac{MW}{385.3} \right)$$

= 17.14 (lb/hr)

NOx Emission Rate (tons/year): *Applicable* yes

$$= \left(\frac{\text{tons}}{\text{yr}} \right) = \frac{\text{lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lb}}$$

= 75.06 (tons/yr)

NOx Emissions (lb/MMBtu): *Applicable* no

$$= \left(\frac{lb}{MMBtu} \right) = \left(\frac{Cd}{10^6} \right) \times \left(\frac{MW}{385.3} \right) \times \left(\frac{DSCF}{MMBtu} \right) \times \left(\frac{20.9}{\left(20.9\text{-O}_2 \text{ concentration (\%)}\right)} \right)$$

= NOT APPLICABLE

Example Calculations: Emissions Calculations

Test Run #: DH-010314.01 **Component: CO**

Observed Measurements/Data:		**Standards/Constants/Conversion Factors**	
15.2	CO final concentration, Cd (ppmv)	528	EPA Standard Temperature, Tstd (°R)
1940680	Average Stack Gas Flow Rate, Q (DSCFH)	29.92	EPA Standard Pressure, Pstd (in. Hg)
16.9	O2 final concentration (%)	385.3	Gas Constant @ EPA STP (SCF/lb-mol)
3508	Horsepower (Hp)	28.317	Liters per Cubic Foot
8698	Fuel O2 Factor (DSCF/MMBtu)	28	CO molecular wt., MW (lb/lb-mol)
		0.001164	Conversion constant (CO ppm to g/m3)
		8760	hours per year
		2000	pounds per ton
		0.028317	cubic meters per cubic feet

CO Emissions (ppmv @ 15%O2): *Applicable* no

$$= \text{ppmv@15\%O}_2 = Cd \times \left(\frac{20.9\text{-}15}{20.9\text{-O}_2 \text{ concentration (\%)}} \right)$$

= **NOT APPLICABLE**

CO Emission Rate (g/hp-hr): *Applicable* no

$$= \left(\frac{\text{g}}{\text{HP}-\text{hr}} \right) = \frac{Cd \times .001164 \times Q \times \left(\frac{0.028317 m^3}{ft^3} \right)}{HP}$$

= **NOT APPLICABLE**

CO Emission Rate (lb/hr): *Applicable* yes

$$= \left(\frac{ppmv}{10^6} \right) \times \text{Average Stack Flow,Q} \times \left(\frac{MW}{385.3} \right)$$

= **2.14 (lb/hr)**

CO Emission Rate (tons/year): *Applicable* yes

$$= \left(\frac{\text{tons}}{\text{yr}} \right) = \frac{\text{lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lb}}$$

= **9.39 (tons/yr)**

CO Emissions (lb/MMBtu): *Applicable* no

$$= \left(\frac{lb}{MMBtu} \right) = \left(\frac{Cd}{10^6} \right) \times \left(\frac{MW}{385.3} \right) \times \left(\frac{DSCF}{MMBtu} \right) \times \left(\frac{20.9}{(20.9\text{-O}_2 \text{ concentration (\%)})} \right)$$

= **NOT APPLICABLE**

Linde **SPECTRA** Environmental Gases, 80 Industrial Drive, Alpha, NJ 08865

THE LINDE GROUP

Linde

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PGVP ID#: I12013
CUSTOMER: UNION CITY
SALES#: 501210969
PROD#: 1254051
P.O.# : 4501210969
MATERIAL#: 24091202
CERTIFICATION DATE: 01-May-2013
EXPIRATION DATE: 02-May-2021
(Using the May 2012 Revision of the EPA Protocol)

PROCEDURE # : **G1**
GAS CODE: APPVD
CYLINDER # : CC-310704
CYLINDER PRES: 2000 PSIG
CYLINDER VALVE: CGA 660
CYLINDER SIZE: 2A
CYLINDER MATERIAL: Aluminum
GAS VOLUME: 4000 Liter
BLEND TOLERANCE: 5% Relative
PAGE: 1 of 1

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Propane	01-May-2013	30.0 ppm	30.0 ppm	+/- 1%
Nitric Oxide	24-Apr-2013 01-May-2013	47.4 ppm 47.3 ppm	47.3 ppm	+/- 1%
NOx			47.3 ppm	Reference Value Only
Carbon Monoxide	01-May-2013	95.3 ppm	95.3 ppm	+/- 1%

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Propane	GMIS-1	cc-113884	100.5 ppm
Nitric Oxide	GMIS-1	CC-278874	100.7 ppm
Carbon Monoxide	GMIS-1	cc-88590	96.8 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Propane	H. Packard 6890	US00001434	GC - FID	01-May-2013
Nitric Oxide	CAI 400-CLD	6L09004	Cheml	01-Apr-2013
Carbon Monoxide	Horiba VIA-510	570423011	NDIR	19-Apr-2013

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE 1997 EPA PROTOCOL PROCEDURES. DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 100 PSIG.

ANALYST: ____________
MATTHEW JACKSON

Linde Gas North America LLC

DATE: 01-May-2013

(908) 329-9700 Main (908) 329-9740 Fax
www.LindeUS.com

RED BALL TECHNICAL GAS SERVICES

Assay Laboratory: Red Ball TGS
555 Craig Kennedy Way
Shreveport, LA 71107
800-551-8150

CERTIFICATE OF ANALYSIS
EPA PROTOCOL GAS

Cylinder Number:	EB0027577	**Certification Date:**	10/29/2012
Product ID Number:	124749	**Expiration Date:**	**10/22/2016**
Cylinder Pressure:	1900 PSIG	**MFG Facility:**	RBTGS-Shreveport-LA
COA Number:	GC1210170814-0	**Lot Number:**	GC1210170814
Customer PO. NO.:		**Tracking Number:**	048358699
Customer		**Previous Certification Dates:**	

This calibration standard has been certified per the 1997 EPA Traceability Protocol, Document EPA-600/97/121, using procedure G1 and/or G2. All values so noted are certified to be +/-1% NIST Traceable.

Do Not Use This Cylinder Below 150 psig (1.0 Megapascal).

Certified Concentration(s)

Component	Concentration	Analytical Principle	Accuracy
Nitric Oxide	**94.5 PPM**	Non Dispersive Infrared Absorptiometry	**:ulate: High Unce**
Total Oxides of Nitrogen	**94.7 PPM**	Non Dispersive Infrared Absorptiometry	
Propane	**51 PPM**	FTIR	**+/- 1% NIST**
Carbon Monoxide	**193 PPM**	Gas Correlation Filter	**+/- 1% NIST**
Nitrogen	Balance		

Reference Standard(s)

Type	Component	Balance Gas	Concentration	Cylinder Number	Expiration	NIST Reference
GMIS	Nitric Oxide	Nitrogen	98.6 PPM	CC238350	2/14/2013	SRM 1686b
GMIS	Nitric Oxide	Nitrogen	98.6 PPM	CC238350	2/14/2013	SRM 1686b
GMIS	Carbon Monoxide	Nitrogen	398 PPM	EB0005726	1/5/2014	NTRM 021003
SRM	Propane	Nitrogen	49 PPM	CAL018150	8/17/2017	SRM 1667b

Analytical Information

Component		**Nitric Oxide**	
Analysis Date:		10/22/2012	
Z 0.152	S 16.337	C 15.549	Conc. 93.5 PPM
S 16.399	C 15.733	Z 0.109	Conc. 94.6 PPM
C 15.71	Z 0.088	S 16.451	Conc. 94.4 PPM
Analysis Date:		10/29/2012	
Z 0.295	S 16.912	C 16.321	Conc. 94.9 PPM
S 16.961	C 16.303	Z 0.281	Conc. 94.8 PPM
C 16.31	Z 0.325	S 16.9825	Conc. 94.8 PPM

Component		**Carbon Monoxide**	
Analysis Date:		10/22/2012	
Z 0.3390	S 41.027	C 19.9610	Conc. 192 PPM
S 41.0170	C 20.021	Z 0.294	Conc. 193 PPM
C 20.036	Z 0.3510	S 40.98	Conc. 193 PPM

Component		**Propane**	
Analysis Date:		10/26/2012	
Z 0.0110	S 49.01	C 50.7800	Conc. 51 PPM
S 49.0400	C 50.8	Z 0.004	Conc. 51 PPM
C 50.8	Z 0.0060	S 49.03	Conc. 51 PPM

Z= Zero Gas S= Span Gas C= Candidate Gas

Fred Holt

Fred Holt, CHMM
Quality Control

Red Ball Technical Gas Service
PGVP Vendor ID # G12012
Information and Ordering
800-551-8150
Fax (318-425-6309)

RED BALL TECHNICAL GAS SERVICES

Assay Laboratory: Red Ball TGS
555 Craig Kennedy Way
Shreveport, LA 71107
800-551-8150

EPA PROTOCOL GAS CERTIFICATE OF ANALYSIS

Cylinder Number:	EB0046618	**Certification Date:**	07/29/2013
Product ID Number:	124752	**Expiration Date:**	07/27/2021
Cylinder Pressure:	1900 PSIG	**MFG Facility:**	RBTGS-Shreveport-LA
COA #	ML130726.170231.3-0	**Lot Number:**	ML130726.170231.3
Customer PO. NO.:		**Tracking Number:**	065271430
Customer:		**Previous Certification Dates:**	

This calibration standard has been certified per the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531, using procedure G1.

Do Not Use This Cylinder Below 100 psig (0.7 Megapascal).

Certified Concentration(s)

Component	Concentration	Uncertainty	Analytical Principle
Carbon Dioxide	**13.9 %**	±0.11 %	NDIR
Oxygen	**10.99 %**	±0.07 %	MPA
Nitrogen	Balance		

Analyitcal Measurement Data Available Online.

Reference Standard(s)

Lot	Expiration	Type	Balance	Component	Concentration	Uncertainty(%)	NIST Reference
GC1106080848	09/07/2013	GMIS	N2	CO2	12.57 %	0.384	3221755
GC0807251121	04/28/2019	GMIS	N2	O2	24.43 %	0.52	71001

Analytical Instrumentation

Component	Analytical Principle	Make	Model	Serial	MPC Date
CO2	NDIR	Horiba	VA-3013	H0000P11	07/10/2013
O2	MPA	Horiba	VA-3013	H0000P11	07/11/2013

Z= Zero Gas   S= Span Gas   C= Candidate Gas

Red Ball Technical Gas Service
PGVP Vendor ID # G12013
Information and Ordering
800-551-8150
Fax (318-425-6309)

Fred Holt

Fred Holt, CHMM
Quality Control

Assay Laboratory: Red Ball TGS
555 Craig Kennedy Way
Shreveport, LA 71107
800-551-8150

EPA PROTOCOL GAS CERTIFICATE OF ANALYSIS

Cylinder Number:	EB0039038	**Certification Date:**	08/02/2013
Product ID Number:	124753	**Expiration Date:**	07/31/2021
Cylinder Pressure:	1900 PSIG	**MFG Facility:**	RBTGS-Shreveport-LA
COA #	ML130726.170120.1-0	**Lot Number:**	ML130726.170120.1
Customer PO. NO.:		**Tracking Number:**	065155673
Customer:		**Previous Certification Dates:**	

This calibration standard has been certified per the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531, using procedure G1.

Do Not Use This Cylinder Below 100 psig (0.7 Megapascal).

Certified Concentration(s)

Component	Concentration	Uncertainty	Analytical Principle
Carbon Dioxide	**6.99 %**	±0.03 %	NDIR
Oxygen	**20.92 %**	±0.08 %	MPA
Nitrogen	Balance		

Analyitcal Measurement Data Available Online.

Reference Standard(s)

Lot	Expiration	Type	Balance	Component	Concentration	Uncertainty(%)	NIST Reference
GC1106080848	09/07/2013	GMIS	N2	CO2	12.57 %	0.384	3221755
GC0807251121	04/28/2019	GMIS	N2	O2	24.43 %	0.52	71001

Analytical Instrumentation

Component	Analytical Principle	Make	Model	Serial	MPC Date
CO2	NDIR	Horiba	VA-3013	H0000P11	07/31/2013
O2	MPA	Horiba	VA-3013	H0000P11	07/11/2013

Z= Zero Gas   S= Span Gas   C= Candidate Gas

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Fred Holt

Fred Holt, CHMM
Quality Control

MATHESON
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1700 Scepter Rd
Waverly, TN 37185
931-296-3357

Certificate of Analysis - EPA Protocol Mixtures

Customer: NORDON

		Protocol:	Reference #:	Lot#:
Cylinder Number:	SX49930	G1	T176792-1	9302603567
Cylinder Pressure:	1900psig			
Last Analysis Date:	11/19/2012			
Expiration Date:	11/19/2014			

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 150 PSIG

REPLICATE RESPONSES

		Date: 11/2/2012	Date: 11/19/2012
Component:	Nitrogen Dioxide	45.60	45.20
		45.60	45.26
Certified Conc:	45.38ppm +/- 1% REL	45.40	45.25

BALANCE GAS: Air

REFERENCE STANDARDS:

Component: Nitrogen Dioxide
Reference Standard: SRM
Cylinder #: CAL016152
Concentration: 98.0ppm
Exp Date: 12/31/2015
Lot #: 2660-C-57

CERTIFICATION INSTRUMENTS

Component: Nitrogen Dioxide
Make/Model: HORIBA CLA-510SS
Serial Number: 8H4SOCTJ
Measurement Principle: CHEMI
Last Calibration: 11/2/2012

Notes:

This Certification was performed according to EPA Traceability Protocol for Assay & Certification of Gaseous Calibration Standards September 1997, using procedure G1 and/or G2.

U.S. EPA Vendor ID No.: D52012: PGVP Participation Date: 1/1/2012: PGVP Renewal Date: 12/31/12

Analyst: Julie Higgins
Julie Higgins

Date: 11/26/2012

NOx Converter Efficiency and Response Times

Date: January 3, 2014

METHOD 7E NOx CONVERTER EFFICIENCY TEST

Certified NO_2 Conc. (ppmv)	45.38
Measured NOx Conc. (ppmv)	41.83
Converter Efficiency (%)	**92**

Criteria: Converter Efficiency should be 90% or greater

METHOD 7E RESPONSE TIMES

	NOx (ppmv)	**CO (ppmv)**	**O_2 (%)**
Low-Level Gas Concentration	0	0	0
Upscale Gas Concentration	94.70	193.00	10.99
95% of Upscale Gas	90.0	183.4	10.4

	NOx	**CO**	**O_2**
Low-Level Gas RT (sec)	88	75	50
Upscale Gas RT (sec)	82	73	37
Longer Analyzer RT Interval (sec)	88	75	50
System Response Time (sec)	88		
*System Response Time (min)	1.5		
†System Purge Time (min)	**2.9**		

*Longer interval of time to reach 95% of stable stable response for low & upscale level gases.

Criteria: †System Purge Time shall be ≥ 2 times the System Response Time

Analyzer Gas Quality Assurance

Test Run: **DH-010314.01**

Parameter	**NOx**	**CO**	**O2**
CALIBRATION ERROR DATA			
Range/Span Data			
Analyzer Range	100	200	25
Method 7E Span	94.7	193.0	20.9
Certified Calibration Gas Data			
Zero Level Certified Value (ppm or %)	0	0	0
Low Level Certified Value (ppm or %)	0.0	0.0	0.0
Mid Level Certified Value (ppm or %)	47.3	95.3	10.99
High Level Certified Value (ppm or %)	94.7	193.0	20.92
Calibration Error Observations (Direct)			
Zero Level Observed (ppm or %)	n/a	n/a	n/a
Low Level Observed (ppm or %)	0.2	0.0	0.0
Mid Level Observed (ppm or %)	47.6	95.7	11.0
High Level Observed (ppm or %)	95.2	193.2	21.0
Calibration Error Results			
Difference from Zero Level (%)	n/a	n/a	n/a
Difference from Low Level (%)	0.18	0.01	0.22
Difference from Mid Level (%)	0.32	0.22	0.15
Difference from High Level (%)	0.53	0.11	0.37
Allowable Difference (%)	(±2%)	(±2%)	(±2%)
TEST RUN DATA			
Bias Observations			
Low/Zero Level Cal. Gas Certified Value (ppm or %)	0.00	0.00	0.00
Upscale Cal. Gas Certified Value (ppm or %)	94.70	193.00	10.99
Initial Low/Zero Level Observed (ppm or %)	0.17	-0.02	0.05
Initial Upscale Level Observed (ppm or %)	95.20	193.21	11.02
Initial Bias Low/Zero Level Gas (ppm or %)	2.74	-0.71	0.05
Initial Bias Upscale Level Gas (ppm or %)	92.63	192.18	10.98
Final Bias Low/Zero Level Gas (ppm or %)	2.72	-1.00	0.16
Final Bias Upscale Level Gas (ppm or %)	91.44	191.53	10.99
Bias and Drift Results			
Initial Bias Low/Zero Level (%)	2.71	-0.35	0.03
Initial Bias Upscale Level (%)	-2.72	-0.53	-0.18
Final Bias Low/Zero Level (%)	2.69	-0.50	0.55
Final Bias Upscale Level (%)	-3.97	-0.87	-0.16
Allowable Bias (%)	(±5%)	(±5%)	(±5%)
Low/Zero Level Drift Calculation (%)	0.03	0.15	0.51
Upscale Level Drift Calculation (%)	1.26	0.34	0.02
Allowable Drift (%)	(±3%)	(±3%)	(±3%)
Raw Results (ppmv or %)	72.48	14.33	16.81
Minimum Detection Limit (MDL)	0.5	1.0	0.1
Corrected Results (ppmv or %)	74.0	15.2	16.9
***Final Results (ppmv or %)**	**74.0**	**15.2**	**16.9**

**Final Results which are shown in Italics represent the MDL for that analyte*

Analyzer Gas Quality Assurance

Test Run:	DH-010314.02		
Parameter	**NOx**	**CO**	**O2**
CALIBRATION ERROR DATA			
Range/Span Data			
Analyzer Range	100	200	25
Method 7E Span	94.7	193.0	20.9
Certified Calibration Gas Data			
Zero Level Certified Value (ppm or %)	0	0	0
Low Level Certified Value (ppm or %)	0.0	0.0	0.0
Mid Level Certified Value (ppm or %)	47.3	95.3	10.99
High Level Certified Value (ppm or %)	94.7	193.0	20.92
Calibration Error Observations (Direct)			
Zero Level Observed (ppm or %)	0.0	0.0	0.0
Low Level Observed (ppm or %)	0.2	0.0	0.0
Mid Level Observed (ppm or %)	47.6	95.7	11.0
High Level Observed (ppm or %)	95.2	193.2	21.0
Calibration Error Results			
Difference from Zero Level (%)	n/a	n/a	n/a
Difference from Low Level (%)	0.18	0.01	0.22
Difference from Mid Level (%)	0.32	0.22	0.15
Difference from High Level (%)	0.53	0.11	0.37
Allowable Difference (%)	(±2%)	(±2%)	(±2%)
TEST RUN DATA			
Bias Observations			
Low/Zero Level Cal. Gas Certified Value (ppm or %)	0.00	0.00	0.00
Upscale Cal. Gas Certified Value (ppm or %)	94.70	193.00	10.99
Initial Low/Zero Level Observed (ppm or %)	0.17	-0.02	0.05
Initial Upscale Level Observed (ppm or %)	95.20	193.21	11.02
Initial Bias Low/Zero Level Gas (ppm or %)	2.72	-1.00	0.16
Initial Bias Upscale Level Gas (ppm or %)	91.44	191.53	10.99
Final Bias Low/Zero Level Gas (ppm or %)	1.70	-0.96	0.18
Final Bias Upscale Level Gas (ppm or %)	90.59	191.32	10.99
Bias and Drift Results			
Initial Bias Low/Zero Level (%)	2.69	-0.50	0.55
Initial Bias Upscale Level (%)	-3.97	-0.87	-0.16
Final Bias Low/Zero Level (%)	1.61	-0.48	0.64
Final Bias Upscale Level (%)	-4.86	-0.98	-0.13
Allowable Bias (%)	(±5%)	(±5%)	(±5%)
Low/Zero Level Drift Calculation (%)	1.07	0.02	0.09
Upscale Level Drift Calculation (%)	0.89	0.11	0.02
Allowable Drift (%)	(±3%)	(±3%)	(±3%)
Raw Results (ppmv or %)	71.69	13.03	16.82
Minimum Detection Limit (MDL)	0.5	1.0	0.1
Corrected Results (ppmv or %)	74.1	14.0	16.9
***Final Results (ppmv or %)**	**74.1**	**14.0**	**16.9**

**Final Results which are shown in Italics represent the MDL for that analyte*

Analyzer Gas Quality Assurance

Test Run:	DH-010314.03		
Parameter	**NOx**	**CO**	**O2**
CALIBRATION ERROR DATA			
Range/Span Data			
Analyzer Range	100	200	25
Method 7E Span	94.7	193.0	20.9
Certified Calibration Gas Data			
Zero Level Certified Value (ppm or %)	0	0	0
Low Level Certified Value (ppm or %)	0.0	0.0	0.0
Mid Level Certified Value (ppm or %)	47.3	95.3	10.99
High Level Certified Value (ppm or %)	94.7	193.0	20.92
Calibration Error Observations (Direct)			
Zero Level Observed (ppm or %)	0.0	0.0	0.0
Low Level Observed (ppm or %)	0.2	0.0	0.0
Mid Level Observed (ppm or %)	47.6	95.7	11.0
High Level Observed (ppm or %)	95.2	193.2	21.0
Calibration Error Results			
Difference from Zero Level (%)	n/a	n/a	n/a
Difference from Low Level (%)	0.18	0.01	0.22
Difference from Mid Level (%)	0.32	0.22	0.15
Difference from High Level (%)	0.53	0.11	0.37
Allowable Difference (%)	(±2%)	(±2%)	(±2%)
TEST RUN DATA			
Bias Observations			
Low/Zero Level Cal. Gas Certified Value (ppm or %)	0.00	0.00	0.00
Upscale Cal. Gas Certified Value (ppm or %)	94.70	193.00	10.99
Initial Low/Zero Level Observed (ppm or %)	0.17	-0.02	0.05
Initial Upscale Level Observed (ppm or %)	95.20	193.21	11.02
Initial Bias Low/Zero Level Gas (ppm or %)	1.70	-0.96	0.18
Initial Bias Upscale Level Gas (ppm or %)	90.59	191.32	10.99
Final Bias Low/Zero Level Gas (ppm or %)	0.19	-4.17	0.01
Final Bias Upscale Level Gas (ppm or %)	91.34	189.89	10.91
Bias and Drift Results			
Initial Bias Low/Zero Level (%)	1.61	-0.48	0.64
Initial Bias Upscale Level (%)	-4.86	-0.98	-0.13
Final Bias Low/Zero Level (%)	0.02	-2.15	-0.16
Final Bias Upscale Level (%)	-4.08	-1.72	-0.55
Allowable Bias (%)	(±5%)	(±5%)	(±5%)
Low/Zero Level Drift Calculation (%)	1.59	1.66	0.80
Upscale Level Drift Calculation (%)	0.78	0.74	0.42
Allowable Drift (%)	(±3%)	(±3%)	(±3%)
Raw Results (ppmv or %)	72.28	11.15	16.86
Minimum Detection Limit (MDL)	0.5	1.0	0.1
Corrected Results (ppmv or %)	75.0	13.7	17.0
***Final Results (ppmv or %)**	**75.0**	**13.7**	**17.0**

**Final Results which are shown in Italics represent the MDL for that analyte*

Company	Plant Name	Unit Make	Unit Model	Unit Number	Status	Date	Time	NOx (ppmvd)	CO (ppmvd)	O2 (%, dry)
Enterprise Products	South Carlsbad CS	Solar	Centaur	Calibration Error	0NOx/0CO/0O2	1/3/14	7:41	0.17	-0.02	0.05
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	7:42	10.35	0.12	13.77
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	7:43	60.42	0.01	20.54
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	7:44	95.27	-0.04	20.97
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	7:45	95.85	-0.03	20.98
Enterprise Products	South Carlsbad CS	Solar	Centaur	Calibration Error	94.7NOx20.92O2	1/3/14	7:46	95.20	-0.05	21.00
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	7:47	55.30	-0.06	11.02
Enterprise Products	South Carlsbad CS	Solar	Centaur	Calibration Error	47.3NOx10.99O2	1/3/14	7:48	47.60	-0.20	11.02
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	7:49	44.34	14.90	0.22
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	7:50	24.23	54.47	0.03
Enterprise Products	South Carlsbad CS	Solar	Centaur	Calibration Error	193CO	1/3/14	7:51	24.25	193.21	0.03
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	7:52	10.00	134.83	0.03
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	7:53	0.57	95.44	0.03
Enterprise Products	South Carlsbad CS	Solar	Centaur	Calibration Error	95.3CO	1/3/14	7:54	0.51	95.73	0.02
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	7:55	0.45	81.22	0.05
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	7:56	2.69	47.66	0.04
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	7:57	3.30	47.74	0.03
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	7:58	38.19	47.68	0.05
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	7:59	41.29	1.88	0.01
Enterprise Products	South Carlsbad CS	Solar	Centaur	CE Test	NO2	1/3/14	8:00	42.18	0.10	0.02
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:01	43.07	0.52	0.03
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:02	43.06	0.48	0.02
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:03	15.10	0.18	0.03
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:04	0.68	0.41	0.03
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:05	0.57	0.16	-0.01
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:06	0.47	0.25	0.02
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:07	0.45	0.06	0.00
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:08	0.45	0.03	0.01
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:09	0.52	0.36	0.01
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:10	0.61	0.36	0.02
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:11	0.85	0.13	0.03
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:12	0.87	-0.14	0.06
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:13	1.38	0.34	0.10
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:14	1.43	0.30	0.14
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:15	1.36	0.51	0.19
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:16	-3.41	-4.24	0.04
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:17	-4.31	-4.96	0.07
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:18	1.10	0.42	0.44
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:19	1.40	0.88	0.57
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:20	1.18	0.76	0.65
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:21	1.45	1.13	0.77
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:22	1.22	0.75	0.89
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:23	0.80	0.43	0.98
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:24	1.27	4.47	6.67
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:25	1.74	25.73	8.18
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:26	1.75	26.08	8.33
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:27	1.67	26.02	8.33
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:28	1.68	25.67	8.38
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:29	0.80	24.64	8.38
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:30	1.79	25.60	8.49
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:31	1.46	25.27	8.57
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:32	1.48	25.16	8.61
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:33	1.49	25.21	8.68
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:34	1.37	24.91	8.71
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:35	1.44	24.83	8.79
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:36	1.47	24.80	8.83
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:37	1.49	24.50	8.92
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:38	1.53	24.59	8.98
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:39	1.67	24.53	9.03
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:40	1.29	23.95	9.11
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:41	1.50	24.19	9.19
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:42	1.67	24.38	9.30
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:43	1.68	24.09	9.40
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:44	1.73	24.08	9.47
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:45	1.79	24.04	9.52
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:46	1.71	23.62	9.64
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:47	1.76	23.54	9.74

Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:48	1.78	23.47	9.86
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:49	1.81	23.06	9.93
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:50	1.64	22.77	10.00
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:51	1.69	22.79	10.10
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:52	1.69	22.63	10.14
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:53	1.68	22.36	10.22
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:54	1.58	22.43	10.28
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:55	1.43	21.99	10.37
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:56	1.77	21.78	9.54
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:57	1.14	1.82	0.04
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:58	0.90	1.12	0.02
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	8:59	1.47	0.02	10.73
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:00	1.61	-0.52	10.94
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:01	14.47	47.84	0.10
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:02	46.49	95.85	0.02
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:03	39.52	53.59	20.65
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:04	2.02	2.08	20.90
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:05	1.96	1.82	20.92
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:06	2.35	1.77	20.93
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:07	1.55	1.98	20.91
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:08	45.63	188.72	16.54
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:17	4.15	-0.08	11.00
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	0NOx/0CO/10.99O2	1/3/14	9:18	2.74	-0.71	10.98
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:19	6.49	20.56	4.10
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	94.7NOx/193CO/0O2	1/3/14	9:20	92.63	192.18	0.05
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:21	86.04	152.17	13.07
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:22	68.42	17.67	16.30
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P1	DH-010314.01	1/3/14	9:23	73.69	21.48	16.68
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P1	DH-010314.01	1/3/14	9:24	74.87	21.03	16.76
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P1	DH-010314.01	1/3/14	9:25	74.57	20.79	16.76
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P1	DH-010314.01	1/3/14	9:26	74.35	20.08	16.79
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P2	DH-010314.01	1/3/14	9:27	73.61	16.91	16.79
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P2	DH-010314.01	1/3/14	9:28	71.53	12.47	16.80
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P2	DH-010314.01	1/3/14	9:29	71.55	12.53	16.78
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P3	DH-010314.01	1/3/14	9:30	71.67	11.92	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P3	DH-010314.01	1/3/14	9:31	70.63	11.73	16.80
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P3	DH-010314.01	1/3/14	9:32	69.26	11.35	16.81
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P4	DH-010314.01	1/3/14	9:33	70.91	11.30	16.78
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P4	DH-010314.01	1/3/14	9:34	72.54	12.14	16.81
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P4	DH-010314.01	1/3/14	9:35	72.63	12.57	16.84
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P5	DH-010314.01	1/3/14	9:36	72.20	12.62	16.84
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P5	DH-010314.01	1/3/14	9:37	72.14	12.24	16.84
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P5	DH-010314.01	1/3/14	9:38	72.31	12.53	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P6	DH-010314.01	1/3/14	9:39	72.42	12.16	16.82
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P6	DH-010314.01	1/3/14	9:40	74.48	14.44	16.81
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P6	DH-010314.01	1/3/14	9:41	73.29	15.86	16.79
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P6	DH-010314.01	1/3/14	9:42	73.43	16.39	16.82
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:43	70.14	12.09	18.89
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:44	71.29	19.84	16.82
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	9:45	72.99	29.72	16.82
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P7	DH-010314.01	1/3/14	9:46	71.34	25.55	16.80
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P7	DH-010314.01	1/3/14	9:47	72.35	21.74	16.81
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P7	DH-010314.01	1/3/14	9:48	72.91	18.04	16.86
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P8	DH-010314.01	1/3/14	9:49	72.82	14.70	16.82
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P8	DH-010314.01	1/3/14	9:50	72.16	12.22	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P8	DH-010314.01	1/3/14	9:51	72.84	12.04	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P9	DH-010314.01	1/3/14	9:52	72.70	12.01	16.84
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P9	DH-010314.01	1/3/14	9:53	72.17	11.98	16.81
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P9	DH-010314.01	1/3/14	9:54	71.87	11.92	16.82
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P10	DH-010314.01	1/3/14	9:55	72.13	11.81	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P10	DH-010314.01	1/3/14	9:56	72.34	11.67	16.82
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P10	DH-010314.01	1/3/14	9:57	69.00	8.15	16.60
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P11	DH-010314.01	1/3/14	9:58	70.88	9.84	16.74
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P11	DH-010314.01	1/3/14	9:59	73.33	11.94	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P11	DH-010314.01	1/3/14	10:00	73.24	11.96	16.85
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P12	DH-010314.01	1/3/14	10:01	73.18	13.23	16.94
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P12	DH-010314.01	1/3/14	10:02	71.83	13.05	16.71
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P12	DH-010314.01	1/3/14	10:03	74.03	16.96	16.85
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1, P12	DH-010314.01	1/3/14	10:04	73.42	17.59	16.85
					DH-010314.01 Averages			**72.48**	**14.33**	**16.81**

Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	10:05	70.42	22.30	10.94
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	0NOx/0CO/10.99O2	1/3/14	10:06	2.72	-1.00	10.99
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	10:07	-1.86	4.38	5.33
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	10:08	85.09	183.30	-0.21
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	94.7NOx/193CO/0O2	1/3/14	10:09	91.44	191.53	0.16
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	10:10	79.65	166.97	5.05
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	10:11	67.55	11.61	16.38
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:12	71.03	13.91	16.79
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:13	71.20	14.14	16.82
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:14	71.43	13.10	16.77
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:15	72.15	13.91	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:16	72.15	14.32	16.85
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:17	71.94	14.28	16.84
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:18	69.80	13.20	16.81
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:19	71.20	13.06	16.81
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:20	71.94	13.80	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:21	71.94	13.74	16.86
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:22	71.72	13.54	16.81
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:23	72.01	13.53	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:24	71.91	13.39	16.84
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:25	71.93	13.34	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:26	71.83	13.35	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:27	71.77	13.25	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:28	71.70	13.03	16.82
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:29	71.96	13.13	16.82
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:30	71.72	13.07	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:31	70.62	12.93	16.82
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:32	69.81	10.57	16.71
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:33	72.48	12.90	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:34	72.42	12.60	16.84
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:35	72.19	12.46	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:36	72.21	12.67	16.86
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:37	72.18	12.38	16.85
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:38	72.19	12.43	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:39	72.17	12.52	16.84
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:40	72.27	12.26	16.86
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:41	71.75	11.87	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.02	1/3/14	10:42	70.91	11.17	16.77
					DH-010314.02 Averages			**71.69**	**13.03**	**16.82**
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	10:43	36.04	10.05	10.66
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	0NOx/0CO/10.99O2	1/3/14	10:44	1.70	-0.96	10.99
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	10:45	31.08	84.95	-0.14
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	94.7NOx/193CO/0O2	1/3/14	10:46	90.59	191.32	0.18
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	10:47	90.76	124.36	16.57
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	10:48	72.21	11.95	16.79
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	10:49	72.12	12.12	16.84
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	10:50	72.37	11.47	16.83
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	10:51	72.38	11.70	16.85
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	10:52	72.39	11.50	16.88
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	10:53	72.37	11.27	16.86
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	10:54	72.33	11.46	16.85
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	10:55	72.30	11.44	16.85
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	10:56	72.39	11.22	16.88
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	10:57	72.36	11.32	16.87
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	10:58	72.27	11.11	16.85
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	10:59	72.28	11.18	16.86
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:00	72.37	11.18	16.85
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:01	72.30	11.16	16.87
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:02	72.33	11.24	16.85
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:03	72.28	10.91	16.86
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:04	72.33	11.13	16.87
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:05	71.95	10.73	16.85
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:06	72.29	10.71	16.85
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:07	72.36	10.84	16.86
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:08	69.57	8.22	16.70
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:09	71.66	12.01	16.97
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:10	71.98	14.94	16.85
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:11	72.77	11.00	16.87
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:12	72.64	10.90	16.86
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:13	72.61	10.49	16.88

Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:14	72.51	10.79	16.87
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:15	72.71	11.41	16.86
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:16	72.76	10.61	16.88
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:17	72.71	10.57	16.87
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:18	72.56	10.54	16.88
Enterprise Products	South Carlsbad CS	Solar	Centaur	T1	DH-010314.03	1/3/14	11:19	72.46	10.40	16.86
					DH-010314.03 Averages			**72.28**	**11.15**	**16.86**
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	11:20	42.04	9.45	11.03
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	0NOx/0CO/10.99O2	1/3/14	11:21	0.19	-4.17	10.91
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	11:22	38.35	107.72	0.03
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	94.7NOx/193CO/0O2	1/3/14	11:23	91.34	189.89	0.01
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	11:24	79.14	101.49	16.20
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	17:01	12.37	-4.16	0.08
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	17:02	38.35	-4.79	0.07
Enterprise Products	South Carlsbad CS	Solar	Centaur	CE Test	NO2	1/3/14	17:03	41.83	-4.42	0.08
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/3/14	17:04	30.41	-4.57	0.08

Annual Emission Test Report
for one
Solar Centaur T4702 Compressor Turbine
Unit Number T2
located at the
South Carlsbad Compressor Station

Prepared for
Enterprise Field Services, LLC
P. O. Box 4324
Houston, TX 77210

January 2014
Nordon Project No. 14-0152-2

This test report has been reviewed and approved for submittal to the New Mexico Environment Department (NMED) by the following representatives:

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SUMMARY OF RESULTS

Exhaust emission testing was performed on one Solar Centaur T4702 (Unit # T2) compressor turbine for Enterprise Field Services, LLC located at the South Carlsbad Compressor Station, near Loving, Eddy County, New Mexico. The turbine is used for natural gas compression. The testing was performed to demonstrate the continued compliance with the emission limits set forth in the NMED permit. Nordon Corporation of Round Rock, Texas, performed the exhaust emissions testing on January 4, 2014.

Continuous emission instruments housed in a mobile analysis unit were used to determine the concentrations of NO_X, CO, and O_2 in the exhaust stack of the compressor turbine. The following Code of Federal Regulations, Title 40, Part 60 (40CFR60), Appendix A reference methods were used to determine stack gas concentrations: Method 7E for nitrogen oxides (NO_X), Method 10 for carbon monoxide (CO), and Method 3A for oxygen (O_2). Mass emission rates were determined stoichiometrically according to Method 19 data reduction procedures using measured fuel flow rate.

Three thirty-minute test runs were performed on the exhaust of the turbine while firing on natural gas. The results of the testing are presented in a summary of results table. This table includes all the relevant information pertaining to the turbine/compressor operations, exhaust emissions, and ambient conditions. Exhaust concentrations are presented in part per million by volume (ppmv) or percent (%) by volume. The mass emission rates are presented in pound per hour (lb/hr) and ton per year (tpy). Turbine/compressor operational data was collected during each test run.

Summary of Results

NORDON CORPORATION

P.O. Box 1415 Round Rock, Texas 78680
PHONE (512) 355-3786 • FAX (512)355-3785

Plant: South Carlsbad Compressor Station
Facility Owner:Enterprise Field Services, LLC
Location: Loving, Eddy County, New Mexico
Unit Make/Model: Solar Centaur T4702
Unit Number: T2 , Ser. No.OHE12C7057
Test Personnel: DWH / KRJ

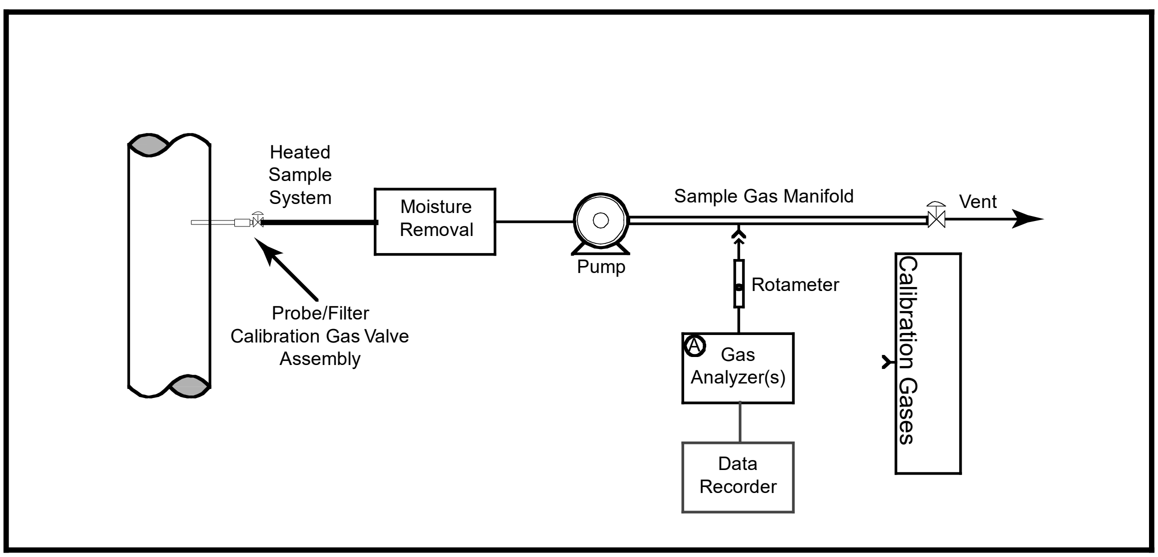
RUN NUMBER	DH-010414.01	DH-010414.02	DH-010414.03	
Date	1/4/14	1/4/14	1/4/14	
Start Time (hr)	8:20	9:10	9:47	
Stop Time (hr)	8:50	9:40	10:17	
TURBINE DATA				
Rated Horsepower (Hp)	3609	3609	3609	
Fuel Pressure (psig)	195	188	192	
Gas Producer Speed (%)	95	95	95	
Power Turbine Speed (%)	86	86	84	
Turbine Compressor Discharge Pressure (psig)	109	107	103	
Exhaust Temperature (°F)	1047	1060	1073	
Horsepower (Hp)	3630	3571	3452	
Heat Rate (MMBtu/hr)	42.9	38.4	39.9	
COMPRESSOR DATA				
Suction Pressure (psig)	330	330	338	
Suction Temperature (°F)	88	93	97	
Discharge Pressure (psig)	560	561	562	
Discharge Temperature (°F)	171	176	177	
Gas Production (MMscfd)	38	34	33	
FUEL & EXHAUST DATA				
O2 F-factor (dscf/MMBtu)	8698	8698	8698	
Fuel Heating Value (HHV Btu/scf)	1098	1098	1098	
Stoichiometric Exhaust Flow (dscfh)	1.97E+06	1.75E+06	1.82E+06	
AMBIENT CONDITIONS				
Temperature (°F): Dry bulb	42	49	64	
Temperature (°F): Wet bulb	36	41	47	
Atmospheric Pressure ("Hg)	26.64	26.64	26.64	
Humidity (lb water/lb air)	0.0036	0.0042	0.0037	
Humidity (% vol)	0.5	0.6	0.5	
MEASURED EXHAUST OUTLET CONCENTRATIONS				**AVERAGES**
NOx (ppmv)	78.7	80.4	84.1	**81.1**
CO (ppmv)	13.1	12.3	12.7	**12.7**
O2 (%)	16.9	16.9	16.9	**16.9**
EMISSION RATES				
NOx (lb/hr) LIMIT=27.0	18.54	16.85	18.27	**17.88**
CO (lb/hr) LIMIT=7.4	1.87	1.57	1.68	**1.71**
NOx (tpy, @8760 hr/yr) LIMIT=118.3	81.19	73.78	80.02	**78.33**
CO (tpy, @8760 hr/yr) LIMIT=32.5	8.20	6.89	7.35	**7.48**

PROCEDURES

Continuous emission instruments housed in the mobile analysis unit were used to determine the concentrations of pollutants found in the turbine exhaust stack. The following 40CFR60, Appendix A reference methods were used to determine stack gas concentrations: Method 7E for NO_X, Method 10 for CO, and Method 3A for O_2. Mass emission rates were determined according to data reduction procedures provided in Method 19.

As depicted in Figure 1, Sample System and Instrumentation, a stainless steel sample probe was located in the centroid of the stack. Sample gas enters the stainless steel probe into a stainless steel 3-way valve. The 3-way valve is used to perform leak checks and sample system bias checks. From the valve, the gas flows through a 3/8" Teflon® heat traced sample line to a stainless steel minimum contact condenser to dry the sample. From the condenser, a 3/8" Teflon sample line brings the exhaust gas to a manifold in the mobile analysis unit via a Teflon-lined diaphragm pump. The manifold partitions the gas through quick-connects so that each instrument can directly sample exhaust gas. Each instrument is equipped with a rotometer to maintain correct sample pressure and flow. The instruments are connected to a computer data acquisition system to document its response during quality assurance activities and testing.

Figure 1: Sample System and Instrumentation



(A) Gas Analyzers - NO_X, CO, O_2

Analyzer Make	Analyzer Model	Detection Principle
NO_X Analyzer: Thermo Environmental	42i-HL	Chemiluminescence
CO Analyzer : Thermo Environmental	48i-HL	Non-dispersive Infra-red
O_2 Analyzer: Thermo Environmental	48i-HL	Paramagnetic Cell

A continuous analyzer is used to determine NO_X concentrations according to EPA Reference Method 7E. This instrument employs a chemiluminescent detection principle. The NO_X concentration and mass emission rates are expressed as NO_2 per the reference method.

A continuous analyzer is used to determine CO concentrations according to EPA Reference Method 10. The instrument employs a nondispersive infrared detector coupled to a gas filter correlation wheel, which eliminates the interferences due to water and carbon dioxide.

A continuous analyzer is used to determine O_2 concentrations according to EPA Reference Method 3A. The instrument is equipped with either an electrochemical or paramagnetic cell.

Data obtained from the continuous emission analyzers were recorded by a National Instruments data acquisition (DAQ) system using Labview software. A copy of the DAQ records can be found in the appendix of this report.

Quality assurance activities meeting the requirements of the EPA reference methods were performed during the turbine testing. Tables documenting quality assurance procedures are located in the appendix of this report.

Exhaust flow rate was determined according to the data reduction procedures provided in EPA Method 19. The O_2 F-Factor used in the emission rate calculation was either calculated based on a recent fuel analysis or the standard 8710 value for natural gas provided by EPA Method 19.

Nordon personnel recorded turbine compressor operating parameters. Ambient conditions were collected using a wet/dry bulb sling psychrometer to measure temperature and a barometer to measure absolute atmospheric pressure.

APPENDIX

Field Data Sheets
Example Calculations
Gas Certifications
Quality Assurance Activities
Run Data Logs

Plant: South Carlsbad Compressor Station												
Facility Owner: Enterprise												
Unit Owner: Enterprise												
Location: Loving, Eddy County, New Mexico												
Applicable Regulation: 40CFR60, Subpart GG												
Unit Make/Model: Solar Centaur T-4702												
Unit Number: T2 Ser. No. OHE12C7057												
Test Personnel: DWH / KRJ												
Date: January 4, 2014												
Run Number	01	02	03	04	05	06	07	08	09	10	11	12
Start Time	820	910	947	1024	1101	1138	1215	1252	1329	1406	1445	1522
Stop Time												
Turbine/Compressor Operation												
Load Condition												
Fuel Flow (Mscfd)	938	839	873	718	836	778	913	877	635	891	596	618
Fuel Flow (scfh)	–											
Power Turbine Speed (%)	86	86	84	84	83	82	80	81	80	80	80	80
Gas Producer Speed (%)	95	95	95	95	95	95	95	95	95	95	95	95
Horsepower (hp)												
Rated Horsepower (hp)												
% Load												
Turbine Compressor Discharge, PCD (psig)	109	107	103	103	103	103	102	102	102	102	102	102
Turbine Temperature T5 (°F)	1047	1060	1073	1075	1077	1075	1078	1078	1079	1081	1079	1078
Gas Compressor Suction Pressure (psig)	330	330	338	341	341	356	359	360	361	363	364	364
Gas Compressor Discharge Pressure (psig)	~~88~~ 560	561	562	566	567	571	574	576	577	577	577	578
Gas Compressor Suction Temperature (°F)	~~8~~ 88	93	97	97	93	91	92	92	92	93	93	93
Gas Compressor Discharge Temperature (°F)	171	176	177	177	171	165	165	165	165	165	165	165
Fuel Gas Presssure (psig)	195	188	192	190	191	190	191	190	191	192	191	194
Gas Production Rate (MMscfd)	38	34	33	33	33	41	40	39	40	40	41	41
Alt. Ft.	3140	3140	3140	3160	3180	3200	3220	3220	3240	3260	3260	3260
Ambient Conditions												
Barometric Pressure (absolute In. Hg)	26.44	26.44	26.44									
Temperature Dry (°F)	42	49	64	66	68	69	72	73	71	71	70	69
Temperature Wet (°F)	36	41	47	47	48	48	50	49	48	48	48	47

Testing by Nordon Corporation

Certificate of Analysis

Number: 1030-14010388-001A

Houston Laboratories
8820 Interchange Drive
Houston, TX 77054
Phone 713-660-0901

Thor Olsen
Nordon Corporation
PO Box 1415
Round Rock, TX 78680

Jan. 21, 2014

Station Name:	South Calrsbad Compressor Stition	Sampled By:	
Station Location:	Loving, NM	Sample Of:	Gas Spot
Sample Point:	Turbine Fuel Gas	Sample Date:	01/04/2014 10:00
Cylinder No:	0298	Sample Conditions:	190 psig, @ 65 °F
Analyzed:	01/16/2014 05:34:22 by JD	Method:	GPA-2261M

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.65 psia
Nitrogen	1.204	1.797	
Carbon Dioxide	1.556	3.648	
Methane	86.800	74.184	
Ethane	6.877	11.016	1.834
Propane	2.516	5.911	0.691
Iso-butane	0.292	0.904	0.095
n-Butane	0.552	1.709	0.173
Iso-pentane	0.086	0.331	0.031
n-Pentane	0.072	0.277	0.026
Hexanes Plus	0.045	0.223	0.020
	100.000	100.000	2.870

GPM TOTAL C2+	2.870
GPM TOTAL C3+	1.036
GPM TOTAL iC5+	0.077

Physical Properties	**Total**	**C6+**
Relative Density Real Gas	0.6496	3.2176
Calculated Molecular Weight	18.77	93.19
Compressibility Factor	0.9973	
GPA 2172-09 Calculation:		
Calculated Gross BTU per ft³ @ 14.65 psia & 60°F		
Real Gas Dry BTU	1097	5113
Water Sat. Gas Base BTU	1078	5024

Comments: H2O Mol% : 1.750 ; Wt% : 1.681
Reran Sample Confirmed GC Analysis

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

Fuel Gas Analysis

Gross Btu/scf	**1098**
O_2 F-Factor dscf/MMBtu	**8698**
O_2 F-Factor (wscf/MMBtu)	**10660**
H_2O F-Factor (scf/MMBtu)	**1962**
CO_2 F-Factor (scf CO_2/MMBtu)	**1058**
Btu/lb	**22164**
Sp. Gr.	**0.6516**
F_o	**1.719**
Moisture Factor	**18.407**
VOC Fraction	**0.063**

Compound	**Mol. Formula**	**Mol. %**
Methane	CH4	86.800
Ethane	C2H6	6.877
Propane	C3H8	2.516
Isobutane	C4H10	0.292
n-Butane	C4H10	0.552
Isopentane	C5H12	0.086
n-Pentane	C5H12	0.072
NeoPentane	C5H12	
n-Hexane	C6H14	0.045
n-Heptane	C7H16	
n-Octane	C8H18	
Carbon dioxide	CO2	1.556
Nitrogen	N2	1.204
Total		100.000

Chain of Custody Form

REPORT TO:

Company: Nordon Corporation
Contact: Don Haynes
Contact Phone: 512-355-3786
Contact Email: don@nordoncorp.com

PROJECT INFO:

Client Name: Enterprise Products
Facility Name: South Carlsbad Compressor Station
Facility Location: Loving, NM
Project #: 14-0001

LABORATORY INFO:

Company: SPL, Inc.
Address: 8820 Interchange Dr
Address: Houston, TX 77054
Contact: Chris Staley
Contact Info: cstaley@spl-inc.com
Lab Project#:

NORDON Corporation
P.O Box 1415 Round Rock, TX 78680
PH: 512.355.3786 FAX: 512.355.3785

Turn Around Time

☒ Standard
☐ Rush
specify RUSH date(s):

Lab ID	Sample Identification	Sample Description	Collection Date	Method 323 (HCHO)	CTM-027 (NH3)	EPA Method 5	EPA Method 201a	EPA Method 202	ASTM D6667	ASTM D1945	Sample Matrix	Container Type	Remarks (volumes, special notes, etc.)
	1030-00406	natural gas	1/4/14						x	x	natural gas	cylinder	
	1030-00298	natural gas	1/4/14						x	x	natural gas	cylinder	

Relinquished By:	Date:	Relinquished By:	Date:	NOTES:
[illegible]	1-13-14			
Received By: [illegible]	**Date:** 1-13-14	**Received By:** [illegible]	**Date:** 1/14/14 15:07	

Page 1 of 1

Example Calculations: Method 7E Concentration Correction

Test Run #: DH-010414.01 **Component:** NOx

Observed Measurements/Data:		**Scale, Certified Concentrations**	
	Direct Calibration Results		
0.42	NOx direct zero, Cdiro	94.7	NOx chart scale, CS
94.68	NOx direct span, Cdirm	94.7	NOx actual calibration gas concentration, Cma
	System Calibration Results	0	Actual low-level gas concentration, Coa
1.66	NOx, initial zero reading, Csoi		
92.45	NOx inital span reading, Csmi		
0.85	NOx final zero reading, Cof		
91.68	NOx final span reading, Csmf		
	Run Results		
76.69	NOx run average, Caverage		

Bias Check Initial Zero (SBoi)

$$SBoi = \frac{(Csoi - Cdiro)}{CS}$$

= **1.31 (%)**

Bias Check Initial Span (SBmi)

$$SBmi = \frac{(Csmi - Cdirm)}{CS}$$

= **-2.36 (%)**

Bias Check Final Zero (SBof)

$$SBof = \frac{(Csof - Cdiro)}{CS}$$

= **0.45 (%)**

Bias Check Final Span (SBmf)

$$SBmf = \frac{(Csmf - Cdirm)}{CS}$$

= **-3.17 (%)**

Drift Check Zero (Do)

$$|SBof - SBoi|$$

= 0.86

Drift Check Span (Ds)

$$|SBmf - SBmi|$$

= 0.81

Bias- Average Zero (Coavg)

$$= \left(\frac{Csoi + Csof}{2}\right)$$

= 1.256 (ppmv)

Bias-Average Span (Cmavg)

$$= \left(\frac{CSmi + CSmf}{2}\right)$$

= 92.06 (ppmv)

NOx Concentration Correction

$$= (Caverage - Coavg) \times \left(\frac{Cma}{Cmavg - Coavg}\right)$$

78.7 (ppmv)

Example Calculations: Method 7E Concentration Correction

Test Run #: DH-010414.01 **Component: CO**

Observed Measurements/Data:		**Scale, Certified Concentrations**	
	Direct Calibration Results	193	CO chart scale, CS
0.63	CO direct zero, Cdiro	193	CO actual calibration gas concentration, Cma
194.59	CO direct span, Cdirm	0	Actual low-level gas concentration, Coa
	System Calibration Results		
-0.63	CO, initial zero reading, Csoi		
192.76	CO inital span reading, Csmi		
0.00	CO final zero reading, Cof		
191.43	CO final span reading, Csmf		
	Run Results		
12.70	CO run average, Caverage		

Bias Check Initial Zero (SBoi)

$$SBoi = \frac{(Csoi - Cdiro)}{CS}$$

= **-0.65 (%)**

Bias Check Initial Span (SBmi)

$$SBmi = \frac{(Csmi - Cdirm)}{CS}$$

= **-0.95 (%)**

Bias Check Final Zero (SBof)

$$SBof = \frac{(Csof - Cdiro)}{CS}$$

= **-0.32 (%)**

Bias Check Final Span (SBmf)

$$SBmf = \frac{(Csmf - Cdirm)}{CS}$$

= **-1.63 (%)**

Drift Check Zero (Do)

$$|SBof - SBoi|$$

= 0.33

Drift Check Span (Ds)

$$|SBmf - SBmi|$$

= 0.69

Bias- Average Zero (Coavg)

$$= \left(\frac{Csoi + Csof}{2}\right)$$

= -0.315 (ppmv)

Bias-Average Span (Cmavg)

$$= \left(\frac{CSmi + CSmf}{2}\right)$$

= 192.10 (ppmv)

CO Concentration Correction

$$= (Caverage - Coavg) \times \left(\frac{Cma}{Cmavg - Coavg}\right)$$

13.1 (ppmv)

Example Calculations: Method 7E Concentration Correction

Test Run #: DH-010414.01 **Component: O2**

Observed Measurements/Data:		**Scale, Certified Concentrations**	
	Direct Calibration Results	20.92	O2 chart scale, CS
0.13	O2 direct zero, Cdiro	20.92	O2 actual calibration gas Concentration, Cma
21.26	O2 direct span, Cdirm	0	Actual low-level gas Concentration, Coa
	System Calibration Results		
0.25	O2, initial zero reading, Csoi		
21.19	O2 inital span reading, Csmi		
0.28	O2 final zero reading, Csof		
21.21	O2 final span reading, Csmf		
	Run Results		
17.22	O2 run average, Caverage		

Bias Check Initial Zero (SBoi)

$$SBoi = \frac{(Csoi - Cdiro)}{CS}$$

= **0.57 (%)**

Bias Check Initial Span (SBmi)

$$SBmi = \frac{(Csmi - Cdirm)}{CS}$$

= **-0.37 (%)**

Bias Check Final Zero (SBof)

$$SBof = \frac{(Csof - Cdiro)}{CS}$$

= **0.75 (%)**

Bias Check Final Span (SBmf)

$$SBmf = \frac{(Csmf - Cdirm)}{CS}$$

= **-0.25 (%)**

Drift Check Zero (Do)

$$|SBof - SBoi|$$

= 0.17

Drift Check Span (Ds)

$$|SBmf - SBmi|$$

= 0.12

Bias- Average Zero (O2avg)

$$= \left(\frac{Csoi + Csof}{2}\right)$$

= 0.263 (%)

Bias-Average Span (Cmavg)

$$= \left(\frac{CSmi + CSmf}{2}\right)$$

= 21.20 (%)

O2 Concentration Correction

$$= (Caverage - Coavg) \times \left(\frac{Cma}{Cmavg - Coavg}\right)$$

16.9 (%)

Example Calculations: Method 19 Exhaust Flow

Test Run #: DH-010414.01 **Component: Stack Flow**

Observed Measurements/Data:		**Standards/Constants/Conversion Factors**	
39083	Fuel Flow Rate (scfh)	1000000	Btu per MMBtu
8698	Fuel O2 F-Factor (dscf/MMBtu)	20.9	O2 % in air
1098	Fuel Heating Value (Btu/scf)		
16.9	O2 final concentration (%)		

Derivation of Exhaust Flow using Equation 19-1 from Method 19

$$E\left(\frac{lb}{MMBtu}\right) = C_d\left(\frac{lb}{scf}\right)F_d\left(\frac{dscf}{MMBtu}\right)\times\frac{20.9}{\left(20.9-\%O_2\right)}$$ Eq. 19-1

divide each side of equation by Cd to obtain the following

$$\left(\frac{scf}{MMBtu}\right) = F_d\left(\frac{dscf}{MMBtu}\right)\times\frac{20.9}{\left(20.9-\%O_2\right)}$$

multiply each side of equation by heat input (MMBtu/hr)

$$\left(\frac{scf}{hr}\right) = HeatInput\left(\frac{MMBtu}{hr}\right)\times F_d\left(\frac{dscf}{MMBtu}\right)\times\frac{20.9}{\left(20.9-\%O_2\right)}$$

Fuel Gas Heat Rate/Heat Input (MMBtu/hr)

$$= \left(\text{Fuel Flow Rate }\frac{scf}{hr}\right)\times\left(\text{Fuel Heating Value }\frac{Btu}{scf}\right)\times\left(\frac{1MMBtu}{1000000\,Btu}\right)$$

= 42.90 (MMBtu/hr)

Stack Gas Volumetric Flow Rate, Q (dscfh)

$$= \left(\text{HeatInput }\frac{MMBtu}{hr}\right)\times\left(\text{Fuel O}_2\text{ F-Factor }\frac{dscf}{MMBtu}\right)\times\left(\frac{20.9}{20.9-O_2}\right)$$

= 1.97E+06 (dscfh)

Example Calculations: Emissions Calculations

Test Run #: DH-010414.01 **Component: NOx**

Observed Measurements/Data:		**Standards/Constants/Conversion Factors**	
78.7	NOx final concentration, Cd (ppmv)	528	EPA Standard Temperature, Tstd (°R)
1973673	Average Stack Gas Flow Rate, Q (DSCFH)	29.92	EPA Standard Pressure, Pstd (in. Hg)
16.9	O2 final concentration (%)	385.3	Gas Constant @ EPA STP (SCF/lb-mol)
3630	Horsepower (Hp)	28.317	Liters per Cubic Foot
8698	Fuel O2 Factor (DSCF/MMBtu)	46	NOx molecular wt. (NO2), MW (lb/lb-mol)
		0.001912	Conversion constant (NOx ppm to g/m3)
		8760	hours per year
		2000	pounds per ton
		0.028317	cubic meters per cubic feet

NOx Emissions (ppmv @ 15%O2): *Applicable* yes

$$= \text{ppmv@15\%O}_2 = Cd \times \left(\frac{20.9\text{-}15}{20.9\text{-O}_2 \text{ concentration (\%)}} \right)$$

= 117 ppmv @15% O2

NOx Emission Rate (g/hp-hr): *Applicable* no

$$= \left(\frac{\text{g}}{\text{HP} - \text{hr}} \right) = \frac{Cd \times .001912 \times Q \times \left(\frac{0.028317 m^3}{ft^3} \right)}{HP}$$

= NOT APPLICABLE

NOx Emission Rate (lb/hr): *Applicable* yes

$$= \left(\frac{ppmv}{10^6} \right) \times \text{Average Stack Flow,Q} \times \left(\frac{MW}{385.3} \right)$$

= 18.54 (lb/hr)

NOx Emission Rate (tons/year): *Applicable* yes

$$= \left(\frac{\text{tons}}{\text{yr}} \right) = \frac{\text{lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lb}}$$

= 81.19 (tons/yr)

NOx Emissions (lb/MMBtu): *Applicable* no

$$= \left(\frac{lb}{MMBtu} \right) = \left(\frac{Cd}{10^6} \right) \times \left(\frac{MW}{385.3} \right) \times \left(\frac{DSCF}{MMBtu} \right) \times \left(\frac{20.9}{(20.9\text{-O}_2 \text{ concentration (\%)})} \right)$$

= NOT APPLICABLE

Example Calculations: Emissions Calculations

Test Run #: DH-010414.01 **Component: CO**

Observed Measurements/Data:

13.1	CO final concentration, Cd (ppmv)
1973673	Average Stack Gas Flow Rate, Q (DSCFH)
16.9	O2 final concentration (%)
3630	Horsepower (Hp)
8698	Fuel O2 Factor (DSCF/MMBtu)

Standards/Constants/Conversion Factors

528	EPA Standard Temperature, Tstd (°R)
29.92	EPA Standard Pressure, Pstd (in. Hg)
385.3	Gas Constant @ EPA STP (SCF/lb-mol)
28.317	Liters per Cubic Foot
28	CO molecular wt., MW (lb/lb-mol)
0.001164	Conversion constant (CO ppm to g/m3)
8760	hours per year
2000	pounds per ton
0.028317	cubic meters per cubic feet

CO Emissions (ppmv @ 15%O2): *Applicable* no

$$= \text{ppmv@15\%O}_2 = Cd \times \left(\frac{20.9\text{-}15}{20.9\text{-O}_2 \text{ concentration (\%)}} \right)$$

= **NOT APPLICABLE**

CO Emission Rate (g/hp-hr): *Applicable* no

$$= \left(\frac{\text{g}}{\text{HP} - \text{hr}} \right) = \frac{Cd \times .001164 \times Q \times \left(\frac{0.028317 m^3}{ft^3} \right)}{HP}$$

= **NOT APPLICABLE**

CO Emission Rate (lb/hr): *Applicable* yes

$$= \left(\frac{ppmv}{10^6} \right) \times \text{Average Stack Flow,Q} \times \left(\frac{MW}{385.3} \right)$$

= **1.87 (lb/hr)**

CO Emission Rate (tons/year): *Applicable* yes

$$= \left(\frac{\text{tons}}{\text{yr}} \right) = \frac{\text{lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lb}}$$

= **8.20 (tons/yr)**

CO Emissions (lb/MMBtu): *Applicable* no

$$= \left(\frac{lb}{MMBtu} \right) = \left(\frac{Cd}{10^6} \right) \times \left(\frac{MW}{385.3} \right) \times \left(\frac{DSCF}{MMBtu} \right) \times \left(\frac{20.9}{(20.9\text{-O}_2 \text{ concentration (\%)})} \right)$$

= **NOT APPLICABLE**

Linde **SPECTRA** Environmental Gases, 80 Industrial Drive, Alpha, NJ 08865

THE LINDE GROUP

Linde

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : **G1**

PGVP ID#:	I12013	**GAS CODE:**	APPVD
CUSTOMER:	UNION CITY	**CYLINDER # :**	CC-310704
SALES#:	501210969	**CYLINDER PRES:**	2000 PSIG
PROD#:	1254051	**CYLINDER VALVE:**	CGA 660
P.O.# :	4501210969	**CYLINDER SIZE:**	2A
MATERIAL#:	24091202	**CYLINDER MATERIAL:**	Aluminum
CERTIFICATION DATE:	01-May-2013	**GAS VOLUME:**	4000 Liter
EXPIRATION DATE:	02-May-2021	**BLEND TOLERANCE:**	5% Relative
		PAGE:	1 of 1

(Using the May 2012 Revision of the EPA Protocol)

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Propane	01-May-2013	30.0 ppm	30.0 ppm	+/- 1%
Nitric Oxide	24-Apr-2013 01-May-2013	47.4 ppm 47.3 ppm	47.3 ppm	+/- 1%
NOx			47.3 ppm	Reference Value Only
Carbon Monoxide	01-May-2013	95.3 ppm	95.3 ppm	+/- 1%

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Propane	GMIS-1	cc-113884	100.5 ppm
Nitric Oxide	GMIS-1	CC-278874	100.7 ppm
Carbon Monoxide	GMIS-1	cc-88590	96.8 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Propane	H. Packard 6890	US00001434	GC - FID	01-May-2013
Nitric Oxide	CAI 400-CLD	6L09004	Cheml	01-Apr-2013
Carbon Monoxide	Horiba VIA-510	570423011	NDIR	19-Apr-2013

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE 1997 EPA PROTOCOL PROCEDURES. DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 100 PSIG.

ANALYST: ______________________
MATTHEW JACKSON

Linde Gas North America LLC

DATE: 01-May-2013

RED BALL TECHNICAL GAS SERVICES

Assay Laboratory: Red Ball TGS
555 Craig Kennedy Way
Shreveport, LA 71107
800-551-8150

CERTIFICATE OF ANALYSIS
EPA PROTOCOL GAS

Cylinder Number:	EB0027577	**Certification Date:**	10/29/2012
Product ID Number:	124749	**Expiration Date:**	**10/22/2016**
Cylinder Pressure:	1900 PSIG	**MFG Facility:**	RBTGS-Shreveport-LA
COA Number:	GC1210170814-0	**Lot Number:**	GC1210170814
Customer PO. NO.:		**Tracking Number:**	048358699
Customer		**Previous Certification Dates:**	

This calibration standard has been certified per the 1997 EPA Traceability Protocol, Document EPA-600/97/121, using procedure G1 and/or G2. All values so noted are certified to be +/-1% NIST Traceable.

Do Not Use This Cylinder Below 150 psig (1.0 Megapascal).

Certified Concentration(s)

Component	Concentration	Analytical Principle	Accuracy
Nitric Oxide	**94.5 PPM**	Non Dispersive Infrared Absorptiometry	**:ulate: High Unce**
Total Oxides of Nitrogen	**94.7 PPM**	Non Dispersive Infrared Absorptiometry	
Propane	**51 PPM**	FTIR	**+/- 1% NIST**
Carbon Monoxide	**193 PPM**	Gas Correlation Filter	**+/- 1% NIST**
Nitrogen	Balance		

Reference Standard(s)

Type	Component	Balance Gas	Concentration	Cylinder Number	Expiration	NIST Reference
GMIS	Nitric Oxide	Nitrogen	98.6 PPM	CC238350	2/14/2013	SRM 1686b
GMIS	Nitric Oxide	Nitrogen	98.6 PPM	CC238350	2/14/2013	SRM 1686b
GMIS	Carbon Monoxide	Nitrogen	398 PPM	EB0005726	1/5/2014	NTRM 021003
SRM	Propane	Nitrogen	49 PPM	CAL018150	8/17/2017	SRM 1667b

Analytical Information

Component		Nitric Oxide	
Analysis Date:		10/22/2012	
Z 0.152	S 16.337	C 15.549	Conc. 93.5 PPM
S 16.399	C 15.733	Z 0.109	Conc. 94.6 PPM
C 15.71	Z 0.088	S 16.451	Conc. 94.4 PPM
Analysis Date:		10/29/2012	
Z 0.295	S 16.912	C 16.321	Conc. 94.9 PPM
S 16.961	C 16.303	Z 0.281	Conc. 94.8 PPM
C 16.31	Z 0.325	S 16.9825	Conc. 94.8 PPM

Component		Carbon Monoxide	
Analysis Date:		10/22/2012	
Z 0.3390	S 41.027	C 19.9610	Conc. 192 PPM
S 41.0170	C 20.021	Z 0.294	Conc. 193 PPM
C 20.036	Z 0.3510	S 40.98	Conc. 193 PPM

Component		Propane	
Analysis Date:		10/26/2012	
Z 0.0110	S 49.01	C 50.7800	Conc. 51 PPM
S 49.0400	C 50.8	Z 0.004	Conc. 51 PPM
C 50.8	Z 0.0060	S 49.03	Conc. 51 PPM

Z= Zero Gas S= Span Gas C= Candidate Gas

Fred Holt

Fred Holt, CHMM
Quality Control

Red Ball Technical Gas Service
PGVP Vendor ID # G12012
Information and Ordering
800-551-8150
Fax (318-425-6309)

RED BALL TECHNICAL GAS SERVICES

Assay Laboratory: Red Ball TGS
555 Craig Kennedy Way
Shreveport, LA 71107
800-551-8150

EPA PROTOCOL GAS CERTIFICATE OF ANALYSIS

Cylinder Number:	EB0046618	**Certification Date:**	07/29/2013
Product ID Number:	124752	**Expiration Date:**	07/27/2021
Cylinder Pressure:	1900 PSIG	**MFG Facility:**	RBTGS-Shreveport-LA
COA #	ML130726.170231.3-0	**Lot Number:**	ML130726.170231.3
Customer PO. NO.:		**Tracking Number:**	065271430
Customer:		**Previous Certification Dates:**	

This calibration standard has been certified per the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531, using procedure G1.

Do Not Use This Cylinder Below 100 psig (0.7 Megapascal).

Certified Concentration(s)

Component	Concentration	Uncertainty	Analytical Principle
Carbon Dioxide	**13.9 %**	±0.11 %	NDIR
Oxygen	**10.99 %**	±0.07 %	MPA
Nitrogen	Balance		

Analyitcal Measurement Data Available Online.

Reference Standard(s)

Lot	Expiration	Type	Balance	Component	Concentration	Uncertainty(%)	NIST Reference
GC1106080848	09/07/2013	GMIS	N2	CO2	12.57 %	0.384	3221755
GC0807251121	04/28/2019	GMIS	N2	O2	24.43 %	0.52	71001

Analytical Instrumentation

Component	Analytical Principle	Make	Model	Serial	MPC Date
CO2	NDIR	Horiba	VA-3013	H0000P11	07/10/2013
O2	MPA	Horiba	VA-3013	H0000P11	07/11/2013

Z= Zero Gas   S= Span Gas   C= Candidate Gas

Red Ball Technical Gas Service
PGVP Vendor ID # G12013
Information and Ordering
800-551-8150
Fax (318-425-6309)

Fred Holt

Fred Holt, CHMM
Quality Control

Assay Laboratory: Red Ball TGS
555 Craig Kennedy Way
Shreveport, LA 71107
800-551-8150

EPA PROTOCOL GAS CERTIFICATE OF ANALYSIS

Cylinder Number:	EB0039038	**Certification Date:**	08/02/2013
Product ID Number:	124753	**Expiration Date:**	07/31/2021
Cylinder Pressure:	1900 PSIG	**MFG Facility:**	RBTGS-Shreveport-LA
COA #	ML130726.170120.1-0	**Lot Number:**	ML130726.170120.1
Customer PO. NO.:		**Tracking Number:**	065155673
Customer:		**Previous Certification Dates:**	

This calibration standard has been certified per the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531, using procedure G1.

Do Not Use This Cylinder Below 100 psig (0.7 Megapascal).

Certified Concentration(s)

Component	Concentration	Uncertainty	Analytical Principle
Carbon Dioxide	**6.99 %**	±0.03 %	NDIR
Oxygen	**20.92 %**	±0.08 %	MPA
Nitrogen	Balance		

Analyitcal Measurement Data Available Online.

Reference Standard(s)

Lot	Expiration	Type	Balance	Component	Concentration	Uncertainty(%)	NIST Reference
GC1106080848	09/07/2013	GMIS	N2	CO2	12.57 %	0.384	3221755
GC0807251121	04/28/2019	GMIS	N2	O2	24.43 %	0.52	71001

Analytical Instrumentation

Component	Analytical Principle	Make	Model	Serial	MPC Date
CO2	NDIR	Horiba	VA-3013	H0000P11	07/31/2013
O2	MPA	Horiba	VA-3013	H0000P11	07/11/2013

Z= Zero Gas S= Span Gas C= Candidate Gas

Red Ball Technical Gas Service
PGVP Vendor ID # G12013
Information and Ordering
800-551-8150
Fax (318-425-6309)

Fred Holt

Fred Holt, CHMM
Quality Control

1700 Scepter Rd
Waverly, TN 37185
931-296-3357

MATHESON
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Certificate of Analysis - EPA Protocol Mixtures

Customer: NORDON

		Protocol:	Reference #:	Lot#:
Cylinder Number:	SX49930	G1	T176792-1	9302603567
Cylinder Pressure:	1900psig			
Last Analysis Date:	11/19/2012			
Expiration Date:	11/19/2014			

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 150 PSIG

REPLICATE RESPONSES

		Date: 11/2/2012	Date: 11/19/2012
Component:	Nitrogen Dioxide	45.60	45.20
		45.60	45.26
Certified Conc:	45.38ppm +/- 1% REL	45.40	45.25

BALANCE GAS: Air

REFERENCE STANDARDS:

Component: Nitrogen Dioxide
Reference Standard: SRM
Cylinder #: CAL016152
Concentration: 98.0ppm
Exp Date: 12/31/2015
Lot #: 2660-C-57

CERTIFICATION INSTRUMENTS

Component: Nitrogen Dioxide
Make/Model: HORIBA CLA-510SS
Serial Number: 8H4SOCTJ
Measurement Principle: CHEMI
Last Calibration: 11/2/2012

Notes:

This Certification was performed according to EPA Traceability Protocol for Assay & Certification of Gaseous Calibration Standards September 1997, using procedure G1 and/or G2.

U.S. EPA Vendor ID No.: D52012: PGVP Participation Date: 1/1/2012: PGVP Renewal Date: 12/31/12

Analyst: Julie Higgins Date: 11/26/2012
Julie Higgins

NOx Converter Efficiency and Response Times

Date: January 4, 2014

METHOD 7E NOx CONVERTER EFFICIENCY TEST

Certified NO_2 Conc. (ppmv)	45.38
Measured NOx Conc. (ppmv)	41.03
Converter Efficiency (%)	**90**

Criteria: Converter Efficiency should be 90% or greater

METHOD 7E RESPONSE TIMES

	NOx (ppmv)	CO (ppmv)	O_2 (%)
Low-Level Gas Concentration	0	0	0
Upscale Gas Concentration	94.7	193	20.92
95% of Upscale Gas	90.0	183.4	19.9

	NOx	CO	O_2
Low-Level Gas RT (sec)	70	66	30
Upscale Gas RT (sec)	63	63	33
Longer Analyzer RT Interval (sec)	70	66	33
System Response Time (sec)	70		
*System Response Time (min)	1.2		
†System Purge Time (min)	**2.3**		

*Longer interval of time to reach 95% of stable stable response for low & upscale level gases.

Criteria: †System Purge Time shall be ≥ 2 times the System Response Time

Analyzer Gas Quality Assurance

Test Run:	DH-010414.01		
Parameter	**NOx**	**CO**	**O2**
CALIBRATION ERROR DATA			
Range/Span Data			
Analyzer Range	100	200	25
Method 7E Span	94.7	193.0	20.9
Certified Calibration Gas Data			
Zero Level Certified Value (ppm or %)	0	0	0
Low Level Certified Value (ppm or %)	0.0	0.0	0.0
Mid Level Certified Value (ppm or %)	47.3	95.3	10.99
High Level Certified Value (ppm or %)	94.7	193.0	20.92
Calibration Error Observations (Direct)			
Zero Level Observed (ppm or %)	n/a	n/a	n/a
Low Level Observed (ppm or %)	0.4	0.6	0.1
Mid Level Observed (ppm or %)	46.9	96.7	11.2
High Level Observed (ppm or %)	94.7	194.6	21.3
Calibration Error Results			
Difference from Zero Level (%)	n/a	n/a	n/a
Difference from Low Level (%)	0.44	0.33	0.60
Difference from Mid Level (%)	0.39	0.71	0.87
Difference from High Level (%)	0.02	0.82	1.64
Allowable Difference (%)	(±2%)	(±2%)	(±2%)
TEST RUN DATA			
Bias Observations			
Low/Zero Level Cal. Gas Certified Value (ppm or %)	0.00	0.00	0.00
Upscale Cal. Gas Certified Value (ppm or %)	94.70	193.00	20.92
Initial Low/Zero Level Observed (ppm or %)	0.42	0.63	0.13
Initial Upscale Level Observed (ppm or %)	94.68	194.59	21.26
Initial Bias Low/Zero Level Gas (ppm or %)	1.66	-0.63	0.25
Initial Bias Upscale Level Gas (ppm or %)	92.45	192.76	21.19
Final Bias Low/Zero Level Gas (ppm or %)	0.85	0.00	0.28
Final Bias Upscale Level Gas (ppm or %)	91.68	191.43	21.21
Bias and Drift Results			
Initial Bias Low/Zero Level (%)	1.31	-0.65	0.57
Initial Bias Upscale Level (%)	-2.36	-0.95	-0.37
Final Bias Low/Zero Level (%)	0.45	-0.32	0.75
Final Bias Upscale Level (%)	-3.17	-1.63	-0.25
Allowable Bias (%)	(±5%)	(±5%)	(±5%)
Low/Zero Level Drift Calculation (%)	0.86	0.33	0.17
Upscale Level Drift Calculation (%)	0.81	0.69	0.12
Allowable Drift (%)	(±3%)	(±3%)	(±3%)
Raw Results (ppmv or %)	76.69	12.70	17.22
Minimum Detection Limit (MDL)	0.5	1.0	0.1
Corrected Results (ppmv or %)	78.7	13.1	16.9
***Final Results (ppmv or %)**	**78.7**	**13.1**	**16.9**

**Final Results which are shown in Italics represent the MDL for that analyte*

Analyzer Gas Quality Assurance

Test Run:	DH-010414.02		
Parameter	**NOx**	**CO**	**O2**
CALIBRATION ERROR DATA			
Range/Span Data			
Analyzer Range	100	200	25
Method 7E Span	94.7	193.0	20.9
Certified Calibration Gas Data			
Zero Level Certified Value (ppm or %)	0	0	0
Low Level Certified Value (ppm or %)	0.0	0.0	0.0
Mid Level Certified Value (ppm or %)	47.3	95.3	10.99
High Level Certified Value (ppm or %)	94.7	193.0	20.92
Calibration Error Observations (Direct)			
Zero Level Observed (ppm or %)	0.0	0.0	0.0
Low Level Observed (ppm or %)	0.4	0.6	0.1
Mid Level Observed (ppm or %)	46.9	96.7	11.2
High Level Observed (ppm or %)	94.7	194.6	21.3
Calibration Error Results			
Difference from Zero Level (%)	n/a	n/a	n/a
Difference from Low Level (%)	0.44	0.33	0.60
Difference from Mid Level (%)	0.39	0.71	0.87
Difference from High Level (%)	0.02	0.82	1.64
Allowable Difference (%)	(±2%)	(±2%)	(±2%)
TEST RUN DATA			
Bias Observations			
Low/Zero Level Cal. Gas Certified Value (ppm or %)	0.00	0.00	0.00
Upscale Cal. Gas Certified Value (ppm or %)	94.70	193.00	20.92
Initial Low/Zero Level Observed (ppm or %)	0.42	0.63	0.13
Initial Upscale Level Observed (ppm or %)	94.68	194.59	21.26
Initial Bias Low/Zero Level Gas (ppm or %)	0.85	0.00	0.28
Initial Bias Upscale Level Gas (ppm or %)	91.68	191.43	21.21
Final Bias Low/Zero Level Gas (ppm or %)	2.50	-1.50	0.34
Final Bias Upscale Level Gas (ppm or %)	91.54	190.52	21.25
Bias and Drift Results			
Initial Bias Low/Zero Level (%)	0.45	-0.32	0.75
Initial Bias Upscale Level (%)	-3.17	-1.63	-0.25
Final Bias Low/Zero Level (%)	2.20	-1.11	1.00
Final Bias Upscale Level (%)	-3.32	-2.11	-0.05
Allowable Bias (%)	(±5%)	(±5%)	(±5%)
Low/Zero Level Drift Calculation (%)	1.75	0.78	0.26
Upscale Level Drift Calculation (%)	0.15	0.47	0.20
Allowable Drift (%)	(±3%)	(±3%)	(±3%)
Raw Results (ppmv or %)	78.07	11.51	17.23
Minimum Detection Limit (MDL)	0.5	1.0	0.1
Corrected Results (ppmv or %)	80.4	12.3	16.9
***Final Results (ppmv or %)**	**80.4**	**12.3**	**16.9**

**Final Results which are shown in Italics represent the MDL for that analyte*

Analyzer Gas Quality Assurance

Test Run:	DH-010414.03		
Parameter	**NOx**	**CO**	**O2**
CALIBRATION ERROR DATA			
Range/Span Data			
Analyzer Range	100	200	25
Method 7E Span	94.7	193.0	20.9
Certified Calibration Gas Data			
Zero Level Certified Value (ppm or %)	0	0	0
Low Level Certified Value (ppm or %)	0.0	0.0	0.0
Mid Level Certified Value (ppm or %)	47.3	95.3	10.99
High Level Certified Value (ppm or %)	94.7	193.0	20.92
Calibration Error Observations (Direct)			
Zero Level Observed (ppm or %)	0.0	0.0	0.0
Low Level Observed (ppm or %)	0.4	0.6	0.1
Mid Level Observed (ppm or %)	46.9	96.7	11.2
High Level Observed (ppm or %)	94.7	194.6	21.3
Calibration Error Results			
Difference from Zero Level (%)	n/a	n/a	n/a
Difference from Low Level (%)	0.44	0.33	0.60
Difference from Mid Level (%)	0.39	0.71	0.87
Difference from High Level (%)	0.02	0.82	1.64
Allowable Difference (%)	(±2%)	(±2%)	(±2%)
TEST RUN DATA			
Bias Observations			
Low/Zero Level Cal. Gas Certified Value (ppm or %)	0.00	0.00	0.00
Upscale Cal. Gas Certified Value (ppm or %)	94.70	193.00	20.92
Initial Low/Zero Level Observed (ppm or %)	0.42	0.63	0.13
Initial Upscale Level Observed (ppm or %)	94.68	194.59	21.26
Initial Bias Low/Zero Level Gas (ppm or %)	2.50	-1.50	0.34
Initial Bias Upscale Level Gas (ppm or %)	91.54	190.52	21.25
Final Bias Low/Zero Level Gas (ppm or %)	2.11	-2.63	0.36
Final Bias Upscale Level Gas (ppm or %)	91.12	189.62	21.30
Bias and Drift Results			
Initial Bias Low/Zero Level (%)	2.20	-1.11	1.00
Initial Bias Upscale Level (%)	-3.32	-2.11	-0.05
Final Bias Low/Zero Level (%)	1.79	-1.69	1.13
Final Bias Upscale Level (%)	-3.76	-2.58	0.18
Allowable Bias (%)	(±5%)	(±5%)	(±5%)
Low/Zero Level Drift Calculation (%)	0.41	0.58	0.12
Upscale Level Drift Calculation (%)	0.45	0.47	0.23
Allowable Drift (%)	(±3%)	(±3%)	(±3%)
Raw Results (ppmv or %)	81.34	10.56	17.27
Minimum Detection Limit (MDL)	0.5	1.0	0.1
Corrected Results (ppmv or %)	84.1	12.7	16.9
***Final Results (ppmv or %)**	**84.1**	**12.7**	**16.9**

**Final Results which are shown in Italics represent the MDL for that analyte*

Company	Plant Name	Unit Make	Unit Model	Unit Number	Status	Date	Time	NOx (ppmvd)	CO (ppmvd)	O2 (%, dry)
Enterprise Products	South Carlsbad CS	Solar	Centaur	Calibration Error	0NOx/0CO/0O2	1/4/14	7:21	0.42	0.63	0.13
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:22	3.92	0.66	20.19
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:23	93.51	0.21	21.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	Calibration Error	94.7NOx/20.92O2	1/4/14	7:24	94.68	0.27	21.26
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:25	71.35	-6.37	10.85
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:26	39.61	-7.87	10.79
Enterprise Products	South Carlsbad CS	Solar	Centaur	Calibration Error	47.3NOx/10.99O2	1/4/14	7:27	46.93	-1.12	11.17
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:28	38.41	116.68	0.17
Enterprise Products	South Carlsbad CS	Solar	Centaur	Calibration Error	193CO	1/4/14	7:29	24.61	194.59	0.15
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:30	24.27	169.53	0.16
Enterprise Products	South Carlsbad CS	Solar	Centaur	Calibration Error	95.3CO	1/4/14	7:31	1.07	96.67	0.14
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:32	3.55	62.58	0.13
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:33	38.71	48.57	0.15
Enterprise Products	South Carlsbad CS	Solar	Centaur	CE Test	NO2	1/4/14	7:34	41.77	44.67	0.17
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:35	25.81	1.20	0.14
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:36	1.02	1.21	0.14
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:37	0.81	0.97	0.14
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:38	0.82	1.23	0.15
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:39	0.76	1.12	0.14
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:40	0.87	0.82	0.15
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:41	0.84	1.17	0.13
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:42	0.91	1.39	0.16
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:43	0.76	0.92	0.14
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:44	0.69	0.78	0.15
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:45	1.06	0.94	0.19
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:46	1.12	0.83	0.28
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:47	1.26	1.15	0.52
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:48	1.14	1.10	0.74
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:49	1.19	1.02	0.93
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:50	1.29	0.91	1.21
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:51	1.38	1.42	1.39
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:52	1.16	1.35	1.53
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:53	1.41	1.26	1.78
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:54	1.37	1.21	1.94
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:55	1.27	1.13	2.16
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:56	1.40	1.07	2.39
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:57	1.37	1.29	2.66
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:58	1.52	1.44	2.89
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	7:59	1.42	1.31	3.07
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:00	1.52	1.22	3.31
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:01	1.45	1.23	3.51
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:02	1.46	1.38	3.72
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:03	1.57	1.59	3.97
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:04	1.54	1.23	4.19
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:05	1.57	1.22	4.41
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:06	1.42	1.18	1.45
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:07	0.81	0.92	0.19
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:08	0.73	0.90	0.18
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:09	0.78	0.84	0.18
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:10	0.82	0.66	0.18
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:11	22.76	13.77	17.03
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:12	75.09	27.54	17.19
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:13	76.40	20.20	18.18
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:14	4.32	0.07	21.20
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	0NOx/0CO/20.92O2	1/4/14	8:15	1.66	-0.63	21.19
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:16	28.78	86.95	0.47
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	94.7NOx/193CO/0O2	1/4/14	8:17	92.45	192.76	0.25
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:18	88.63	101.50	17.01
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:19	76.49	16.82	17.18
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P1	DH-010414.01	1/4/14	8:20	76.40	31.71	17.19
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P1	DH-010414.01	1/4/14	8:21	76.70	19.32	17.19
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P1	DH-010414.01	1/4/14	8:22	76.52	16.99	17.20
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P1	DH-010414.01	1/4/14	8:23	76.59	12.25	17.20
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P2	DH-010414.01	1/4/14	8:24	76.64	9.08	17.19
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P2	DH-010414.01	1/4/14	8:25	77.06	21.17	17.18
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P2	DH-010414.01	1/4/14	8:26	77.23	14.08	17.22
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P3	DH-010414.01	1/4/14	8:27	76.98	8.87	17.21

Company	Plant Name	Unit Make	Unit Model	Unit Number	Status	Date	Time	NOx (ppmvd)	CO (ppmvd)	O2 (%, dry)
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P3	DH-010414.01	1/4/14	8:28	77.28	13.24	17.20
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P3	DH-010414.01	1/4/14	8:29	76.89	25.32	17.20
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P4	DH-010414.01	1/4/14	8:30	76.32	10.29	17.20
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P4	DH-010414.01	1/4/14	8:31	76.24	14.23	17.20
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P4	DH-010414.01	1/4/14	8:32	76.73	14.74	17.23
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P5	DH-010414.01	1/4/14	8:33	76.75	15.37	17.21
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P5	DH-010414.01	1/4/14	8:34	77.70	12.23	17.21
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P5	DH-010414.01	1/4/14	8:35	77.61	12.50	17.22
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P6	DH-010414.01	1/4/14	8:36	77.56	12.06	17.23
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P6	DH-010414.01	1/4/14	8:37	77.71	12.16	17.23
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P6	DH-010414.01	1/4/14	8:38	77.66	12.70	17.23
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:39	77.64	11.35	19.70
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:40	4.26	1.07	21.24
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:41	3.69	3.05	18.20
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	8:42	77.11	13.11	17.23
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P7	DH-010414.01	1/4/14	8:43	77.46	14.12	17.22
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P7	DH-010414.01	1/4/14	8:44	77.58	14.16	17.22
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P7	DH-010414.01	1/4/14	8:45	77.43	12.11	17.20
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P7	DH-010414.01	1/4/14	8:46	77.61	11.83	17.21
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P8	DH-010414.01	1/4/14	8:47	77.62	4.15	17.22
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P8	DH-010414.01	1/4/14	8:48	77.03	11.53	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P8	DH-010414.01	1/4/14	8:49	77.02	11.62	17.23
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P9	DH-010414.01	1/4/14	8:50	76.36	8.02	17.20
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P9	DH-010414.01	1/4/14	8:51	75.50	3.66	17.26
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P9	DH-010414.01	1/4/14	8:52	75.09	10.41	17.59
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P10	DH-010414.01	1/4/14	8:53	74.59	6.33	17.22
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P10	DH-010414.01	1/4/14	8:54	73.10	9.95	17.09
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P10	DH-010414.01	1/4/14	8:55	76.57	11.42	17.27
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P11	DH-010414.01	1/4/14	8:56	75.47	9.41	17.20
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P11	DH-010414.01	1/4/14	8:57	75.35	8.14	17.23
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P11	DH-010414.01	1/4/14	8:58	76.93	13.24	17.25
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P12	DH-010414.01	1/4/14	8:59	75.55	9.57	17.26
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P12	DH-010414.01	1/4/14	9:00	77.90	12.98	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2, P12	DH-010414.01	1/4/14	9:01	77.66	11.54	17.24
					DH-010414.01 Averages			**76.69**	**12.70**	**17.22**
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	9:02	70.88	6.28	16.79
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	9:03	12.04	2.26	20.77
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	0NOx/20.92O2	1/4/14	9:04	0.85	0.00	21.21
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	9:05	23.26	94.71	0.26
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	94.7NOx/0O2	1/4/14	9:06	91.68	191.43	0.28
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	9:07	88.96	113.37	16.91
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	9:08	77.33	13.19	17.22
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:09	77.43	13.64	17.21
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:10	77.51	11.03	17.23
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:11	77.43	11.77	17.22
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:12	77.41	12.91	17.22
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:13	77.71	11.17	17.22
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:14	77.45	10.93	17.21
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:15	77.52	10.80	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:16	77.58	12.10	17.23
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:17	77.80	11.00	17.23
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:18	77.75	11.32	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:19	77.70	12.53	17.25
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:20	77.79	14.40	17.23
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:21	77.73	11.35	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:22	77.88	10.97	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:23	77.92	10.77	17.21
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:24	78.15	10.71	17.23
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:25	77.92	10.31	17.23
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:26	78.19	10.32	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:27	78.74	10.17	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:28	79.05	10.45	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:29	78.60	10.36	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:30	78.49	10.61	17.25
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:31	78.74	10.00	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:32	78.91	10.30	17.25
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:33	78.91	11.49	17.25
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:34	78.51	12.79	17.23

Company	Plant Name	Unit Make	Unit Model	Unit Number	Status	Date	Time	NOx (ppmvd)	CO (ppmvd)	O2 (%, dry)
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:35	78.71	11.39	17.26
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:36	78.28	10.84	17.21
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:37	78.48	10.99	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:38	78.47	12.85	17.25
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:39	77.72	14.62	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.02	1/4/14	9:40	77.63	13.37	17.24
					DH-010414.02 Averages			**78.07**	**11.51**	**17.23**
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	9:41	61.99	16.81	21.18
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	0NOx/20.92O2	1/4/14	9:42	2.50	-1.50	21.25
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	9:43	21.31	58.04	1.49
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	94.7NOx/0O2	1/4/14	9:44	91.54	190.52	0.34
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	9:45	86.46	73.20	17.17
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	9:46	78.59	12.03	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	9:47	79.11	10.31	17.26
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	9:48	79.25	11.30	17.27
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	9:49	79.52	9.92	17.26
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	9:50	79.99	9.71	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	9:51	80.48	9.48	17.26
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	9:52	80.27	9.44	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	9:53	80.31	9.91	17.26
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	9:54	80.31	10.72	17.25
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	9:55	80.18	9.00	17.25
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	9:56	80.76	10.20	17.27
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	9:57	81.01	16.00	17.28
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	9:58	81.36	11.69	17.26
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	9:59	82.09	16.89	17.28
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:00	82.44	11.24	17.28
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:01	82.25	10.23	17.26
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:02	82.07	10.78	17.24
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:03	82.19	10.41	17.26
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:04	82.13	9.73	17.27
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:05	82.25	10.93	17.25
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:06	82.14	10.30	17.27
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:07	82.23	9.32	17.27
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:08	82.22	9.21	17.28
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:09	81.95	11.52	17.27
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:10	82.35	9.54	17.29
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:11	82.21	10.07	17.29
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:12	82.23	9.75	17.28
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:13	82.22	9.70	17.28
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:14	82.17	9.18	17.27
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:15	82.24	9.96	17.29
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:16	82.21	9.92	17.28
Enterprise Products	South Carlsbad CS	Solar	Centaur	T2	DH-010414.03	1/4/14	10:17	82.23	9.58	17.29
					DH-010414.03 Averages			**81.34**	**10.56**	**17.27**
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	10:18	49.14	12.33	21.26
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	0NOx/20.92O2	1/4/14	10:19	2.11	-2.63	21.30
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	10:20	38.80	116.05	0.41
Enterprise Products	South Carlsbad CS	Solar	Centaur	Bias Check	94.7NOx/0O2	1/4/14	10:21	91.12	189.62	0.36
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	10:22	86.39	62.81	17.20
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	16:04	40.92	1.54	0.08
Enterprise Products	South Carlsbad CS	Solar	Centaur	RT	NO2	1/4/14	16:05	41.03	1.46	0.09
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	16:06	19.78	1.46	0.08
Enterprise Products	South Carlsbad CS	Solar	Centaur			1/4/14	16:07	-2.28	0.24	0.01

New Mexico Environment Department
525 Camino de los Marquez, Suite 1
Santa Fe, NM 87505
Phone (505) 476-4300 Fax (505) 476-4375

Version 1/1/2010

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UNIVERSAL STACK TEST NOTIFICATION, PROTOCOL AND REPORT FORM

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Submit to: Stacktest.aqb@state.nm.us

I. DATABASE HEADER INFORMATION (drop down menus in bold)			
a. AI# **218**	**Test Report**	**Periodic Test (Portable Analyzer)**	
d. Company Name: **Enterprise Field Services LLC**		e. Facility Name: **South Carlsbad Compressor Station**	
f. Emission Unit Numbers: **1, 2**		g. Emission Unit Description (boiler, Waukesha 7042, etc) **Turbines, Solar Centaur T-4702**	
h. Reports - Tracking Number from notification response: **CMT**		i. Proposed Test Date: **Week of 1/19/15**	j. Actual test date: **1/20/2015**
k. Reason for test (name permit requirement, NSPS, MACT, consent decree, etc. Indicate here is this notification is a revised test date only) **Annual performance test of existing turbines pursuant to NSR condition A205C.**			

II. GENERAL COMPANY AND FACILITY INFORMATION			
a.Company Address: **PO Box 4324**		k.. Facility Address: **Roberson Road, Eddy County**	
b. City: **Houston**	c. State: **TX** d. Zip: **77210**	l. City: **Loving**	m. State: **NM** n. Zip: **88526**
e. Environmental Contact: **Dina Babinski**	f. Title: **ENV Supervisor**	o. Facility Contact: **Thomas Green**	p. Title: **Area Supervisor**
g. Phone Number: **210-528-3824**	h. Cell Number: **210-232-4880**	q. Phone Number: **575-885-7235**	r. Cell Number: **575-708-0015**
i. Email Address: **djbabinski@eprod.com**		s. Email Address: **tdgreen@eprod.com**	
j. Title V Permit Number: **P-130-R2**		t. NSR Permit Number: **NSR 220M8-R1**	
u. Detailed driving directions from nearest New Mexico town: **From Loving, UN285 north to Roberson Road west, Roberson Road west to station.**			

III. TESTING FIRM		
a. Company: **Compliance Services and Testing**	g. Contact: **Chris Spencer**	
b. Address 1: **7108 Washington NE Ste. A**	h. Title: **Director**	
c. Address 2: **PO Box 94191-87199**	i. Office Phone:	j. Cell Phone: **505-681-4909**

d. City:	e. State:	f. Zip:	k. Email Address:
Albuquerque	**NM**	**87109**	**cspencer@comptesting.com**

IV. EMISSION UNIT

a. Emission Unit Number:	b. Make & Model Number
1 and 2	**Solar Centaur T-4702**
c. Serial Number: **See section g.**	d. Permitted Capacity: **3609 hp**

e Exceptions: Explain if test is late, rescheduled, related to an enforcement action:

g. Emission Unit Description and brief process name or description:

Turbine 1 SN: OHD10C7915
Turbine 2 SN: OHE12C7057
Natural gas-fired turbines for natural gas compression.

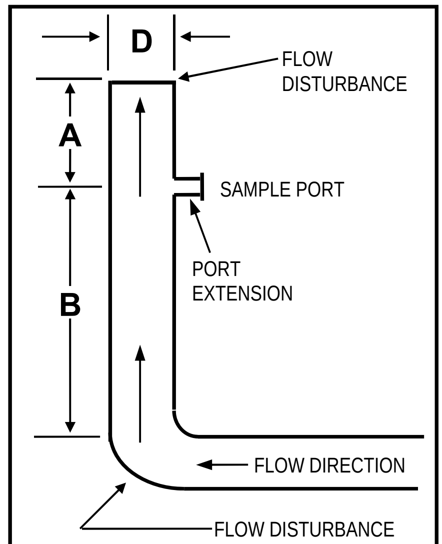
h. Installation Date:	i. Startup Date:	k. Date Reached Max. Capacity:

l. Control Equipment Description as listed in permit (model, ser. # etc. if applicable):

NA

STACK PARAMETERS

m. Velocity (ft/sec):	**177**
n. Temperature (ºC):	**486**
o. Stack Diameter, D (in.):	**NA**
p. Distance to Stack Bends or Obstructions:	
Upstream, Distance A (in.):	**NA**
Downstream, Distance B (in.):	**NA**



EXAMPLE VIEW SHOWING DISTANCES FROM SAMPLE PORT TO FLOW DISTURBANCES

Attach an explanation or drawing to explain any difficult or unusual stack geometry or parameters.

V. POLLUTANTS AND PROPOSED TEST METHODS

Pollutant or Parameter:		Proposed Test Methods (Deviations from approved methods require supporting documentation and prior authorization)	Deviation to Test Method Requested
☒	**Portable Analyzer Methods for NOx, CO, SO_2**		☐
☐	**NOx**	**EPA Method 7E**	☐
☐	**CO**	**EPA Method 10**	☐
☐	**SO2**	**EPA Method 6**	☐
☐	**VOCs**	**(Specify)**	☐
☐	**HAPs**	**(Specify)**	☐
☐	**PM (TSP)**	**EPA Method 5**	☐
☐	**PM10**	**EPA Method 201**	☐
☐	**PM2.5**	**(Specify)**	☐
☐	**Opacity**	**EPA Method 9**	☐
☐	**Visual E.**	**EPA Method 22**	☐
☐	**Stack Flow**	**EPA Methods 1 - 3**	☐
☐	**Moisture**	**EPA Method 4**	☐
☐	**Other**	**(Specify)**	☐
☐	**Other**	**(Specify)**	☐

List Specific VOC's and HAP's:

VI. PROPOSED TEST RUN AND TEST LOAD INFORMATION

a. Number of Test Runs:	b. Run Duration	c. Required by (regulation or permit number):	d. Specific Condition or Section:
3	20 min	NSR 220 A205C	A205C

PLEASE NOTE – Default run duration is 60 minutes, unless otherwise specified by an applicable regulation.

e. Expected Load:	f. Percent of Permitted Capacity:	g. Is this an opacity test?	h. If yes, no. of observation pts.:
>90%	>90%	**Yes** ☐ **No** ☒	

i. If expected load during test is less than 90% of capacity, explain**:**

NOTE – Failure to test at 90-100% of permitted load will limit unit operation to 110% of tested load until a new initial compliance test is conducted.

PLANT OR UNIT OPERATING PARAMETERS TO BE MONITORED

j. List and explain the plant operating parameters that will be monitored and applicable permit conditions or regulatory standards.

Fuel usage, compressor operating parameters, turbine operating parameters.

VII. ADDITIONAL DETAILS (where applicable)

RATA and INSTRUMENTAL ANALYZER CALIBRATION PROCEDURES

a. Do any of the methods you are proposing utilize instrumental analyzers (i.e.; EPA Methods 3A, 6C, 7E, 10, 18, 25/25A, 320 etc.)? If yes, briefly describe analyzer calibration procedures and/or calibration standard procedures. Enter the highest pollutant concentration expected and the proposed concentrations of calibration gases.	☒ Yes	☐ No

As described in the methods.

SAMPLING TRAIN LEAK CHECK PROCEDURES

b. Do any of the methods you are proposing utilize the EPA Method 5 sampling train (i.e.; EPA Methods 1-4, 5, 17, 26/26A, 29, etc.)? If yes, briefly describe sampling train and pitot tube leak check procedures:	☐ Yes	☒ No

EPA METHOD 19 IN LIEU OF EPA METHODS 1-4

c. Are you proposing to utilize EPA Method 19 in lieu of EPA Methods 1-4? If yes, explain why you believe this proposal is justified:	☒ Yes	☐ No

Method 19 with use of a calibrated fuel meter and current fuel gas analysis.

PLEASE NOTE – EPA Method 19 may be utilized in lieu of EPA Methods 1-4, subject to the approval of the Department. If you are proposing to utilize EPA Method 19 in lieu of EPA Methods 1-4, you MUST include a recent fuel gas heating value analysis as well as a recent fuel flow meter calibration certificate, preferably conducted on the day of the test, but no earlier than three months prior to the test date. If the analyses have been conducted prior to the test date, you MUST append the certificates to the protocol. If conducted on the day of the test, you MUST append the certificates to the final test report.

VIII. ATTACHMENTS (as needed to support proposed test; check all that apply)		
NOTIFICATION/PROTOCOL ATTACHMENTS		
☐	Road Map Indicating Directions from Nearest New Mexico Town to Facility	
☐	Schematic of process being tested showing emission points, sampling sites and stack cross-section	
☐	Copy of proposed test methods (except for those promulgated test methods found in 40 CFR 51, 60, 61 and 63)	
☐	Fuel Heating Value Analysis	
☐	Fuel Flow Meter Calibration Certificate	
☐	Other:	
☐	Other:	
TEST REPORT ATTACHMENTS		
☐	**Section 2. Tables of Results**	
☐	**Supporting Documents (Specify)**	
Retain Report Section 3 - Test Procedures, Data, Calculations, Appendices – 2 years NSR permits, 5 years TV		

IX. CERTIFICATION		
This document has been prepared under my supervision and is accurate and complete to the best of my knowledge. I understand that acceptance of this protocol does not waive the requirements of any permit or regulation. I understand that any procedural errors or omissions are the sole responsibility of the permit holder.		
Signature: Jon Field	Print Name and Title: **Jon E. Fields, Director-Field Compliance**	Date: 2-18-2014
Responsible Official for Title V? ☐ Yes	☒ No (R.O signature not required for routine periodic testing)	

2015 Compliance Test Report

On

Exhaust Emissions

From Two

Solar Centaur T-4702 Centrifugal Internal Combustion Engine

At The

South Carlsbad Compressor Station

Near

Loving, New Mexico

Prepared For

Enterprise Field Services

January 2015

Project Number 1187

State of New Mexico Environment Department
Air Quality Bureau Permit Number 0220-M8-R1

Prepared By

Compliance Services & Testing

Compliance Services & Testing
P.O. Box 94191-87199
7108 Washington St. NE
Suite A
Albuquerque, NM 87109
(505) 681-4909 Phone
www.comptesting.com

February 5, 2015

Dina Babinski
Enterprise Field Services
PO Box 4324
Houston, TX 77210

RE: Annual testing at the South Carlsbad Compressor Station.

Mrs. Babinski:

On January 20, 2015 CST performed annual emissions testing at the South Carlsbad Compressor Station to satisfy the requirements of the New Mexico Environment Department Air Quality Bureau Permit Number 0220-M8-R1. The unit is identified as follows:

Engine Information		
Unit Number	1	2
Engine Make	Solar	
Engine Model	Centaur T-4702	
Serial Number	OHD10-C-7915	OHE12-C-7057
Rated Horsepower	3609	
Rated Speed	15000	

The testing followed procedures found in the NMED "SOP for Using Portable Analyzers in Performance Testing." Mass emission rates were calculated using EPA Method 19 (combustion stoichiometry). The rates in terms of pounds per hour and tons per year were calculated using the oxygen F-factor (DSCFex/MMBtu), the fuel consumption rate (SCFH), the fuel higher heating value (Btu/SCF), and the pollutant concentration. Fuel consumption was monitored from a fuel meter. Three twenty-minute test runs were performed. The attached data sheet gives a detailed summary of the results of this test. Quality assurance data sheets are also attached. Strip charts are on file, and are available if needed.

Respectfully,

Jeremy Cahn
Compliance Services and Testing

Summary of Results
South Carlsbad Compressor Station, Unit #1

Company: Enterprise Field Services
Location: South Carlsbad Compressor Station
Source: Solar Centaur 40-T4702 SN: OHD10C7915
Engine Site Rating: 3609 Hp @ 15000 RPM
Technician: SR

Test Run Number	**1**	**2**	**3**	
EU Number	**1**	**1**	**1**	
Date	1/20/15	1/20/15	1/20/15	
Start Time	9:51	10:16	10:41	
Stop Time	10:11	10:36	11:01	
Engine/Compressor Operation				
Gas Producer Speed (%)	95.0	95.4	95.4	
Power Turbine Speed (%)	82.0	82.6	82.5	
Engine Horsepower (Hp)	3429	3443	3443	
Engine Compressor Discharge, PCD (psig)	101	102	102	
Fuel Valve Output (%)	58.7	59.3	59.4	
Suction Pressure (psig)	404	404	404	
Discharge Pressure (psig)	689	691	690	
Suction Temperature (°F)	130	132	133	
Discharge Temperature (°F)	167	172	173	
Air Inlet Temperature (T1) (°F)	61	64	65	
Average Exhaust Temperature (T5) (°F)	1104	1121	1126	
Compressor Throughput (MMCFD)	78.9	78.9	78.9	
Fuel Data				
Measured Fuel Consumption (MSCFD)	788.7	788.7	788.7	
Measured Fuel Consumption (SCFH)	32861	32861	32861	
O2 F-Factor (DSCF/MMBtu, HHV basis)	8697	8697	8697	
Fuel Heating Value (Btu/SCF, HHV)	1148	1148	1148	
BHp Specific Fuel Rate (Btu/Hp-hr, HHV basis)	9871	9871	9871	
Ambient Conditions				
Pressure Altitude (MSL)	3010	3010	3010	
Atmospheric Pressure ("Hg)	26.83	26.83	26.83	
Dry Bulb Temperature (°F)	60.3	62.4	63.7	
Wet Bulb Temperature (°F)	47.3	48.2	49.1	
Humidity (lb/lb air)	0.0046	0.0046	0.0048	
Measured Exhaust Emissions (Corrected)				**Average**
NOx (ppmv)	82.52	83.57	83.12	**83.07**
CO (ppmv)	16.45	15.56	15.41	**15.81**
O2 (vol %)	16.52	16.52	16.53	**16.52**
CO2 (vol %)	2.52	2.54	2.57	**2.54**
Moisture Content (% - from Method 4)	4.64	4.64	4.64	**4.64**
Fo (Natural Gas)	1.74	1.73	1.70	**1.72**
Exhaust Flow Rates (EPA Method 19 - Fuel Based)				
Dry SCFH (dry basis, calc. from Fuel Consumption)	1.57E+06	1.57E+06	1.57E+06	**1.57E+06**
Calculated Mass Emission Rates (EPA Methods 1-4)				
NOx (lbs/hr) **{Permit Limit = 27.0}**	15.43	15.63	15.58	**15.55**
CO (lbs/hr) **{Permit Limit = 7.4}**	1.87	1.77	1.76	**1.80**
NOx (tons/yr) **{Permit Limit = 118.3}**	67.60	68.46	68.24	**68.10**
CO (tons/yr) **{Permit Limit = 32.5}**	8.20	7.76	7.70	**7.89**

Summary of Results
South Carlsbad Compressor Station, Unit #2

Company: Enterprise Field Services
Location: South Carlsbad Compressor Station
Source: Solar Centaur 40-T4702 SN: OHE12C7057
Engine Site Rating: 3609 Hp @ 15000 RPM
Technician: SR

Test Run Number	**1**	**2**	**3**	
EU Number	**2**	**2**	**2**	
Date	1/20/15	1/20/15	1/20/15	
Start Time	8:29	8:54	9:19	
Stop Time	8:49	9:14	9:39	
Engine/Compressor Operation				
Gas Producer Speed (%)	94.8	94.7	94.8	
Power Turbine Speed (%)	84.1	83.7	83.6	
Engine Horsepower (Hp)	3421	3418	3421	
Engine Compressor Discharge, PCD (psig)	105	105	104	
Fuel Valve Output (%)	37.8	37.7	38.1	
Suction Pressure (psig)	237	238	238	
Discharge Pressure (psig)	416	414	413	
Suction Temperature (°F)	49	49	49	
Discharge Temperature (°F)	129	127	127	
Air Inlet Temperature (T1) (°F)	52	53	54	
Average Exhaust Temperature (T5) (°F)	1054	1056	1059	
Compressor Throughput (MMCFD)	80.6	80.6	80.6	
Fuel Data				
Measured Fuel Consumption (MSCFD)	788.7	788.7	788.7	
Measured Fuel Consumption (SCFH)	32861	32861	32861	
O2 F-Factor (DSCF/MMBtu, HHV basis)	8697	8697	8697	
Fuel Heating Value (Btu/SCF, HHV)	1148	1148	1148	
BHp Specific Fuel Rate (Btu/Hp-hr, HHV basis)	9871	9871	9871	
Ambient Conditions				
Pressure Altitude (MSL)	3000	3000	3010	
Atmospheric Pressure ("Hg)	26.84	26.84	26.83	
Dry Bulb Temperature (°F)	47.7	48.7	51.1	
Wet Bulb Temperature (°F)	40.6	41.7	43	
Humidity (lb/lb air)	0.0043	0.0045	0.0046	
Measured Exhaust Emissions (Corrected)				**Average**
NOx (ppmv)	81.07	83.33	84.59	**83.00**
CO (ppmv)	10.51	9.99	10.61	**10.37**
O2 (vol %)	16.71	16.71	16.73	**16.72**
CO2 (vol %)	2.41	2.41	2.45	**2.43**
Moisture Content (% - from Method 4)	4.64	4.64	4.64	**4.64**
Fo (Natural Gas)	1.74	1.74	1.70	**1.72**
Exhaust Flow Rates (EPA Method 19 - Fuel Based)				
Dry SCFH (dry basis, calc. from Fuel Consumption)	1.64E+06	1.64E+06	1.64E+06	**1.64E+06**
Calculated Mass Emission Rates (EPA Methods 1-4)				
NOx (lbs/hr) **{Permit Limit = 27.0}**	15.85	16.29	16.62	**16.25**
CO (lbs/hr) **{Permit Limit = 7.4}**	1.25	1.19	1.27	**1.24**
NOx (tons/yr) **{Permit Limit = 118.3}**	69.42	71.36	72.79	**71.19**
CO (tons/yr) **{Permit Limit = 32.5}**	5.48	5.21	5.56	**5.41**

Quality Assurance Report - Sample System #1
Converter Efficiency Test, Interference Test, Response Time and Bias Test, Mass Flow Controller Check, Pre and Post Leak Checks

NOx Converter Efficiency Check

Method: 7E Section 8.2.4
Frequency: Before each field test
Criteria: Equal to or greater than 90% conversion efficiency

Test Date: 1/19/15 Technician: SR

NO2 / N2 Balance	*Results*
Certified Value	48.9 ppmv
Observed Value	47.1 ppmv
Converter Efficiency	96%

Interference Response Checks

Method: 7E Section 8.2.7
Frequency: Prior to initial use in the field or after major alteration or modification
Criteria: Sum of responses < 2.5 % of calibration span

Test Date: 1/20/15 Technician: SR

Interference Test Gases		**Analyzer Response (ppmv or % as applicable)**					
Type Gas	*Conc.*	*NOx (ppmv)*	*CO (ppmv)*	*SO2 (ppmv)*	*THC (ppmv)*	*O2 (%)*	*CO2 (%)*
NOx in N2	50 ppm	---	N/A	---	---	0.00	0.01
CO in N2	50 ppm	N/A	---	---	---	0.00	0.01
O2 in N2	10.0%	0.23	-0.21	---	---	---	N/A
CO2 in N2	10.0%	0.23	-0.21	---	---	N/A	---
THC in air	---	---	---	---	---	---	---

Gas Dilution Calibration - 2 Mass Flow Controllers

Method: 205
Frequency: Before each field test.
Criteria: Produce Calibration gases whose measured values are within ± 2% of predicted values.

Manufacturer: Environics
Model Number: Series 4040
Serial Number: 4456

Cal Gas: NOx
Test Date: 1/19/15
Technician: SR

	MFC 3			**MFC 2**		
	Direct Inject	**Diluted Conc.**	**Diluted Conc.**	**Direct Inject**	**Diluted Conc.**	**Diluted Conc.**
Certified Value:	242	2957	2957	242	2957	2957
Ex. Dilution:	---	242	150	---	750	900
Injection 1	246	239	147	245	743	896
Injection 2	248	238	148	244	746	894
Injection 3	246	237	147	245	742	897
Average	**246.67**	**238.00**	**147.33**	**244.67**	**743.67**	**895.67**
% Variation	**0.47%**	**0.42%**	**0.39%**	**0.24%**	**0.28%**	**0.17%**
% Difference	**-1.91%**	**1.67%**	**1.79%**	**-1.10%**	**0.85%**	**0.48%**

Sample System Bias & Response Time Check

Method: 7E Section 8.2.5-6
Frequency: Before sampling begins
Criteria: 5% of calibration span
Criteria: Note the longer of the two times as the response time

Test Date: 1/20/15 Technician: SR

Sample System Bias Check

Introduction Technique	**NOx (ppmv)**	**CO (ppmv)**	**SO2 (ppmv)**	**THC (ppmv)**	**O2 (%)**	**CO2 (%)**
Direct Zero Input	0	0.0			0.0	0.0
Bias Input	-1	-0.3			0.0	0.1
Zero Bias	-0.4%	-0.3%			0.0%	1.0%
Direct Span Input	49.6	50.1			10.0	10.0
Bias Input	50.6	50.4			10.0	10.1
Span Bias	1.1%	0.3%			0.0%	1.0%

Sample System Response Time

Parameter	**NOx (ppmv)**	**CO (ppmv)**	**SO2 (ppmv)**	**THC (ppmv)**	**O2 (%)**	**CO2 (%)**
Upscale Response	35	45			50	55
Downscale Response	40	50			55	55
Purge Time	110 seconds					

Sample System Leak Check

Frequency: Daily or whenever the sample system is moved or disassembled (CST SOP)
Criteria: Less than one inch decrease in pressure in one minute (CST SOP)

Test Date				
1/20/15	Vacuum Initial:	0.0 inches	/ minute at	13 inches Hg
	Vacuum Final:	0.0 inches	/ minute at	13 inches Hg

Quality Assurance Worksheet
Instrument Calibration and Drift Correction

Company: Enterprise Field Services
Location: South Carlsbad Compressor Station
Source: Solar Centaur 40-T4702 SN: OHD10C7915
Engine Site Rating: 3609 Hp @ 15000 RPM
Test Date: Tuesday, January 20, 15

UNIT NUMBER 1

GAS LEVELS PER METHOD	CALIBRATION GAS CONCENTRATIONS Certified Concentration	Target (% Span)	INITIAL CALIBRATION & LINEARITY CHECK Analyzer Response	Calibration Error < 2%
NOx				
Zero	0.0 ppmv	0.0	-0.4 ppmv	-0.4%
Mid	50.0 ppmv	52.6	49.6 ppmv	-0.4%
High	95.0 ppmv	100.0	95.8 ppmv	0.8%
Analyzer Range = 100 ppmv			**Span = 95.0**	
CO				
Zero	0.0 ppmv	0.0	0 ppmv	0.0%
Mid	50.0 ppmv	52.6	50.1 ppmv	0.1%
High	95.0 ppmv	100.0	95.6 ppmv	0.6%
Analyzer Range = 100 ppmv			**Span = 95.0**	
O2				
Zero	0.0%	0.0	0.0%	0.0%
Mid	10.0%	47.6	10.0%	0.0%
High	21.0%	100.0	21.0%	0.0%
Analyzer Range = 22.0%			**Span = 21.0**	
CO2				
Zero	0.0%	0.0	0.0%	0.0%
Mid	5.0%	50.0	5.2%	2.0%
High	10.0%	100.0	10.0%	0.0%
Analyzer Range = 11.0%			**Span = 10.0**	

TEST RUN 1

Start Run	ZERO and SPAN CALIBRATION CHECK			
9:51				
Stop Run	**Initial Response**	**Final Response**	**Drift < 3%**	**Bias < 5%**
10:11				
Avg. ppmv				
82.00	-1.6 ppmv	-0.6 ppmv	1.1%	0.6%
Corr. ppmv				
82.52	49.3 ppmv	49.2 ppmv	0.2%	0.8%
Cal. Span				
95				
Avg. ppmv				
15.00	-1.5 ppmv	-1.8 ppmv	0.3%	1.9%
Corr. ppmv				
16.45	49.3 ppmv	48.6 ppmv	1.4%	1.5%
Cal. Span				
95				
Avg.%				
16.52	0.0%	0.0%	0.0%	0.0%
Corr. %				
16.52	10.0%	10.0%	0.0%	0.0%
Cal. Span				
21				
Avg.%				
2.79	0.3%	0.3%	0.0%	3.0%
Corr. %				
2.52				
Cal. Span	10.2%	10.2%	0.0%	2.0%
10				

TEST RUN 2

Start Run	ZERO and SPAN CALIBRATION CHECK			
10:16				
Stop Run	**Initial Response**	**Final Response**	**Drift < 3%**	**Bias < 5%**
10:36				
Avg. ppmv				
83.00	-0.6 ppmv	-0.7 ppmv	0.1%	0.7%
Corr. ppmv				
83.57	49.2 ppmv	49.6 ppmv	0.8%	0.4%
Cal. Span				
95				
Avg. ppmv				
14.00	-1.8 ppmv	-1.5 ppmv	0.3%	1.6%
Corr. ppmv				
15.56	48.6 ppmv	48.7 ppmv	0.2%	1.4%
Cal. Span				
95				
Avg.%				
16.52	0.0%	0.0%	0.0%	0.0%
Corr. %				
16.52	10.0%	10.0%	0.0%	0.0%
Cal. Span				
21				
Avg.%				
2.81	0.3%	0.3%	0.0%	3.0%
Corr. %				
2.54				
Cal. Span	10.2%	10.2%	0.0%	2.0%
10				

TEST RUN 3

Start Run	ZERO and SPAN CALIBRATION CHECK			
10:41				
Stop Run	**Initial Response**	**Final Response**	**Drift < 3%**	**Bias < 5%**
11:01				
Avg. ppmv				
83.00	-0.7 ppmv	0.8 ppmv	1.6%	0.8%
Corr. ppmv				
83.12	49.6 ppmv	50.3 ppmv	1.4%	0.3%
Cal. Span				
95				
Avg. ppmv				
14.00	-1.5 ppmv	-1.5 ppmv	0.0%	1.6%
Corr. ppmv				
15.41	48.7 ppmv	48.9 ppmv	0.4%	1.2%
Cal. Span				
95				
Avg.%				
16.53	0.0%	0.0%	0.0%	0.0%
Corr. %				
16.53	10.0%	10.0%	0.0%	0.0%
Cal. Span				
21				
Avg.%				
2.83	0.3%	0.3%	0.0%	3.0%
Corr. %				
2.57				
Cal. Span	10.2%	10.1%	1.0%	1.0%
10				

Quality Assurance Worksheet
Instrument Calibration and Drift Correction

Company: Enterprise Field Services
Location: South Carlsbad Compressor Station
Source: Solar Centaur 40-T4702 SN: OHE12C7057
Engine Site Rating: 3609 Hp @ 15000 RPM
Test Date: Tuesday, January 20, 15

UNIT NUMBER 2

GAS LEVELS PER METHOD	CALIBRATION GAS CONCENTRATIONS: Certified Concentration	CALIBRATION GAS CONCENTRATIONS: Target (% Span)	INITIAL CALIBRATION & LINEARITY CHECK: Analyzer Response	INITIAL CALIBRATION & LINEARITY CHECK: Calibration Error < 2%
NOx				
Zero	0.0 ppmv	0.0	-0.4 ppmv	-0.4%
Mid	50.0 ppmv	52.6	49.6 ppmv	-0.4%
High	95.0 ppmv	100.0	95.8 ppmv	0.8%
Analyzer Range = 100 ppmv			**Span = 95.0**	
CO				
Zero	0.0 ppmv	0.0	0 ppmv	0.0%
Mid	50.0 ppmv	52.6	50.1 ppmv	0.1%
High	95.0 ppmv	100.0	95.6 ppmv	0.6%
Analyzer Range = 100 ppmv			**Span = 95.0**	
O2				
Zero	0.0%	0.0	0.0%	0.0%
Mid	10.0%	47.6	10.0%	0.0%
High	21.0%	100.0	21.0%	0.0%
Analyzer Range = 22.0%			**Span = 21.0**	
CO2				
Zero	0.0%	0.0	0.0%	0.0%
Mid	5.0%	50.0	5.2%	2.0%
High	10.0%	100.0	10.0%	0.0%
Analyzer Range = 11.0%			**Span = 10.0**	

TEST RUN 1

Start Run 8:29 / Stop Run 8:49	ZERO and SPAN CALIBRATION CHECK: Initial Response	Final Response	Drift < 3%	Bias < 5%
Avg. ppmv				
82.00	-0.8 ppmv	-0.9 ppmv	0.1%	0.9%
Corr. ppmv				
81.07	50.6 ppmv	49.9 ppmv	1.4%	0.1%
Cal. Span				
95				
Avg. ppmv				
10.00	-0.3 ppmv	-1.1 ppmv	0.8%	1.2%
Corr. ppmv				
10.51	50.4 ppmv	50.0 ppmv	0.8%	0.0%
Cal. Span				
95				
Avg.%				
16.71	0.0%	0.0%	0.0%	0.0%
Corr. %				
16.71	10.0%	10.0%	0.0%	0.0%
Cal. Span				
21				
Avg.%				
2.56	0.1%	0.2%	1.0%	2.0%
Corr. %				
2.41				
Cal. Span	10.1%	10.2%	1.0%	2.0%
10				

TEST RUN 2

Start Run 8:54 / Stop Run 9:14	ZERO and SPAN CALIBRATION CHECK: Initial Response	Final Response	Drift < 3%	Bias < 5%
Avg. ppmv				
83.00	-0.9 ppmv	-0.6 ppmv	0.3%	0.6%
Corr. ppmv				
83.33	49.9 ppmv	49.1 ppmv	1.6%	0.9%
Cal. Span				
95				
Avg. ppmv				
9.00	-1.1 ppmv	-1.3 ppmv	0.2%	1.4%
Corr. ppmv				
9.99	50.0 ppmv	49.7 ppmv	0.6%	0.3%
Cal. Span				
95				
Avg.%				
16.71	0.0%	0.0%	0.0%	0.0%
Corr. %				
16.71	10.0%	10.0%	0.0%	0.0%
Cal. Span				
21				
Avg.%				
2.65	0.2%	0.3%	1.0%	3.0%
Corr. %				
2.41				
Cal. Span	10.2%	10.2%	0.0%	2.0%
10				

TEST RUN 3

Start Run 9:19 / Stop Run 9:39	ZERO and SPAN CALIBRATION CHECK: Initial Response	Final Response	Drift < 3%	Bias < 5%
Avg. ppmv				
84.00	-0.6 ppmv	-1.6 ppmv	1.1%	1.7%
Corr. ppmv				
84.59	49.1 ppmv	49.3 ppmv	0.4%	0.7%
Cal. Span				
95				
Avg. ppmv				
9.40	-1.3 ppmv	-1.5 ppmv	0.2%	1.6%
Corr. ppmv				
10.61	49.7 ppmv	49.3 ppmv	0.8%	0.7%
Cal. Span				
95				
Avg.%				
16.73	0.0%	0.0%	0.0%	0.0%
Corr. %				
16.73	10.0%	10.0%	0.0%	0.0%
Cal. Span				
21				
Avg.%				
2.73	0.3%	0.3%	0.0%	3.0%
Corr. %				
2.45				
Cal. Span	10.2%	10.2%	0.0%	2.0%
10				

CMS3R125

CORPORATE MEASUREMENT SYSTEM

Gas Quality Report - Detail

Prod date: 01/2015 thru 02/2015

Request: Meter: 16961

Report Date: 01/29/2015 14:58

Meter Number: 16961 01 **Production month:** 01/2015 **Sample Type:** Hourly Chrom

Gas Quality Source: 1696101 SO CARLSBAD TURB FUEL **Gpa Version:** 2145-09

Date/Time	Btu	Gravity	Co2	N2	C1 Methane	C2 Ethane	C3 Propane	IC4 Iso Butane	NC4 Butane	IC5 Iso Pntn	NC5 Pntn	NeoC5 Neo Pntn	C6 Plus	H2s	Hydrogen	Oxygen	Helium	Argon	Carbon Monoxide
01 07:00	1136.1	0.6631	0.0010	2.8563	83.6352	8.7108	3.5983	0.3324	0.6696	0.0887	0.0739	0.0000	0.0338	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
02 07:00	1131.9	0.6623	0.0000	3.0501	83.5036	8.7941	3.5326	0.3155	0.6255	0.0818	0.0673	0.0000	0.0295	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
03 07:00	1144.6	0.6699	0.0005	2.9842	82.6472	9.2540	3.8378	0.3545	0.7048	0.0964	0.0819	0.0000	0.0387	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
04 07:00	1147.0	0.6710	0.0007	2.9347	82.6754	9.1282	3.9093	0.3730	0.7572	0.1013	0.0839	0.0000	0.0363	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
05 07:00	1137.1	0.6715	0.1691	2.7855	83.1382	8.9093	3.7070	0.3526	0.7133	0.1012	0.0859	0.0000	0.0379	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
06 07:00	1145.9	0.6678	0.0001	2.7198	83.0808	9.1256	3.7825	0.3571	0.7129	0.0977	0.0831	0.0000	0.0404	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
07 07:00	1143.7	0.6680	0.0000	2.8722	82.8418	9.3017	3.7556	0.3455	0.6793	0.0918	0.0759	0.0000	0.0362	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
08 07:00	1145.5	0.6701	0.0000	2.9626	82.5880	9.3120	3.8738	0.3561	0.7034	0.0917	0.0759	0.0000	0.0365	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
09 07:00	1150.8	0.6718	0.0007	2.7886	82.4602	9.4905	3.9595	0.3627	0.7254	0.0950	0.0789	0.0000	0.0385	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10 07:00	1149.5	0.6724	0.0007	2.9273	82.3088	9.4880	3.9740	0.3640	0.7325	0.0924	0.0766	0.0000	0.0357	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11 07:00	1149.0	0.6750	0.1284	2.9126	82.0913	9.5789	3.9495	0.3732	0.7553	0.0963	0.0788	0.0000	0.0357	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12 07:00	1144.4	0.6781	0.4807	3.0357	81.5945	9.6236	3.9708	0.3597	0.7277	0.0938	0.0772	0.0000	0.0363	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13 07:00	1147.9	0.6768	0.2911	2.9947	81.6992	9.7065	4.0125	0.3615	0.7320	0.0929	0.0757	0.0000	0.0339	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14 07:00	1148.3	0.6770	0.3226	2.9553	81.6891	9.7146	4.0303	0.3580	0.7251	0.0927	0.0766	0.0000	0.0357	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15 07:00	1144.8	0.6764	0.3676	3.0413	81.7852	9.5369	3.9848	0.3579	0.7222	0.0938	0.0766	0.0000	0.0337	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
16 07:00	1146.7	0.6761	0.3418	2.9360	81.8389	9.6164	3.9933	0.3578	0.7135	0.0924	0.0757	0.0000	0.0342	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17 07:00	1147.6	0.6768	0.3276	2.9696	81.6666	9.7419	4.0432	0.3548	0.6993	0.0905	0.0742	0.0000	0.0323	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
18 07:00	1147.0	0.6753	0.3235	2.8677	81.9681	9.5738	4.0126	0.3541	0.6991	0.0917	0.0759	0.0000	0.0335	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
19 07:00	1145.5	0.6751	0.3013	2.9786	81.8912	9.6138	3.9732	0.3507	0.6937	0.0898	0.0743	0.0000	0.0334	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20 07:00	1145.7	0.6746	0.3163	2.8955	81.9762	9.6418	3.9297	0.3515	0.6939	0.0885	0.0729	0.0000	0.0337	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
21 07:00	1146.7	0.6732	0.2871	2.7472	82.3412	9.4139	3.9329	0.3620	0.7168	0.0908	0.0745	0.0000	0.0336	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22 07:00	1144.0	0.6735	0.3042	2.9108	82.1824	9.4289	3.9351	0.3518	0.6991	0.0857	0.0706	0.0000	0.0314	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
23 07:00	1143.6	0.6744	0.3243	2.9862	82.0282	9.4913	3.9240	0.3490	0.7001	0.0882	0.0746	0.0000	0.0341	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
24 07:00	1143.9	0.6717	0.2962	2.7363	82.5729	9.2893	3.8392	0.3561	0.7125	0.0889	0.0742	0.0000	0.0344	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25 07:00	1139.9	0.6721	0.2491	2.9321	82.5773	9.1645	3.8167	0.3529	0.7087	0.0894	0.0743	0.0000	0.0350	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
26 07:00	1140.0	0.6725	0.4310	2.8624	82.4850	9.1263	3.8349	0.3525	0.7065	0.0909	0.0749	0.0000	0.0356	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
27 07:00	1142.3	0.6734	0.3694	2.9020	82.3455	9.1996	3.8931	0.3606	0.7254	0.0942	0.0771	0.0000	0.0331	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
28 07:00	1141.0	0.6745	0.4682	2.9293	82.1582	9.3125	3.8447	0.3595	0.7259	0.0930	0.0760	0.0000	0.0327	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Average:	1144.3	0.6727	0.2180	2.9098	82.3489	9.3675	3.8875	0.3549	0.7100	0.0922	0.0763	0.0000	0.0348	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AVG GPM:						2.5046	1.0707	0.1161	0.2238	0.0337	0.0277	0.0000	0.0156		**TOTAL AVG GPM:**		3.9921		

Fuel Gas Analysis
Diluent F Factors, Higher Heating Value Calculation, Predicted Fo, Fuel VOC Content

Company:	**Enterprise**
Sample ID:	**South Carlsbad Turbine Fuel**
Time:	**N/A**
Date:	**1/20/15**

CALCULATION OF DENSITY AND HEATING VALUE @ 68°F and 29.92 in Hg

Component	% Volume	Molecular Wt.	Density (lb/ft3)	% volume x Density	weight %	Component Gross Btu/lb	Weight Fract. Btu	Gross Htng. Val. (Btu/SCF)	Volume Fract. Btu
Hydrogen		2.016	0.0052	0.00000	0.0000	61100	0.00	325.0	0.000
Oxygen		32.000	0.0831	0.00000	0.0000	0	0.00	0.0	0.000
Nitrogen	2.8955	28.016	0.0731	0.00212	4.1617	0	0.00	0.0	0.000
CO2	0.3163	44.010	0.1149	0.00036	0.7149	0	0.00	0.0	0.000
CO		28.010	0.0727	0.00000	0.0000	4347	0.00	322.0	0.000
Methane	81.9762	16.041	0.0417	0.03414	67.1515	23879	16035.10	1013.0	830.419
Ethane	9.6418	30.067	0.0789	0.00760	14.9562	22320	3338.23	1792.0	172.781
Ethylene		28.051	0.0733	0.00000	0.0000	21644	0.00	1614.0	0.000
Propane	3.9297	44.092	0.1175	0.00462	9.0790	21661	1966.61	2590.0	101.779
propylene		42.077	0.1090	0.00000	0.0000	21041	0.00	2336.0	0.000
Isobutane	0.3515	58.118	0.1554	0.00055	1.0742	21308	228.90	3363.0	11.821
n-butane	0.6939	58.118	0.1554	0.00108	2.1207	21257	450.79	3370.0	23.384
Isobutene		56.102	0.1454	0.00000	0.0000	20840	0.00	3068.0	0.000
Isopentane	0.0885	72.144	0.1870	0.00017	0.3255	21091	68.66	4008.0	3.547
n-pentane	0.0729	72.144	0.1870	0.00014	0.2681	21052	56.45	4016.0	2.928
n-hexane +	0.0337	86.169	0.2234	0.00008	0.1480	20940	31.00	4762.0	1.605
H2S		34.076	0.0895	0.00000	0.0000	7100	0.00	647.0	0.000
Totals	**100.00**	**731.25**	**1.91**	**0.0508**	**100.00**	**Gross Heating Value**			
Total Density:		**0.0508**	**Specific Gravity:**		**0.665**	**Btu/lb:**	**22176**	**Btu/SCF:**	**1148**

CALCULATION OF F FACTORS

Component	Mol. Wt.	C Factor	H Factor	% volume	Fract. Wt.	Weight Percents: Carbon	Hydrogen	Nitrogen	Oxygen	Sulfur
Hydrogen	2.016	0.0000	1.0000	0.0000	0.0000		0.0000			
Oxygen	32.000	0.0000	0.0000	0.0000	0.0000				0.0000	
Nitrogen	28.016	0.0000	0.0000	2.8955	81.1203			4.1632		
CO2	44.010	0.2723	0.0000	0.3163	13.9204	0.1945			0.5194	
CO	28.010	0.4259	0.0000	0.0000	0.0000	0.0000			0.0000	
Methane	16.041	0.7500	0.2500	81.9762	1314.9802	50.6153	16.8718			
Ethane	30.067	0.8000	0.2000	9.6418	289.9000	11.9025	2.9756			
Ethylene	28.051	0.8571	0.1429	0.0000	0.0000	0.0000	0.0000			
Propane	44.092	0.8182	0.1818	3.9297	173.2683	7.2756	1.6168			
Propene	42.077	0.8571	0.1429	0.0000	0.0000	0.0000	0.0000			
Isobutane	58.118	0.8276	0.1725	0.3515	20.4285	0.8677	0.1808			
n-butane	58.118	0.8276	0.1725	0.6939	40.3281	1.7129	0.3570			
Isobutene	56.102	0.8571	0.1429	0.0000	0.0000	0.0000	0.0000			
Isopentane	72.144	0.8333	0.1667	0.0885	6.3847	0.2731	0.0546			
n-pentane	72.144	0.8333	0.1667	0.0729	5.2593	0.2249	0.0450			
n-hexane	86.169	0.8372	0.1628	0.0337	2.9039	0.1248	0.0243			
H2S	34.076	0.0000	0.0587	0.0000	0.0000	0.0000	0.0000			0.0000
Totals	**731.25**	**9.80**	**2.96**	**100.00**	**1948.494**	**73.191**	**22.126**	**4.163**	**0.519**	**0.000**

CALCULATED VALUES

O2 F Factor (dry)	**8697**	DSCF of Exhaust/MMBtu of Fuel Burned @ 0% excess air
O2 F Factor (wet)	**10623**	SCF of Exhaust/MMBtu of Fuel Burned @ 0% excess air
Moisture F Factor	**1926**	SCF of Water/MMBtu of Fuel Burned @ 0% excess air
Combust. Moisture	**18.13**	Volume % water in flue gas @ 0% excess air
CO2 F Factor	**1059**	DSCF of CO2/MMBtu of Fuel Burned @ 0% excess air
Carbon Dioxide	**12.18**	Volume % CO2 in flue gas @ 0% O2
Predicted Fo Factor	**1.72**	EPA Method 3b Fo value
Fuel VOC %	**29.17%**	Non-methane
Fuel VOC %	**13.56%**	Non-methane, non-ethane

Nolan, Shiver

From:	Nolan, Shiver
Sent:	Tuesday, February 09, 2016 8:30 AM
To:	'stacktest.aqb@state.nm.us'
Cc:	Ferguson, Dina; Polk, Alena (ampolk@eprod.com)
Subject:	South Carlsbad Eng 1 & 2 Solar Centaur T-4702
Attachments:	201601 South Carlsbad Annual Test Report.pdf - Adobe Acrobat Pro.pdf

Attached are the two stack test referenced above. Contact Information has been included on the NMED forms.

Shiver Nolan
Sr. Compliance Administrator

New Mexico Environment Department
525 Camino de los Marquez, Suite 1
Santa Fe, NM 87505
Phone (505) 476-4300 Fax (505) 476-4375

Version 1/1/2010

NMED USE ONLY	
DTS	
TEMPO	

UNIVERSAL STACK TEST NOTIFICATION, PROTOCOL AND REPORT FORM

NMED USE ONLY	
Staff	
Admin	

Submit to: Stacktest.aqb@state.nm.us

I. DATABASE HEADER INFORMATION (drop down menus in bold)		
a. AI# 218	Test Report	Periodic Test (Portable Analyzer)
d. Company Name: Enterprise Field Services LLC	e. Facility Name: South Carlsbad Compressor Station	
f. Emission Unit Numbers: 1, 2	g. Emission Unit Description (boiler, Waukesha 7042, etc) Turbines, Solar Centaur T-4702	
h. Reports - Tracking Number from notification response: CMT	i. Proposed Test Date: Week of 1/18/16	j. Actual test date: 1/20/16
k. Reason for test (name permit requirement, NSPS, MACT, consent decree, etc. Indicate here is this notification is a revised test date only) Annual performance test of existing turbines pursuant to NSR condition A205C.		

II. GENERAL COMPANY AND FACILITY INFORMATION					
a.Company Address: PO Box 4324			k.. Facility Address: Roberson Road, Eddy County		
b. City: Houston	c. State: TX	d. Zip: 77210	l. City: Loving	m. State: NM	n. Zip: 88526
e. Environmental Contact: Alena Polk	f. Title: Sr. Env. Engineer		o. Facility Contact: Thomas Green	p. Title: Area Supervisor	
g. Phone Number: 575-706-4926	h. Cell Number: 575-706-4926		q. Phone Number: 575-885-7235	r. Cell Number: 575-708-0015	
i. Email Address: ampolk@eprod.com			s. Email Address: tdgreen@eprod.com		
j. Title V Permit Number: P-130-M1R2			t. NSR Permit Number: NSR 220M9		
u. Detailed driving directions from nearest New Mexico town: From Loving, UN285 north to Roberson Road west, Roberson Road west to station.					

III. TESTING FIRM		
a. Company: Compliance Services and Testing	g. Contact: Chris Spencer	
b. Address 1: 7108 Washington NE Ste. A	h. Title: Director	
c. Address 2: PO Box 94191-87199	i. Office Phone:	j. Cell Phone: 505-681-4909

UNIVERSAL STACK TEST NOTIFICATION, PROTOCOL AND REPORT FORM

d. City:	e. State:	f. Zip:	k. Email Address:
Albuquerque	**NM**	**87109**	**cspencer@comptesting.com**

IV. EMISSION UNIT

a. Emission Unit Number: **1 and 2**	b. Make & Model Number **Solar Centaur T-4702**
c. Serial Number: **See section g.**	d. Permitted Capacity: **3609 hp**
e Exceptions: Explain if test is late, rescheduled, related to an enforcement action:	

g. Emission Unit Description and brief process name or description:

Turbine 1 SN: OHD10C795
Turbine 2 SN: OHE12C7057
Natural gas-fired turbines for natural gas compression.

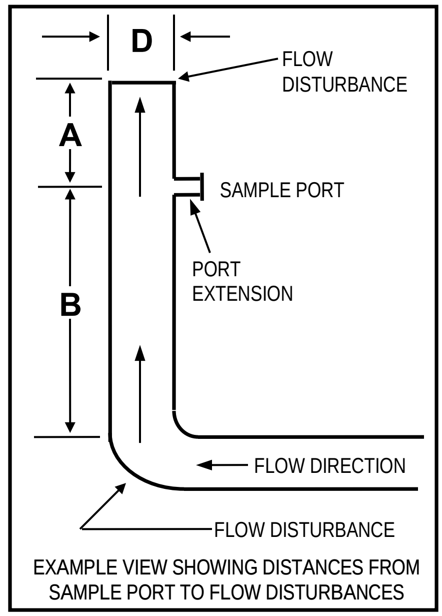
h. Installation Date:	i. Startup Date:	k. Date Reached Max. Capacity:

l. Control Equipment Description as listed in permit (model, ser. # etc. if applicable):

NA

STACK PARAMETERS

m. Velocity (ft/sec):	**177**
n. Temperature (ºC):	**486**
o. Stack Diameter, D (in.):	**NA**
p. Distance to Stack Bends or Obstructions:	
Upstream, Distance A (in.):	**NA**
Downstream, Distance B (in.):	**NA**



Attach an explanation or drawing to explain any difficult or unusual stack geometry or parameters.

V. POLLUTANTS AND PROPOSED TEST METHODS

	Pollutant or Parameter:	Proposed Test Methods (Deviations from approved methods require supporting documentation and prior authorization)	Deviation to Test Method Requested
☒	**Portable Analyzer Methods for NOx, CO, SO_2**		☐
☐	**NOx**	**EPA Method 7E**	☐
☐	**CO**	**EPA Method 10**	☐
☐	**SO2**	**EPA Method 6**	☐
☐	**VOCs**	**(Specify)**	☐
☐	**HAPs**	**(Specify)**	☐
☐	**PM (TSP)**	**EPA Method 5**	☐
☐	**PM10**	**EPA Method 201**	☐
☐	**PM2.5**	**(Specify)**	☐
☐	**Opacity**	**EPA Method 9**	☐
☐	**Visual E.**	**EPA Method 22**	☐
☐	**Stack Flow**	**EPA Methods 1 - 3**	☐
☐	**Moisture**	**EPA Method 4**	☐
☒	**Other**	**(Specify) EPA Method 19**	☐
☐	**Other**	**(Specify)**	☐

List Specific VOC's and HAP's:

VI. PROPOSED TEST RUN AND TEST LOAD INFORMATION

a. Number of Test Runs:	b. Run Duration	c. Required by (regulation or permit number):	d. Specific Condition or Section:
3	20 min	NSR 220 M9	A205C

PLEASE NOTE – Default run duration is 60 minutes, unless otherwise specified by an applicable regulation.

e. Expected Load:	f. Percent of Permitted Capacity:	g. Is this an opacity test?	h. If yes, no. of observation pts.:
>90%	>90%	Yes ☐ No ☒	

i. If expected load during test is less than 90% of capacity, explain:

NOTE – Failure to test at 90-100% of permitted load will limit unit operation to 110% of tested load until a new initial compliance test is conducted.

PLANT OR UNIT OPERATING PARAMETERS TO BE MONITORED

j. List and explain the plant operating parameters that will be monitored and applicable permit conditions or regulatory standards.

Fuel usage, compressor operating parameters, turbine operating parameters.

VII. ADDITIONAL DETAILS (where applicable)

RATA and INSTRUMENTAL ANALYZER CALIBRATION PROCEDURES

a. Do any of the methods you are proposing utilize instrumental analyzers (i.e.; EPA Methods 3A, 6C, 7E, 10, 18, 25/25A, 320 etc.)? If yes, briefly describe analyzer calibration procedures and/or calibration standard procedures. Enter the highest pollutant concentration expected and the proposed concentrations of calibration gases. ☒ Yes ☐ No

As described in the methods.

SAMPLING TRAIN LEAK CHECK PROCEDURES

b. Do any of the methods you are proposing utilize the EPA Method 5 sampling train (i.e.; EPA Methods 1-4, 5, 17, 26/26A, 29, etc.)? If yes, briefly describe sampling train and pitot tube leak check procedures: ☐ Yes ☒ No

EPA METHOD 19 IN LIEU OF EPA METHODS 1-4

c. Are you proposing to utilize EPA Method 19 in lieu of EPA Methods 1-4? If yes, explain why you believe this proposal is justified: ☒ Yes ☐ No

Method 19 with use of a calibrated fuel meter and current fuel gas analysis.

PLEASE NOTE – EPA Method 19 may be utilized in lieu of EPA Methods 1-4, subject to the approval of the Department. If you are proposing to utilize EPA Method 19 in lieu of EPA Methods 1-4, you MUST include a recent fuel gas heating value analysis as well as a recent fuel flow meter calibration certificate, preferably conducted on the day of the test, but no earlier than three months prior to the test date. If the analyses have been conducted prior to the test date, you MUST append the certificates to the protocol. If conducted on the day of the test, you MUST append the certificates to the final test report.

VIII. ATTACHMENTS (as needed to support proposed test; check all that apply)	
NOTIFICATION/PROTOCOL ATTACHMENTS	
☐	Road Map Indicating Directions from Nearest New Mexico Town to Facility
☐	Schematic of process being tested showing emission points, sampling sites and stack cross-section
☐	Copy of proposed test methods (except for those promulgated test methods found in 40 CFR 51, 60, 61 and 63)
☐	Fuel Heating Value Analysis
☐	Fuel Flow Meter Calibration Certificate
☐	Other:
☐	Other:
TEST REPORT ATTACHMENTS	
☒	**Section 2. Tables of Results**
☐	**Supporting Documents (Specify)**
Retain Report Section 3 - Test Procedures, Data, Calculations, Appendices – 2 years NSR permits, 5 years TV	

IX. CERTIFICATION		
This document has been prepared under my supervision and is accurate and complete to the best of my knowledge. I understand that acceptance of this protocol does not waive the requirements of any permit or regulation. I understand that any procedural errors or omissions are the sole responsibility of the permit holder.		
Signature: Jon Fields	Print Name and Title: **Jon E. Fields - Director, Field Environmental**	Date: 2-9-2016
Responsible Official for Title V? ☐ Yes	☒ No (R.O signature not required for routine periodic testing)	

2016 Compliance Test Report

On

Exhaust Emissions

From Two

Solar Centaur T-4702 Centrifugal Internal Combustion Engine

At The

South Carlsbad Compressor Station

Near

Loving, New Mexico

Prepared For

Enterprise Field Services

Project Number 1377

State of New Mexico Environment Department
Air Quality Bureau Permit Number 0220-M8-R1

Prepared By

Compliance Services & Testing

COMPLIANCE SERVICES & TESTING

P.O. Box 94191-87199
7108 Washington St. NE
Suite A
Albuquerque, NM 87109
(505) 681-4909 Phone
www.comptesting.com

February 3, 2016

Dina Ferguson
Enterprise Field Services
PO Box 4324
Houston, TX 77210

RE: Annual testing at the South Carlsbad Compressor Station.

Mrs. Ferguson:

On January 20, 2016 CST performed annual emissions testing at the South Carlsbad Compressor Station to satisfy the requirements of the New Mexico Environment Department Air Quality Bureau Permit Number 0220-M8-R1. The unit is identified as follows:

Engine Information		
Unit Number	1	2
Engine Make	Solar	
Engine Model	Centaur T-4702	
Serial Number	OHD10-C-7915	OHE12-C-7057
Rated Horsepower	3609	
Rated Speed	15000	

The testing followed procedures found in the NMED "ASTM D 6522-00 SOP". The mass emission rates were determined using EPA Method 19 (combustion stoichiometry). The rates in terms of pounds per hour and tons per year were calculated using the oxygen F-factor (DSCFex/MMBtu), the fuel consumption rate (SCFH), the fuel higher heating value (Btu/SCF), and the pollutant concentration. Fuel consumption was monitored from a fuel meter. The attached data sheet gives a detailed summary of the results of this test. Quality assurance data sheets are also attached.

Respectfully,

Jeremy Cahn

Jeremy Cahn
Compliance Services and Testing

Summary of Results
South Carlsbad Compressor Station, Unit #1

Company: Enterprise Field Services
Location: South Carlsbad Compressor Station
Source: Solar Centaur 40-T4702 SN: OHD10C7915
Engine Site Rating: 3609 Hp @ 15000 RPM
Technician: JC,FC
Sample System #: 1

Test Run Number	***1***	***2***	***3***	
Emissions Unit	**1**	**1**	**1**	
Date	1/20/16	1/20/16	1/20/16	
Start Time	7:53	8:18	8:43	
Stop Time	8:13	8:38	9:03	
Engine/Compressor Operation				
Turbine Load (%)	**94.7**	**95.0**	**95.2**	
Gas Producer Speed (%)	94.7	95.0	95.2	
Power Turbine Speed (%)	82.7	83.0	83.1	
Engine Horsepower (Hp)	3418	3429	3436	
Engine Compressor Discharge, PCD (psig)	104	105	105	
Fuel Valve Output (%)	59.9	61.3	60	
Suction Pressure (psig)	419	423	424	
Discharge Pressure (psig)	659	712	712	
Suction Temperature (°F)	98	98	99	
Discharge Temperature (°F)	123	124	177	
Air Inlet Temperature (T1) (°F)	40.2	39	43.2	
Average Exhaust Temperature (T5) (°F)	1080	1047	1090	
Compressor Throughput (MCFD)	72	72	72	
Fuel Data				
Measured Fuel Consumption (MSCFD)	788	788	788	
Calculated Fuel Consumption (SCFH)	17905	17905	17905	
O2 F-Factor (DSCF/MMBtu, HHV basis)	8696	8696	8696	
Fuel Heating Value (Btu/SCF, HHV)	1155	1155	1155	
BHp Specific Fuel Rate (Btu/Hp-hr, HHV basis)	198790	196897	6017	
Ambient Conditions				
Pressure Altitude (MSL)	3090	3090	3090	
Atmospheric Pressure ("Hg)	26.75	26.75	26.75	
Dry Bulb Temperature (°F)	41.7	42.1	44.8	
Wet Bulb Temperature (°F)	35.8	35.1	38.5	
Humidity (lb/lb air)	0.0035	0.0032	0.0040	
Measured Exhaust Emissions (Corrected)				***Average***
NOx (ppmv)	67.41	71.88	69.61	**69.63**
CO (ppmv)	13.62	8.90	8.16	**10.23**
O2 (vol %)	16.77	16.79	16.79	**16.78**
CO2 (vol %)	2.46	2.54	2.53	**2.51**
Fo (Natural Gas)	1.67	1.62	1.62	**1.64**
Exhaust Flow Rates (EPA Method 19 - Fuel Based)				
Dry SCFH (dry basis, calc. from Fuel Consumption)	910,503	914,424	913,092	**912,673**
Calculated Mass Emission Rates (EPA Method 19)				
NOx (lbs/hr) **{Permit Limit = 27.0}**	7.33	7.85	7.59	**7.59**
CO (lbs/hr) **{Permit Limit = 7.4}**	0.90	0.59	0.54	**0.68**
NOx (tons/yr) **{Permit Limit = 118.3}**	32.11	34.38	33.25	**33.25**
CO (tons/yr) **{Permit Limit = 32.5}**	3.95	2.59	2.37	**2.97**

Summary of Results
South Carlsbad Compressor Station, Unit #2

Company: Enterprise Field Services
Location: South Carlsbad Compressor Station
Source: Solar Centaur 40-T4702 SN: OHE12C7057
Engine Site Rating: 3609 Hp @ 15000 RPM
Technician: JC,FC
Sample System #: 2

Test Run Number	***1***	***2***	***3***	
Emissions Unit	**2**	**2**	**2**	
Date	1/20/16	1/20/16	1/20/16	
Start Time	7:53	8:18	8:43	
Stop Time	8:13	8:38	9:03	
Engine/Compressor Operation				
Turbine Load (%)	**94.7**	**95.2**	**95.3**	
Gas Producer Speed (%)	94.7	95.2	95.3	
Power Turbine Speed (%)	85.2	85.7	86.1	
Engine Horsepower (Hp)	3418	3436	3439	
Engine Compressor Discharge, PCD (psig)	109	110	110.0	
Fuel Valve Output (%)	39.2	39.5	39.6	
Suction Pressure (psig)	237	236	236	
Discharge Pressure (psig)	427	428	427	
Suction Temperature (°F)	41	42	42	
Discharge Temperature (°F)	123	124	125	
Air Inlet Temperature (T1) (°F)	40.2	39	41	
Average Exhaust Temperature (T5) (°F)	1080	1047	1056	
Compressor Throughput (MCFD)	72	72	72	
Fuel Data				
Measured Fuel Consumption (MSCFD)	788	788	788	
Calculated Fuel Consumption (SCFH)	17905	17905	17905	
O2 F-Factor (DSCF/MMBtu, HHV basis)	8696	8696	8696	
Fuel Heating Value (Btu/SCF, HHV)	1155	1155	1155	
BHp Specific Fuel Rate (Btu/Hp-hr, HHV basis)	6049	6017	6011	
Ambient Conditions				
Pressure Altitude (MSL)	3090	3090	3090	
Atmospheric Pressure ("Hg)	26.75	26.75	26.75	
Dry Bulb Temperature (°F)	41.7	42.1	44.8	
Wet Bulb Temperature (°F)	35.8	35.1	38.5	
Humidity (lb/lb air)	0.0035	0.0032	0.0040	
Measured Exhaust Emissions (Corrected)				***Average***
NOx (ppmv)	71.70	75.09	73.53	**73.44**
CO (ppmv)	14.67	12.03	9.98	**12.23**
O2 (vol %)	17.59	17.45	17.30	**17.45**
CO2 (vol %)	2.00	2.12	2.18	**2.10**
Fo (Natural Gas)	1.66	1.63	1.65	**1.65**
Exhaust Flow Rates (EPA Method 19 - Fuel Based)				
Dry SCFH (dry basis, calc. from Fuel Consumption)	1,134,456	1,087,659	1,044,190	**1,088,769**
Calculated Mass Emission Rates (EPA Method 19)				
NOx (lbs/hr) **{Permit Limit = 27.0}**	9.71	9.75	9.17	**9.55**
CO (lbs/hr) **{Permit Limit = 7.4}**	1.21	0.95	0.76	**0.97**
NOx (tons/yr) **{Permit Limit = 118.3}**	42.55	42.72	40.17	**41.81**
CO (tons/yr) **{Permit Limit = 32.5}**	5.30	4.17	3.32	**4.26**

Quality Assurance Report - Sample System #1
Converter Efficiency Test, Interference Test, Response Time and Bias Test, Mass Flow Controller Check, Pre and Post Leak Checks

NOx Converter Efficiency Check

Method: 7E Section 8.2.4
Frequency: Before each field test
Criteria: Equal to or greater than 90% conversion efficiency

Test Date: 1/20/16 Technician: JC

NO2	Results
Certified Value	48.9 ppmv
Observed Value	49.0 ppmv
Converter Efficiency	100%

Interference Response Checks

Method: 7E Section 8.2.7
Frequency: Prior to initial use in the field or after major alteration or modification
Criteria: Sum of responses < 2.5 % of calibration span

Test Date: 1/20/16 Technician: JC

Interference Test Gases		Analyzer Response (ppmv or % as applicable)					
Type Gas	*Conc.*	*NOx (ppmv)*	*CO (ppmv)*	*SO2 (ppmv)*	*THC (ppmv)*	*O2 (%)*	*CO2 (%)*
NOx in N2	44.5 ppm	---	N/A	---	---	0.00	-0.03
CO in N2	44.8 ppm	N/A	---	---	---	0.00	-0.03
O2 in N2	9.6%	0.05	-0.24	---	---	---	N/A
CO2 in N2	6.5%	0.05	-0.24	---	---	N/A	---
THC in air	---	---	---	---	---	---	---

Sample System Bias & Response Time Check

Method: 7E Section 8.2.5-6
Frequency: Before sampling begins
Criteria: 5% of calibration span
Criteria: Note the longer of the two times as the response time

Test Date: 1/20/16 Technician: JC

Sample System Bias Check

Introduction Technique	NOx (ppmv)	CO (ppmv)	SO2 (ppmv)	THC (ppmv)	O2 (%)	CO2 (%)
Direct Zero Input	0.0	0.0			0.0	0.0
Bias Input	0.0	0.0			0.0	0.0
Zero Bias	0.0%	0.0%			0.0%	0.0%
Direct Span Input	44.6	44.8			9.6	6.5
Bias Input	43.7	44.8			9.6	6.5
Span Bias	-1.1%	0.0%			0.0%	0.0%

Sample System Response Time

Parameter	NOx (ppmv)	CO (ppmv)	SO2 (ppmv)	THC (ppmv)	O2 (%)	CO2 (%)
Upscale Response	40	35			50	50
Downscale Response	40	35			45	55
Purge Time	110 seconds					

Sample System Leak Check

Frequency: Daily or whenever the sample system is moved or disassembled (CST SOP)
Criteria: Less than one inch decrease in pressure in one minute (CST SOP)

Test Date				
1/20/16	Vacuum Initial:	0.0 inches	/ minute at	14 inches Hg
	Vacuum Final:	0.0 inches	/ minute at	14 inches Hg

Quality Assurance Worksheet
Instrument Calibration and Drift Correction

Company: Enterprise Field Services
Location: South Carlsbad Compressor Station
Source: Solar Centaur 40-T4702 SN: OHD10C7915
Engine Site Rating: 3609 Hp @ 15000 RPM
Test Date: Wednesday, January 20, 2016
Sample System #: 1

UNIT NUMBER 1

GAS LEVELS PER METHOD	CALIBRATION GAS CONCENTRATIONS: Certified Concentration	CALIBRATION GAS CONCENTRATIONS: Target (% Span)	INITIAL CALIBRATION & LINEARITY CHECK: Analyzer Response	INITIAL CALIBRATION & LINEARITY CHECK: Calibration Error < 2%
NOx				
Zero	0.0 ppmv	0.0	0.0 ppmv	0.0%
Mid	44.5 ppmv	52.0	44.6 ppmv	0.1%
High	85.5 ppmv	100.0	85.7 ppmv	0.2%
Analyzer Range = 100 ppmv			Span = 85.5	
CO				
Zero	0.0 ppmv	0.0	0.0 ppmv	0.0%
Mid	44.8 ppmv	53.7	44.8 ppmv	0.0%
High	83.4 ppmv	100.0	83.0 ppmv	-0.5%
Analyzer Range = 100 ppmv			Span = 83.4	
O2				
Zero	0.0%	0.0	0.0%	0.0%
Mid	9.6%	45.5	9.6%	0.0%
High	21.1%	100.0	21.0%	-0.5%
Analyzer Range = 22.0%			Span = 21.1	
CO2				
Zero	0.0%	0.0	0.0%	0.0%
Mid	4.0%	61.5	4.1%	1.5%
High	6.5%	100.0	6.5%	0.0%
Analyzer Range = 7.0%			Span = 6.5	

TEST RUN 1

Start Run 7:53 / Stop Run 8:13	ZERO and SPAN CALIBRATION CHECK: Initial Response	Final Response	Drift < 3%	Bias < 5%
Avg. ppmv				
66.35	0.0 ppmv	0.0 ppmv	0.0%	0.0%
Corr. ppmv				
67.41	43.7 ppmv	43.9 ppmv	0.4%	0.7%
Cal. Span				
85.5				
Avg. ppmv				
13.52	0.0 ppmv	0.0 ppmv	0.0%	0.0%
Corr. ppmv				
13.62	44.8 ppmv	44.1 ppmv	1.6%	0.8%
Cal. Span				
83.4				
Avg.%				
16.77	0.0%	0.0%	0.0%	0.0%
Corr. %				
16.77	9.6%	9.6%	0.0%	0.0%
Cal. Span				
21.1				
Avg.%				
2.46	0.0%	0.0%	0.0%	0.0%
Corr. %				
2.46				
Cal. Span	6.5%	6.5%	0.0%	0.0%
6.5				

TEST RUN 2

Start Run 8:18 / Stop Run 8:38	ZERO and SPAN CALIBRATION CHECK: Initial Response	Final Response	Drift < 3%	Bias < 5%
Avg. ppmv				
71.15	0.0 ppmv	0.0 ppmv	0.0%	0.0%
Corr. ppmv				
71.88	43.9 ppmv	44.2 ppmv	0.7%	0.4%
Cal. Span				
85.5				
Avg. ppmv				
8.80	0.0 ppmv	0.0 ppmv	0.0%	0.0%
Corr. ppmv				
8.90	44.1 ppmv	44.5 ppmv	0.9%	0.4%
Cal. Span				
83.4				
Avg.%				
16.79	0.0%	0.0%	0.0%	0.0%
Corr. %				
16.79	9.6%	9.6%	0.0%	0.0%
Cal. Span				
21.1				
Avg.%				
2.54	0.0%	0.0%	0.0%	0.0%
Corr. %				
2.54				
Cal. Span	6.5%	6.5%	0.0%	0.0%
6.5				

TEST RUN 3

Start Run 8:43 / Stop Run 9:03	ZERO and SPAN CALIBRATION CHECK: Initial Response	Final Response	Drift < 3%	Bias < 5%
Avg. ppmv				
69.49	0.0 ppmv	1.0 ppmv	1.2%	1.2%
Corr. ppmv				
69.61	44.2 ppmv	45.0 ppmv	1.8%	0.6%
Cal. Span				
85.5				
Avg. ppmv				
7.71	0.0 ppmv	-1.0 ppmv	1.2%	1.2%
Corr. ppmv				
8.16	44.5 ppmv	44.7 ppmv	0.4%	0.1%
Cal. Span				
83.4				
Avg.%				
16.79	0.0%	0.0%	0.0%	0.0%
Corr. %				
16.79	9.6%	9.6%	0.0%	0.0%
Cal. Span				
21.1				
Avg.%				
2.53	0.0%	0.0%	0.0%	0.0%
Corr. %				
2.53				
Cal. Span	6.5%	6.5%	0.0%	0.0%
6.5				

Quality Assurance Report - Sample System #2
Converter Efficiency Test, Interference Test, Response Time and Bias Test, Mass Flow Controller Check, Pre and Post Leak Checks

NOx Converter Efficiency Check

Method: *7E Section 8.2.4*
Frequency: *Before each field test*
Criteria: *Equal to or greater than 90% conversion efficiency*

Test Date: 1/20/16 Technician: JC

NO2	*Results*
Certified Value	48.9 ppmv
Observed Value	49.4 ppmv
Converter Efficiency	101%

Interference Response Checks

Method: *7E Section 8.2.7*
Frequency: *Prior to initial use in the field or after major alteration or modification*
Criteria: *Sum of responses < 2.5 % of calibration span*

Test Date: 1/20/16 Technician: JC

Interference Test Gases		**Analyzer Response (ppmv or % as applicable)**					
Type Gas	*Conc.*	*NOx (ppmv)*	*CO (ppmv)*	*SO2 (ppmv)*	*THC (ppmv)*	*O2 (%)*	*CO2 (%)*
NOx in N2	44.5 ppm	---	N/A	---	---	0.01	0.02
CO in N2	44.8 ppm	N/A	---	---	---	0.01	0.02
O2 in N2	9.6%	0.37	-0.12	---	---	---	N/A
CO2 in N2	6.5%	0.37	-0.12	---	---	N/A	---
THC in air	---	---	---	---	---	---	---

Sample System Bias & Response Time Check

Method: *7E Section 8.2.5-6*
Frequency: *Before sampling begins*
Criteria: *5% of calibration span*
Criteria: *Note the longer of the two times as the response time*

Test Date: 1/20/16 Technician: JC

Sample System Bias Check

Introduction Technique	**NOx (ppmv)**	**CO (ppmv)**	**SO2 (ppmv)**	**THC (ppmv)**	**O2 (%)**	**CO2 (%)**
Direct Zero Input	0.0	0.0			0.0	0.0
Bias Input	0.0	0.0			0.0	0.0
Zero Bias	0.0%	0.0%			0.0%	0.0%
Direct Span Input	44.1	45.0			9.6	6.5
Bias Input	43.6	43.9			9.6	6.5
Span Bias	-0.6%	-1.3%			0.0%	0.0%

Sample System Response Time

Parameter	**NOx (ppmv)**	**CO (ppmv)**	**SO2 (ppmv)**	**THC (ppmv)**	**O2 (%)**	**CO2 (%)**
Upscale Response	35	40			45	55
Downscale Response	35	40			45	55
Purge Time	110 seconds					

Sample System Leak Check

Frequency: *Daily or whenever the sample system is moved or disassembled (CST SOP)*
Criteria: *Less than one inch decrease in pressure in one minute (CST SOP)*

Test Date				
1/20/16	Vacuum Initial:	0.0 inches	/ minute at	16 inches Hg
	Vacuum Final:	0.0 inches	/ minute at	16 inches Hg

Quality Assurance Worksheet
Instrument Calibration and Drift Correction

Company: Enterprise Field Services
Location: South Carlsbad Compressor Station
Source: Solar Centaur 40-T4702 SN: OHE12C7057
Engine Site Rating: 3609 Hp @ 15000 RPM
Test Date: Wednesday, January 20, 2016
Sample System #: 2

UNIT NUMBER 2

GAS LEVELS PER METHOD	CALIBRATION GAS CONCENTRATIONS Certified Concentration	Target (% Span)	INITIAL CALIBRATION & LINEARITY CHECK Analyzer Response	Calibration Error < 2%
NOx				
Zero	0.0 ppmv	0.0	0.0 ppmv	0.0%
Mid	44.5 ppmv	52.0	44.1 ppmv	-0.5%
High	85.5 ppmv	100.0	84.8 ppmv	-0.8%
Analyzer Range = 100 ppmv			**Span = 85.5**	
CO				
Zero	0.0 ppmv	0.0	0.0 ppmv	0.0%
Mid	44.8 ppmv	53.7	45.0 ppmv	0.2%
High	83.4 ppmv	100.0	83.9 ppmv	0.6%
Analyzer Range = 100 ppmv			**Span = 83.4**	
O2				
Zero	0.0%	0.0	0.0%	0.0%
Mid	9.6%	45.5	9.6%	0.0%
High	21.1%	100.0	21.1%	0.0%
Analyzer Range = 22.0%			**Span = 21.1**	
CO2				
Zero	0.0%	0.0	0.0%	0.0%
Mid	4.0%	61.5	4.0%	0.0%
High	6.5%	100.0	6.5%	0.0%
Analyzer Range = 7.0%			**Span = 6.5**	

TEST RUN 1

Start Run 7:53 / Stop Run 8:13	ZERO and SPAN CALIBRATION CHECK Initial Response	Final Response	Drift < 3%	Bias < 5%
Avg. ppmv				
70.49	0.0 ppmv	0.0 ppmv	0.0%	0.0%
Corr. ppmv				
71.70	43.6 ppmv	43.9 ppmv	0.7%	0.7%
Cal. Span				
85.5				
Avg. ppmv				
14.43	0.0 ppmv	0.0 ppmv	0.0%	0.0%
Corr. ppmv				
14.67	43.9 ppmv	44.2 ppmv	0.7%	0.7%
Cal. Span				
83.4				
Avg.%				
17.59	0.0%	0.0%	0.0%	0.0%
Corr. %				
17.59	9.6%	9.6%	0.0%	0.0%
Cal. Span				
21.1				
Avg.%				
2.00	0.0%	0.0%	0.0%	0.0%
Corr. %				
2.00				
Cal. Span	6.5%	6.5%	0.0%	0.0%
6.5				

TEST RUN 2

Start Run 8:18 / Stop Run 8:38	ZERO and SPAN CALIBRATION CHECK Initial Response	Final Response	Drift < 3%	Bias < 5%
Avg. ppmv				
73.73	0.0 ppmv	1.0 ppmv	1.2%	1.2%
Corr. ppmv				
75.09	43.9 ppmv	43.9 ppmv	0.0%	0.7%
Cal. Span				
85.5				
Avg. ppmv				
11.91	0.0 ppmv	0.0 ppmv	0.0%	0.0%
Corr. ppmv				
12.03	44.2 ppmv	44.5 ppmv	0.7%	0.4%
Cal. Span				
83.4				
Avg.%				
17.45	0.0%	0.0%	0.0%	0.0%
Corr. %				
17.45	9.6%	9.6%	0.0%	0.0%
Cal. Span				
21.1				
Avg.%				
2.10	0.0%	0.0%	0.0%	0.0%
Corr. %				
2.12				
Cal. Span	6.5%	6.4%	1.5%	1.5%
6.5				

TEST RUN 3

Start Run 8:43 / Stop Run 9:03	ZERO and SPAN CALIBRATION CHECK Initial Response	Final Response	Drift < 3%	Bias < 5%
Avg. ppmv				
72.22	1.0 ppmv	1.0 ppmv	0.0%	1.2%
Corr. ppmv				
73.53	43.9 ppmv	44.3 ppmv	0.9%	0.2%
Cal. Span				
85.5				
Avg. ppmv				
9.57	0.0 ppmv	-1.0 ppmv	1.2%	1.2%
Corr. ppmv				
9.98	44.5 ppmv	44.9 ppmv	0.9%	0.1%
Cal. Span				
83.4				
Avg.%				
17.39	0.0%	0.0%	0.0%	0.0%
Corr. %				
17.30	9.6%	9.7%	1.0%	0.5%
Cal. Span				
21.1				
Avg.%				
2.14	0.0%	0.0%	0.0%	0.0%
Corr. %				
2.18				
Cal. Span	6.4%	6.4%	0.0%	1.5%
6.5				

ENTERPRISE™ Measurement Processing System

Snap-shot	
1/20/2016 8:00:00	
Static	198.13
DP	63.18
Temp	33.28
Volume	1,575.00
Yest MCF	1,463.88
Forecast	1,575.17

General Information For 16961-01

WellName	SO CARLSBAD TURB FUEL		
PIN	1696101		
Group Number	5	Local Address	57
System	GTTAES2	Scada Server	AESTX2
DAL / OrgID	661 / EPF	Team	C2
Model	827	Load File	AESORIF
Business Party	0	Operator Name	ENTERPRISE FIELD SERVICES LLC
Pipe: 4.03	Plate: 1.5	B/R:	0.37
Meter Type	Non WATT Meter		
S/T/R	12 / 23S / 27E		

Measurement	
1/20/2016 8:00:00	
Static	198.13
DP	63.18
Temp	33.28
Volume	65.63
Flow Time	60.00

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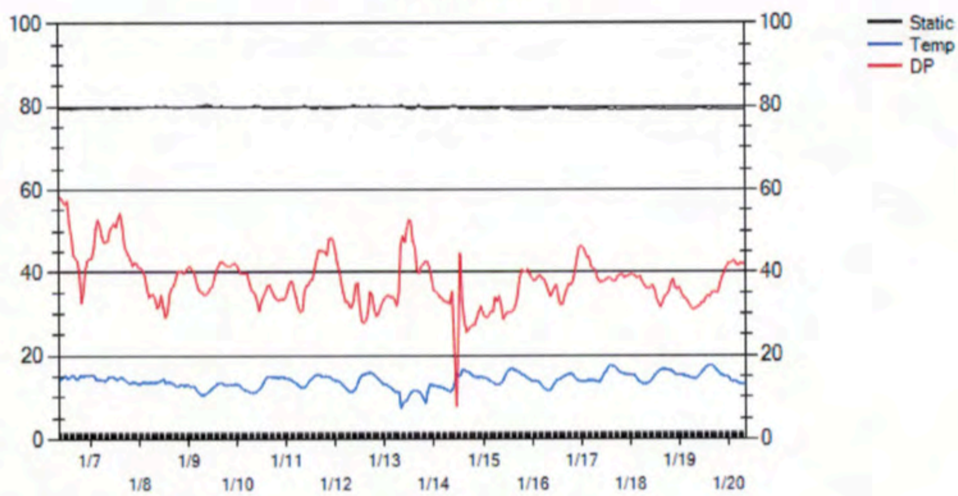
Graph for 16961-01



Days
- ○ 1 ○ 3
- ○ 5 ○ 7
- ◉ 14 ○ 31

Static Pressure Range
◉ 250 ○ 500 ○ 1000 ○ 1500 ○ 2000

Diff. Pressure Range
○ 75 ◉ 150 ○ 300 ○ 800

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Fuel Gas Analysis, Gas Fuel O2 F-Factor, Moisture Content, Fuel VOC%, and Heating Value Calculation

Company: Enterprise Field Services
Sample ID: South Carlsbad
Time: N/A
Date: 2/2/16

CALCULATION OF DENSITY AND HEATING VALUE @ 68°F and 29.92 in Hg

Component	% Volume	Molecular Wt.	Density (lb/ft3)	% volume x Density	weight %	Component Gross Btu/lb	Weight Fract. Btu	Gross Htng. Val. (Btu/SCF)	Volume Fract. Btu
Hydrogen		2.016	0.0052	0.00000	0.0000	61100	0.00	325.0	0.000
Oxygen		32.000	0.0831	0.00000	0.0000	0	0.00	0.0	0.000
Nitrogen	2.9591	28.016	0.0731	0.00216	4.2554	0	0.00	0.0	0.000
CO2	0.0001	44.010	0.1149	0.00000	0.0002	0	0.00	0.0	0.000
CO		28.010	0.0727	0.00000	0.0000	4347	0.00	322.0	0.000
Methane	81.9206	16.041	0.0417	0.03412	67.1414	23879	16032.70	1013.0	829.856
Ethane	9.7466	30.067	0.0789	0.00769	15.1268	22320	3376.30	1792.0	174.659
Ethylene		28.051	0.0733	0.00000	0.0000	21644	0.00	1614.0	0.000
Propane	4.1308	44.092	0.1175	0.00485	9.5487	21661	2068.34	2590.0	106.988
propylene		42.077	0.1090	0.00000	0.0000	21041	0.00	2336.0	0.000
Isobutane	0.3608	58.118	0.1554	0.00056	1.1032	21308	235.08	3363.0	12.134
n-butane	0.7075	58.118	0.1554	0.00110	2.1634	21257	459.87	3370.0	23.843
Isobutene		56.102	0.1454	0.00000	0.0000	20840	0.00	3068.0	0.000
Isopentane	0.0822	72.144	0.1870	0.00015	0.3025	21091	63.80	4008.0	3.295
n-pentane	0.0662	72.144	0.1870	0.00012	0.2436	21052	51.29	4016.0	2.659
n-hexane +	0.0261	86.169	0.2234	0.00006	0.1147	20940	24.02	4762.0	1.243
H2S		34.076	0.0895	0.00000	0.0000	7100	0.00	647.0	0.000
Totals	**100.00**	**731.25**	**1.91**	**0.0508**	**100.00**	**Gross Heating Value**			
Average Density:		**0.0508**	**Specific Gravity:**		**0.664**	**Btu/lb:**	**22311**	**Btu/SCF:**	**1155**

CALCULATION OF F FACTORS

Component	Mol. Wt.	C Factor	H Factor	% volume	Fract. Wt.	Weight Percents				
						Carbon	Hydrogen	Nitrogen	Oxygen	Sulfur
Hydrogen	2.016	0.0000	1.0000	0.0000	0.0000		0.0000			
Oxygen	32.000	0.0000	0.0000	0.0000	0.0000				0.0000	
Nitrogen	28.016	0.0000	0.0000	2.9591	82.9021			4.2575		
CO2	44.010	0.2723	0.0000	0.0001	0.0044	0.0001			0.0002	
CO	28.010	0.4259	0.0000	0.0000	0.0000	0.0000			0.0000	
Methane	16.041	0.7500	0.2500	81.9206	1314.0883	50.6139	16.8713			
Ethane	30.067	0.8000	0.2000	9.7466	293.0510	12.0397	3.0099			
Ethylene	28.051	0.8571	0.1429	0.0000	0.0000	0.0000	0.0000			
Propane	44.092	0.8182	0.1818	4.1308	182.1352	7.6529	1.7007			
Propene	42.077	0.8571	0.1429	0.0000	0.0000	0.0000	0.0000			
Isobutane	58.118	0.8276	0.1725	0.3608	20.9690	0.8912	0.1857			
n-butane	58.118	0.8276	0.1725	0.7075	41.1185	1.7476	0.3642			
Isobutene	56.102	0.8571	0.1429	0.0000	0.0000	0.0000	0.0000			
Isopentane	72.144	0.8333	0.1667	0.0822	5.9302	0.2538	0.0508			
n-pentane	72.144	0.8333	0.1667	0.0662	4.7759	0.2044	0.0409			
n-hexane	86.169	0.8372	0.1628	0.0261	2.2490	0.0967	0.0188			
H2S	34.076	0.0000	0.0587	0.0000	0.0000	0.0000	0.0000			0.0000
Totals	**731.25**	**9.80**	**2.96**	**100.00**	**1947.224**	**73.500**	**22.242**	**4.257**	**0.000**	**0.000**

CALCULATED VALUES

O2 F Factor (dry)	**8696**	DSCF of Exhaust/MMBtu of Fuel Burned @ 0% excess air
O2 F Factor (wet)	**10620**	SCF of Exhaust/MMBtu of Fuel Burned @ 0% excess air
Moisture F Factor	**1924**	SCF of Water/MMBtu of Fuel Burned @ 0% excess air
Combust. Moisture	**18.12**	Volume % water in flue gas @ 0% excess air
CO2 F Factor	**1057**	DSCF of CO2/MMBtu of Fuel Burned @ 0% excess air
Carbon Dioxide	**12.16**	Volume % CO2 in flue gas @ 0% O2
Predicted Fo Factor	**1.72**	EPA Method 3b Fo value
Fuel VOC %	**29.63%**	Non-methane
Fuel VOC %	**13.94%**	Non-methane, non-ethane

Example Calculations

Drift Corrected Emission Concentrations

Formula

$$C_{GAS} = (Ç - C_O) \times \frac{C_{MA}}{C_M - C_O} \quad \textit{(eq. 7E-5)}$$

All Calculations Refer to Test Run 1 Unit #1

$Ç_{NOx}$ =	Raw Concentration of NOx	= 66.35 ppmv
C_O =	Avg. of Initial and Final Zero Checks	= 0.00 ppmv
C_M =	Avg. of Initial and Final Span Checks	= 43.80 ppmv
C_{MA} =	Certified Concentration of Span Gas	= 44.50 ppmv
C_{NOx} =	$(66.35 - 0.00) \times \frac{44.50}{(43.80 - 0.00)}$	**= 67.41 ppmv**

$Ç_{CO}$ =	Raw Concentration of CO	= 13.52 ppmv
C_O =	Avg. of Initial and Final Zero Checks	= 0.00 ppmv
C_M =	Avg. of Initial and Final Span Checks	= 44.45 ppmv
C_{MA} =	Certified Concentration of Span Gas	= 44.80 ppmv
C_{CO} =	$(13.52 - 0.00) \times \frac{44.80}{(44.45 - 0.00)}$	**= 13.62 ppmv**

$Ç_{O2}$ =	Raw Concentration of O2	= 16.77%
C_O =	Avg. of initial and final zero bias checks	= 0.00%
C_M =	Avg. of initial and final span bias checks	= 9.60%
C_{MA} =	Actual concentration of span gas	= 9.60%
C_{O2} =	$(16.77 - 0.00) \times \frac{9.60}{(9.60 - 0.00)}$	**= 16.77%**

$Ç_{CO2}$ =	Raw Concentration of CO2	= 2.46%
C_O =	Avg. of initial and final zero bias checks	= 0.00%
C_M =	Avg. of initial and final span bias checks	= 6.50%
C_{MA} =	Actual concentration of span gas	= 6.50%
C_{CO2} =	$(2.46 - 0.00) \times \frac{6.50}{(6.50 - 0.00)}$	**= 2.46%**

F_O Calculation to Verify O2 / CO2 Measurements (Eq. 3b-1)

C_{O2} =	Corrected Concentration of O2	= 16.77%
C_{CO2} =	Corrected Concentration of CO2	= 2.46%
Th. F_O =	Theoretical F_O from FGA	= 1.72
F_O =	$\frac{(20.9 - O2\%)}{CO2\ \%}$	
F_O =	$\frac{(20.9 - 16.77)}{2.46}$	= **1.67**

Example Calculations

Mass Emission Rates via EPA Method 19

Measured Data and Constants from Test Run 1 Unit #1

C_{NOx} =	Corrected Concentration of NOx	=	67.41	ppmv
C_{CO} =	Corrected Concentration of CO	=	13.62	ppmv
Horsepower =	Observed Horsepower	=	3418	Hp
$Q_{S\ M19}$ =	Measured Stack Flow Rate	=	910,503	SCF/H Dry
lb / mole =	EPA STP for Ideal Gas	=	385.15	SCF
lbs / hr to tpy =	Mass Conversion Factor	=	4.38	hrs-tons / lbs-yr
C_F =	PPMV Normalization	=	1.00E-06	1 / ppmv
MW_{NOx} =	Molecular Weight of NOx	=	46	lb / lb-mol
MW_{CO} =	Molecular Weight of CO	=	28	lb / lb-mol

Stack Gas Flow Rate via Method 19 (eq. 19-1)

Q_F =	Fuel Flow (Measured)	=	17905	SCF/H
F_{BTU} =	Fuel Higher Heating Value	=	1155	Btu/SCF
F_{O2} =	O2 F-Factor	=	8696	DSCF/MMBtu
C_{O2} =	Corrected Concentration of O2	=	16.77	%

$$Q_{S\ M19} = Q_F \times F_{BTU} \times F_{O2} \times 10^{\wedge}6 \times \frac{20.9}{(20.9 - \%O2)} \text{ DSCF/H}$$

$$Q_{S\ M19} = 17905 \times 1155 \times 8696 \times 5.06 \times 1.00E\text{-}06$$

$Q_{S\ M19}$ = 910,503 DSCF/H

Adjust Measured Concentrations to 15% O2 (Eq. 60.335)

Cx @ 15% O2 $= Cx\ (ppmv) \times \frac{5.9}{(20.9 - O2\%)}$

C_{NOx} @ 15% O2 $= 67.41 \times \frac{5.9}{(20.9 - 16.77)} =$ **96.37** **@ 15% O2**

Formulas

Pounds per Hour (lbs/hr)

E_x (lb/hr) = $C_x \times C_F \times Q_s \times \{ MW_x / (\text{lb / mole}) \}$

Tons per Year (tpy)

E_x (tpy) = E_x (lb/hr) $\times$ { 8760 (hr / yr) / 2000 (lb / ton) }

Calculated Mass Emission Rates From Method 19 Exhaust Flow Rate

E_{NOx}

lbs/hr $= 67.41 \times 1.00E\text{-}06 \times 910{,}503 \times \frac{46}{385.15} =$ **7.33**

tpy $= 7.33 \text{ lb/hr} \times 4.38 \ \frac{\text{hrs-ton}}{\text{lbs-yr}} =$ **32.11**

E_{CO}

lbs/hr $= 13.62 \times 1.00E\text{-}06 \times 910{,}503 \times \frac{28}{385.15} =$ **0.90**

tpy $= 0.90 \text{ lb/hr} \times 4.38 \ \frac{\text{hrs-ton}}{\text{lbs-yr}} =$ **3.95**

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1700 Scepter Rd
Waverly, TN 37185
931-296-3357

Certificate of Analysis - EPA Protocol Mixtures

Customer: CST

Customer PO#:

Protocol: G1
Reference #: T186938-4
Lot#: 9303606470

Cylinder Number: CC203971

Cylinder Pressure: 1900 PSIG

Last Analysis Date: 8/22/2013

Expiration Date: 8/23/2016

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 100 PSIG

REPLICATE RESPONSES

Date: 8/15/2013	Date: 8/22/2013
49.0	48.9
49.0	48.8
48.7	49.1

Component: Nitric Oxide

Certified Conc: 48.9 PPM +/- 0.2 PPM ABS

NOx: 49.9 PPM Reference Only

BALANCE GAS: Nitrogen

REFERENCE STANDARDS:

Component: Nitric Oxide
Reference Standard: NTRM
Cylinder #: ND44693
Concentration: 98.17 PPM
Exp Date: 9/20/2015
NIST Sample #: 121101

CERTIFICATION INSTRUMENTS

Component: Nitric Oxide
Make/Model: Antaris IGS
Serial Number: AKS1000151
Measurement Principle: FTIR
Last Calibration: 8/12/2013

Notes:

The certification was performed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards May 2012, using procedure G1 and/or G2. U.S EPA Vendor ID Number: D62013, PGVP Participation Date: 01/01/13, PGVP Renewal Date: 01/01/14

Analyst: Taylor Wallace
Taylor Wallace

Date: 8/22/2013

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1700 Scepter Rd
Waverly, TN 37185
931-296-3357

Certificate of Analysis - EPA Protocol Mixtures

Customer: CST | Customer PO#: | Part # G2676958

Protocol:	Reference #:	Lot#:
G1	T204960-2	9305612744

Cylinder Number: SX37028
Cylinder Pressure: 1900 psig
Last Analysis Date: 2/18/2015
Expiration Date: 2/19/2018

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 100 PSIG

REPLICATE RESPONSES

Component: Carbon Monoxide
Certified Conc: 44.84 ppm +/- 0.06 ppm ABS

Date: 2/9/2015
44.85
44.83
44.84

Component: Nitric Oxide
Certified Conc: 44.5 ppm +/- 0.2 ppm ABS

Date: 2/9/2015	Date: 2/18/2015
44.6	44.6
44.4	44.6
44.4	44.5

NOx: 44.6 ppm Reference Only

BALANCE GAS: Nitrogen

REFERENCE STANDARDS:

Component:	Carbon Monoxide	Component:	Nitric Oxide
Reference Standard:	SRM	Reference Standard:	SRM
Cylinder #:	FF10672	Cylinder #:	FF31654
Concentration:	24.512 ppm	Concentration:	19.06 ppm
Exp. Date:	3/28/2021	Exp. Date:	4/11/2016
NIST Sample #:	58-E-11	NIST Sample #:	50-G-09

CERTIFICATION INSTRUMENTS

Component:	Carbon Monoxide	Component:	Nitric Oxide
Make/Model:	Horiba VIA-510	Make/Model:	Horiba CLA-510SS
Serial Number:	ETYS79C6	Serial Number:	FDRJ8FDME
Measurement Principle:	NDIR	Measurement Principle:	CHEMI
Last Calibration:	1/27/2015	Last Calibration:	1/19/2015

Notes:

The certification was performed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards May 2012, using procedure G1 and/or G2. U.S EPA Vendor ID Number: D62015, PGVP Participation Date: 01/01/15, PGVP Renewal Date: 01/01/16

Analyst: Roman Khidekel

Date: 2/26/2015

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1700 Scepter Rd
Waverly, TN 37185
931-296-3357

Certificate of Analysis - EPA Protocol Mixtures

Customer: Matheson Tri-Gas

Customer PO#:

		Protocol:	Reference #:	Lot#:
Cylinder Number:	SX46823	G1	T201719-3	9304611567
Cylinder Pressure:	1900 psig			
Last Analysis Date:	10/28/2014			
Expiration Date:	10/29/2022			

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 100 PSIG

Matheson Part Number: G2687072

Component: Carbon Monoxide

Certified Conc: 83.39 ppm +/- 0.08 ppm ABS

Component: Nitric Oxide

Certified Conc: 85.5 ppm +/- 0.3 ppm ABS

NOx: 86.3 ppm Reference Only

REPLICATE RESPONSES

Date:	10/21/2014	Date:	10/28/2014
	83.39		
	83.25		
	83.53		
Date:	10/21/2014	Date:	10/28/2014
	85.4		85.9
	85.3		85.7
	85.5		86.0

BALANCE GAS: Nitrogen

REFERENCE STANDARDS:

Component:	Carbon Monoxide	Component:	Nitric Oxide
Reference Standard:	SRM	Reference Standard:	NTRM
Cylinder #:	FF18328	Cylinder #:	ND44704
Concentration:	49.136 ppm	Concentration:	98.17 ppm
Exp. Date:	2/24/2021	Exp. Date:	9/20/2015
NIST Sample #:	04-L-64	NIST Sample #:	121101

CERTIFICATION INSTRUMENTS

Component:	Carbon Monoxide	Component:	Nitric Oxide
Make/Model:	Antaris IGS	Make/Model:	Antaris IGS
Serial Number:	AKS1000151	Serial Number:	AKS1000151
Measurement Principle:	FTIR	Measurement Principle:	FTIR
Last Calibration:	9/30/2014	Last Calibration:	10/27/2014

Notes:

The certification was performed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards May 2012, using procedure G1 and/or G2. U.S EPA Vendor ID Number: D62014, PGVP Participation Date: 01/01/14, PGVP Renewal Date: 01/01/15

Analyst: Roman Khidekel

Date: 10/29/2014

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1700 Scepter Rd
Waverly, TN 37185
931-296-3357

Certificate of Analysis - EPA Protocol Mixtures

Customer: WHS: 710

Part # G2689319

		Protocol:	*Reference #:	Lot#:
Cylinder Number:	SX35534	G1	T212837-01	9305615921
Cylinder Pressure:	1900 psig			
Last Analysis Date:	10/16/2015			
Expiration Date:	10/16/2023			

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 100 PSIG

			REPLICATE RESPONSES
Component:	Carbon Dioxide	Date:	10/16/2015
Certified Conc:	6.46% +/- 0.02% ABS		6.46
			6.46
			6.46
Component:	Oxygen	Date:	10/16/2015
Certified Conc:	9.56 % +/- 0.02% ABS		9.56
			9.56
			9.55

BALANCE GAS: Nitrogen

REFERENCE STANDARDS:

Component:	Carbon Dioxide	Component:	Oxygen
Reference Standard:	SRM	Reference Standard:	SRM
Cylinder #:	FF10608	Cylinder #:	CAL016848
Concentration:	6.944 %	Concentration:	9.918 %
Exp. Date:	7/14/2018	Exp. Date:	6/1/2017
NIST Sample#	7-H-18	NIST Sample#	72-D-11

CERTIFICATION INSTRUMENTS

Component:	Carbon Dioxide	Component:	Oxygen
Make/Model:	HORIBA VIA 510	Make/Model:	HORIBA MPA 510
Serial Number:	41679080021	Serial Number:	U1LSAGS6
Measurement Principle:	NDIR	Measurement Principle:	PARAMAGNETIC
Last Calibration:	10/14/2015	Last Calibration:	10/13/2015

Notes:

The certification was performed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards May 2012, using procedure G1 and/or G2. U.S EPA Vendor ID Number: D62015, PGVP Participation Date: 01/01/15, PGVP Renewal Date: 01/01/16
The expanded uncertainty listed for each component was calculated at a coverage factor of k=2 and at a level of confidence of 95%.

Analyst: Ashley Stokes
Ashley Stokes

Date: 10/19/2015

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1700 Scepter Rd
Waverly, TN 37185
931-296-3357

Certificate of Analysis - EPA Protocol Mixtures

Customer: CST

		Protocol:	Reference #:	Lot#:
Cylinder Number:	SX48140	G1	T189541-5	9303607405
Cylinder Pressure:	1900psig			
Last Analysis Date:	11/13/2013			
Expiration Date:	11/14/2021			

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 100 PSIG

			REPLICATE RESPONSES
Component:	Carbon Dioxide		Date: 11/13/2013
			3.98
Certified Conc:	3.97% +/- 0.03%	ABS	3.97
			3.97
Component:	Oxygen		Date: 11/13/2013
			21.1
Certified Conc:	21.1% +/- 0.4%	ABS	21.1
			21.0

BALANCE GAS: Nitrogen

REFERENCE STANDARDS:

Component:	Carbon Dioxide	Component:	Oxygen
Reference Standard:	PRM	Reference Standard:	SRM
Cylinder #:	D249735	Cylinder #:	CAL015730
Concentration:	19.793%	Concentration:	23.03%
Exp. Date:	4/4/2018	Exp. Date:	1/1/2016
NIST Sample #:	VSL PRIMARY	NIST Sample #:	71-D-36

CERTIFICATION INSTRUMENTS

Component:	Carbon Dioxide	Component:	Oxygen
Make/Model:	HORIBA VIA-510	Make/Model:	HORIBA MPA-510
Serial Number:	41679080021	Serial Number:	U1LSAGS6
Measurement Principle:	NDIR	Measurement Principle:	PARAMAGNETIC
Last Calibration:	10/30/2013	Last Calibration:	11/13/2013

Notes:

This Certification was performed according to EPA Traceability Protocol for Assay & Certification of Gaseous Calibration Standards May 2012 , using procedure G1 and/or G2.

U.S. EPA Vendor ID No.: D62013 PGVP Participation Date: 01/01/13: PGVP Renewal Date: 1/1/2014

Analyst: La'Shawn Grissom-Brown

La'Shawn Grissom-Brown

Date: 11/13/2013

Data Log Records
Unit #1

Time	Date	NOx PPMV	CO PPMV	O2 %VOL	CO2 %VOL	Event
7:30	1/20/16	0.26	0.13	0.01	0.01	**NOx Converter**
7:31	1/20/16	44.55	44.81	0.01	-0.01	**Efficiency Test**
7:32	1/20/16	85.74	82.99	0.01	-0.01	**Initial Linearity**
7:33	1/20/16	-0.11	-0.20	9.56	6.49	
7:34	1/20/16	0.44	-0.47	20.97	4.10	
7:35	1/20/16	49.02	-0.57	0.04	0.01	**Response Time /**
7:36	1/20/16	0.23	-0.12	0.00	-0.03	**Bias Check /**
7:37	1/20/16	43.67	44.80	0.00	-0.03	**Interference Test**
7:38	1/20/16	0.05	-0.24	9.57	6.45	
7:39	1/20/16	0.34	-0.61	-0.01	0.01	
7:40	1/20/16	66.96	13.09	16.80	2.41	**Stratification Test**
7:41	1/20/16	71.08	12.65	16.80	2.41	**Point 1**
7:42	1/20/16	70.91	12.61	16.79	2.41	
7:43	1/20/16	71.35	12.52	16.78	2.41	
7:44	1/20/16	70.57	12.44	16.78	2.43	
7:45	1/20/16	70.81	12.64	16.78	2.43	**Point 2**
7:46	1/20/16	69.75	13.29	16.78	2.43	
7:47	1/20/16	69.39	12.85	16.77	2.43	
7:48	1/20/16	69.95	12.76	16.77	2.45	
7:49	1/20/16	69.31	12.72	16.77	2.45	**Point 3**
7:50	1/20/16	69.98	13.29	16.76	2.46	
7:51	1/20/16	68.65	13.19	16.76	2.45	
7:52	1/20/16	68.61	13.78	16.76	2.46	
7:53	1/20/16	68.93	13.33	16.76	2.45	**Start Run 1**
7:54	1/20/16	68.05	13.98	16.77	2.45	
7:55	1/20/16	68.44	13.19	16.78	2.45	
7:56	1/20/16	67.22	13.41	16.79	2.45	
7:57	1/20/16	64.52	13.27	16.80	2.45	
7:58	1/20/16	64.48	13.18	16.80	2.45	
7:59	1/20/16	63.99	13.49	16.79	2.46	
8:00	1/20/16	64.96	13.06	16.78	2.46	
8:01	1/20/16	66.31	13.33	16.77	2.46	
8:02	1/20/16	67.47	13.16	16.77	2.46	
8:03	1/20/16	68.35	13.46	16.78	2.45	
8:04	1/20/16	66.12	13.31	16.78	2.46	
8:05	1/20/16	65.71	12.60	16.78	2.46	
8:06	1/20/16	65.72	12.51	16.78	2.46	
8:07	1/20/16	66.15	12.44	16.77	2.46	
8:08	1/20/16	67.26	14.07	16.77	2.46	
8:09	1/20/16	68.57	13.97	16.77	2.46	
8:10	1/20/16	66.10	13.88	16.76	2.48	
8:11	1/20/16	65.44	13.44	16.77	2.48	
8:12	1/20/16	63.77	14.34	16.75	2.52	
8:13	1/20/16	65.75	16.42	16.75	2.52	
Run 1 Average		**66.35**	**13.52**	**16.77**	**2.46**	

Time	Date	NOx PPMV	CO PPMV	O2 %VOL	CO2 %VOL	Event
8:14	1/20/16	0.36	-0.18	0.01	0.01	
8:15	1/20/16	43.90	44.07	0.01	-0.03	
8:16	1/20/16	0.34	-0.24	9.59	6.46	
8:17	1/20/16	67.69	9.65	16.80	2.55	
8:18	1/20/16	68.60	9.30	16.80	2.55	**Start Run 2**
8:19	1/20/16	68.60	9.30	16.79	2.55	
8:20	1/20/16	69.77	8.93	16.80	2.55	
8:21	1/20/16	70.88	8.99	16.80	2.55	
8:22	1/20/16	70.31	8.95	16.79	2.55	
8:23	1/20/16	71.37	8.90	16.79	2.53	
8:24	1/20/16	71.84	8.97	16.79	2.53	
8:25	1/20/16	71.39	8.60	16.79	2.53	
8:26	1/20/16	72.28	8.93	16.79	2.53	
8:27	1/20/16	72.21	8.58	16.79	2.53	
8:28	1/20/16	71.83	8.98	16.79	2.53	
8:29	1/20/16	72.31	8.97	16.79	2.53	
8:30	1/20/16	71.38	8.56	16.78	2.53	
8:31	1/20/16	72.64	8.60	16.79	2.53	
8:32	1/20/16	72.26	8.63	16.78	2.53	
8:33	1/20/16	71.81	8.23	16.79	2.53	
8:34	1/20/16	71.91	8.64	16.79	2.53	
8:35	1/20/16	71.32	8.94	16.79	2.53	
8:36	1/20/16	71.45	8.60	16.79	2.52	
8:37	1/20/16	69.78	8.61	16.79	2.53	
8:38	1/20/16	70.24	8.62	16.79	2.52	
Run 2 Average		**71.15**	**8.80**	**16.79**	**2.54**	
8:39	1/20/16	0.45	-0.34	0.01	0.01	
8:40	1/20/16	44.18	44.45	0.01	-0.03	
8:41	1/20/16	0.70	-0.48	9.60	6.50	
8:42	1/20/16	69.49	8.26	16.79	2.52	
8:43	1/20/16	69.55	8.40	16.79	2.53	**Start Run 3**
8:44	1/20/16	69.00	8.24	16.79	2.53	
8:45	1/20/16	70.87	7.92	16.79	2.53	
8:46	1/20/16	69.25	7.90	16.79	2.53	
8:47	1/20/16	69.25	7.89	16.79	2.54	
8:48	1/20/16	69.55	8.25	16.79	2.54	
8:49	1/20/16	69.22	7.94	16.79	2.53	
8:50	1/20/16	70.03	7.90	16.79	2.54	
8:51	1/20/16	68.83	7.89	16.78	2.54	
8:52	1/20/16	69.42	7.92	16.78	2.54	
8:53	1/20/16	68.77	7.88	16.78	2.53	
8:54	1/20/16	70.00	7.90	16.79	2.54	
8:55	1/20/16	69.62	7.54	16.78	2.53	
8:56	1/20/16	69.38	7.52	16.78	2.53	
8:57	1/20/16	68.86	7.16	16.79	2.54	
8:58	1/20/16	69.15	7.51	16.78	2.54	
8:59	1/20/16	69.90	7.17	16.78	2.53	
9:00	1/20/16	69.39	7.17	16.78	2.54	
9:01	1/20/16	70.06	7.57	16.78	2.54	
9:02	1/20/16	69.40	7.15	16.78	2.53	
9:03	1/20/16	69.72	7.18	16.78	2.53	
Run 3 Average		**69.49**	**7.71**	**16.79**	**2.53**	
9:04	1/20/16	0.73	-0.59	0.01	-0.01	
9:05	1/20/16	44.96	44.72	0.01	-0.03	
9:06	1/20/16	0.59	-0.31	9.60	6.53	

Data Log Records
Unit #2

Time	Date	NOx PPMV	CO PPMV	O2 %VOL	CO2 %VOL	Event
7:30	1/20/16	0.08	-0.15	0.00	-0.01	NOx Converter
7:31	1/20/16	0.21	-0.25	9.62	6.49	Efficiency Test
7:32	1/20/16	0.11	-0.05	21.12	3.99	Initial Linearity
7:33	1/20/16	44.14	44.95	-0.01	0.01	
7:34	1/20/16	84.78	83.93	-0.02	0.00	
7:35	1/20/16	49.35	-0.35	0.01	-0.02	Response Time /
7:36	1/20/16	0.32	-0.05	0.00	0.00	Bias Check /
7:37	1/20/16	0.37	-0.12	9.59	6.51	Interference Test
7:38	1/20/16	43.63	43.94	0.01	0.02	
7:39	1/20/16	0.02	-0.04	0.00	0.02	
7:40	1/20/16	71.19	11.95	17.38	1.92	Stratification Test
7:41	1/20/16	72.71	10.94	17.43	1.96	Point 1
7:42	1/20/16	72.35	10.94	17.46	1.97	
7:43	1/20/16	72.54	10.94	17.49	1.98	
7:44	1/20/16	72.15	10.94	17.51	1.97	
7:45	1/20/16	71.62	11.95	17.52	1.99	Point 2
7:46	1/20/16	69.86	17.94	17.52	1.99	
7:47	1/20/16	70.53	15.94	17.53	2.01	
7:48	1/20/16	70.63	15.95	17.53	2.02	
7:49	1/20/16	70.52	16.94	17.53	2.02	Point 3
7:50	1/20/16	71.00	16.95	17.53	2.05	
7:51	1/20/16	71.13	16.94	17.53	2.04	
7:52	1/20/16	71.03	16.96	17.52	2.05	
7:53	1/20/16	72.01	14.95	17.52	2.04	Start Run 1
7:54	1/20/16	72.23	12.94	17.53	2.02	
7:55	1/20/16	72.24	13.94	17.54	2.03	
7:56	1/20/16	72.10	14.95	17.54	2.03	
7:57	1/20/16	71.80	14.95	17.54	2.03	
7:58	1/20/16	71.86	14.95	17.54	2.03	
7:59	1/20/16	71.49	14.95	17.53	2.04	
8:00	1/20/16	71.30	14.96	17.55	2.02	
8:01	1/20/16	71.17	14.95	17.56	2.02	
8:02	1/20/16	71.06	14.95	17.57	2.01	
8:03	1/20/16	70.39	14.95	17.60	2.00	
8:04	1/20/16	70.18	12.94	17.62	1.99	
8:05	1/20/16	70.21	11.95	17.63	1.99	
8:06	1/20/16	70.23	11.95	17.63	1.97	
8:07	1/20/16	70.13	11.95	17.64	1.97	
8:08	1/20/16	69.49	12.94	17.64	1.96	
8:09	1/20/16	67.93	16.96	17.64	1.98	
8:10	1/20/16	67.51	18.95	17.64	1.99	
8:11	1/20/16	68.81	14.96	17.63	1.97	
8:12	1/20/16	68.66	15.95	17.63	1.97	
8:13	1/20/16	69.48	12.94	17.64	1.95	
	Run 1 Average	**70.49**	**14.43**	**17.59**	**2.00**	

Time	Date	NOx PPMV	CO PPMV	O2 %VOL	CO2 %VOL	Event
8:14	1/20/16	0.37	-0.45	0.03	-0.03	
8:15	1/20/16	0.38	-0.39	9.63	6.46	
8:16	1/20/16	43.93	44.19	0.01	-0.02	
8:17	1/20/16	74.03	11.19	17.40	2.08	
8:18	1/20/16	73.80	11.18	17.41	2.10	Start Run 2
8:19	1/20/16	73.80	11.19	17.42	2.10	
8:20	1/20/16	73.75	11.19	17.43	2.09	
8:21	1/20/16	73.67	11.19	17.43	2.11	
8:22	1/20/16	73.57	11.19	17.44	2.09	
8:23	1/20/16	73.36	11.19	17.44	2.09	
8:24	1/20/16	73.69	12.20	17.44	2.09	
8:25	1/20/16	73.69	12.19	17.45	2.12	
8:26	1/20/16	73.77	12.20	17.45	2.09	
8:27	1/20/16	73.89	12.20	17.45	2.09	
8:28	1/20/16	73.73	12.20	17.45	2.10	
8:29	1/20/16	73.85	11.19	17.46	2.10	
8:30	1/20/16	73.71	11.19	17.46	2.10	
8:31	1/20/16	73.81	11.19	17.46	2.10	
8:32	1/20/16	73.68	12.20	17.46	2.10	
8:33	1/20/16	73.44	12.20	17.45	2.10	
8:34	1/20/16	74.03	12.20	17.46	2.10	
8:35	1/20/16	73.66	13.18	17.46	2.11	
8:36	1/20/16	73.72	12.20	17.46	2.10	
8:37	1/20/16	73.81	13.18	17.45	2.11	
8:38	1/20/16	73.94	13.19	17.45	2.10	
	Run 2 Average	**73.73**	**11.91**	**17.45**	**2.10**	
8:39	1/20/16	0.63	-0.34	0.03	-0.03	
8:40	1/20/16	0.48	-0.52	9.62	6.44	
8:41	1/20/16	43.86	44.49	0.03	-0.01	
8:42	1/20/16	72.68	9.96	17.39	2.15	
8:43	1/20/16	72.63	9.96	17.39	2.15	Start Run 3
8:44	1/20/16	72.45	9.96	17.39	2.13	
8:45	1/20/16	72.26	9.95	17.40	2.15	
8:46	1/20/16	72.27	9.96	17.40	2.14	
8:47	1/20/16	72.24	9.87	17.40	2.14	
8:48	1/20/16	72.36	9.96	17.39	2.15	
8:49	1/20/16	72.61	9.96	17.39	2.14	
8:50	1/20/16	72.24	9.95	17.40	2.15	
8:51	1/20/16	72.21	9.96	17.39	2.15	
8:52	1/20/16	72.32	9.96	17.39	2.15	
8:53	1/20/16	72.28	9.96	17.39	2.14	
8:54	1/20/16	72.31	9.96	17.40	2.16	
8:55	1/20/16	72.25	8.95	17.40	2.14	
8:56	1/20/16	72.19	9.96	17.39	2.15	
8:57	1/20/16	72.06	8.95	17.39	2.14	
8:58	1/20/16	71.79	8.95	17.39	2.14	
8:59	1/20/16	72.34	8.95	17.38	2.14	
9:00	1/20/16	71.57	8.95	17.39	2.14	
9:01	1/20/16	72.02	8.95	17.38	2.15	
9:02	1/20/16	72.03	8.95	17.38	2.14	
9:03	1/20/16	72.21	8.95	17.38	2.14	
	Run 3 Average	**72.22**	**9.57**	**17.39**	**2.14**	
9:04	1/20/16	0.87	-0.63	0.04	-0.04	
9:05	1/20/16	0.29	-0.66	9.66	6.43	
9:06	1/20/16	44.29	44.94	0.04	-0.04	

Particulate Matter Emission Estimates

Leslie Witherspoon
Solar Turbines Incorporated

PURPOSE

This document summarizes Solar's recommended $PM_{10/2.5}$ emission levels for our combustion turbines. The recommended levels are based on an analysis of emissions tests collected from customer sites.

Particulate Matter Definition

National Ambient Air Quality Standards (NAAQS) for particulate matter were first set in 1971. Total suspended particulate (TSP) was the first indicator used to represent suspended particles in the ambient air. Since July 1, 1987, the Environmental Protection Agency (EPA) has used the indicator PM_{10}, which includes only the particles with aerodynamic diameter smaller than 10 micrometers. PM_{10} (coarse particles) come from sources such as windblown dust from the desert or agricultural fields and dust kicked up on unpaved roads by vehicle traffic.

The EPA added a $PM_{2.5}$ ambient air standard in 1997. $PM_{2.5}$ includes particles with an aerodynamic diameter less than 2.5 micrometers. $PM_{2.5}$ (fine particles) are generally emitted from activities such as industrial and residential combustion and from vehicle exhaust. Fine particles are also formed in the atmosphere when gases such as sulfur dioxide, nitrogen oxides, and volatile organic compounds, emitted by combustion activities, are transformed by chemical reactions.

Nearly all particulate matter from gas turbine exhaust is less than one micrometer (micron) in diameter. Thus the emission rates of TSP, PM_{10}, and $PM_{2.5}$ from gas turbines are theoretically equivalent although source testing will show variation due to test method detection levels and processes.

TESTING FOR PARTICULATE MATTER

The turbine combustion process has little effect on the particulate matter generated and measured. The largest contributor to particulate matter emissions for gas and liquid fired combustion turbines is measurement technique and error. Other, minor contributing, sources of particulate matter emissions include carbon, ash, fuel-bound sulfur, artifact sulfate formation, compressor/lubricating oils, and inlet air.

Historical customer particulate matter source test data show that there is significant variability from test to test. The source test results support the common industry argument that particulate matter from natural gas fired combustion sources is difficult to measure accurately. The reference test methods for particulate matter were developed primarily for measuring emissions from coal-fired power plants and other major emitters of particulates. Particulate concentrations from gas turbine can be 100 to 10,000 times lower than the "traditional" particulate sources. The test methods were not developed or verified for low emission levels. There are interferences, insignificant at higher exhaust particulate matter concentrations that result in emissions greater than the actual emissions from gas turbines. New methods are being developed to address this problem.

Due to measurement and procedural errors, the measured results, in most cases, may not be representative of actual particulate matter emitted. There are many potential error sources in measuring particulate matter. Most of these have to do with contamination of the samples, material from the sampling apparatus getting into the samples, and general human error in samples and analysis.

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Recommended Particulate Matter Emission Factors

When necessary to support the air permitting process Solar recommends the following $PM_{10/2.5}$ emission factors:

- Natural Gas: 0.015 lb/MMBtu fuel input (HHV)
- Landfill Gas: 0.03 lb/MMBtu fuel input (HHV)
- Liquid Fuel: 0.06 lb/MMBtu fuel input (HHV). The liquid fuel emission factor assumes fuel sulfur content is <500 ppm and ash content is <0.005% by wt.

The emission levels cited above are only for engine operation with the fuels listed. Other fuels may not yield similar results.

Recent customer source testing has shown that AP-42 (EPA AP-42 "Compilation of Air Pollutant Emission Factors.") emission factors for natural gas are achievable in the field, when the test method recommendations shown below are followed. Historically, Solar did not recommend using AP-42 because while some source test firms have measured below AP-42 levels, others have measured higher. Because particulate matter emissions levels are highly dependent on the test firm and have very little to do with the turbine, Solar does not warrant AP-42 levels but does recognize they are achievable in the field. Customers generally choose a particulate matter emissions factor at or above the AP-42 level that works for their site permitting recognizing that the lower the emissions factor the higher the risk for source testing. Any Solar warranty on particulate matter would be at the recommended levels above, e.g. 0.015 lb/MMBtu (HHV) for natural gas.

Test Method Recommendation

Solar recommends that EPA Methods 201/201A[1] be used to measure the “front half”. “Front half” represents filterable particulate matter.

EPA Method 202[2] (with nitrogen purge and field blanks) should be used to measure the “back half”. “Back half” measurements represent the condensable portion of particulate matter.

EPA Method 5[3], which measures the front and back halves may be substituted (e.g. where exhaust temperatures do not allow the use of Method 202).

Testing should include three test runs of 4 hours each.

Solar recommends using the aforementioned test methods until more representative test methods are developed and made commercially available.

References

[1] EPA Method 201, Determination of PM10 Emissions, Exhaust Gas Recycle Procedure. EPA Method 201A, Determination of PM10 Emissions, Constant Sampling Rate Procedure, 40 CFR 60, Part 60, Appendix A.

[2] EPA Method 202, Determination of Condensible Particulate Emissions from Stationary Sources, 40 CFR 60, Part 60, Appendix A.

[3] EPA Method 5, Determination of Particulate Emissions from Stationary Sources, 40 CFR 60, Part 60, Appendix

Solar Turbines Incorporated
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Ms. Jennifer Courser 05/15/2010
Enterprise Products Operating
2162 Commerce Dr.
Midland, TX 79707
(432) 681-2600

Re: Annual emissions testing at the South Carlsbad Compressor Station on Unit 1

Ms. Courser,

Exhaust emissions from one compressor turbine was tested at the South Carlsbad compressor station near Loving, New Mexico on. Testing was conducted to demonstrate compliance with emission limits set forth by NMED permit. The engine is identified as follows:

Engine Information	
Unit Number:	Unit 1
Manufacturer:	Solar
Serial Number:	4920
Model:	CENTAUR 40
Mfr. Rated Hp:	4500hp
Mfr. Rated Speed:	15,000

This is a natural gas fired turbine used for compression of natural gas for transportation through the pipeline.

The test matrix consisted of three 20-minute test runs on the turbine in accordance with NMED requirements. For each test, the average emission concentrations of nitrogen oxides (NO_X), oxygen (O_2), and carbon monoxide (CO) were measured using analytical instrumentation. Operational data such as Gas Producer Speed, Turbine Speed, and suction and discharge pressures were recorded during each run from available operational data on the unit.

Results of the tests are presented in tabular format in this report. Included in this table are engine operational data, ambient conditions, emission concentrations, and mass emission rates.

Continuous emission monitors housed in an air-conditioned mobile laboratory were used to measure the exhaust concentrations of NO_X, CO and O_2. This testing utilized the following analytical methods:

EPA Reference Method 3a	O_2 concentration
EPA Reference Method 7e	NO_X concentration
EPA Reference Method 10	CO concentration
EPA Reference Method 19	Mass emission rates

A computerized data recorder was used to record output from the analyzers. The data logger record provides documentation of the emission measurements and the instrument calibrations. The data logger records are also useful for indicating trends in the data.

Mass emission rates were calculated using EPA Method 19 calculations (combustion stoichiometry). Emission rates in terms of lbs/hr and TPY were calculated using the pollutant concentration (ppmv), the oxygen F-factor ($DSCF_{ex}$/MMBtu) and the horsepower specific fuel consumption rate (Btu/Hp-hr). The O_2 F-Factor used in this test series was 8710 ($DSCF_{ex}$/MMBtu), the EPA default value for engines burning natural gas. The horsepower specific fuel rate used in the test was 9080 Btu/Hp-hr.

A summary of the quality assurance procedures associated with the EPA test methods is presented in tabular format in the appendix of this report. Examples of these procedures include daily multipoint calibrations, zero and span checks between each test run, NO_2 to NO converter efficiency check results, sample system bias check results, and analyzer interference test results.

The appendix of this report also includes supporting test documentation, example calculations, and data logger records.

If you have any questions, please feel free to contact me at (806) 773-8851.

Sincerely,

Ross Thompson
Principal Scientist
Relient Emissions Testing, Inc

Solar Turbines
A Caterpillar Company

Solar Turbines Incorporated

9330 Sky Park Court
San Diego, CA 92123
Tel: (858) 694-1616

Submitted Electronically

September 4, 2019

Attn: Jing Li
Enterprise Products

Subject: Centaur 40 Routine Maintenance Overhaul
South Carlsbad (NM)

The Centaur 40 turbine package (S/N 3020123) at the above facility recently underwent a routine maintenance overhaul utilizing Solar Turbine's engine exchange program.

The overhaul engine core that Solar Turbines provided to Enterprise was a like-for-like replacement with the same guarantees on performance and emissions as the core that was replaced.

Per 40 CFR 60, Subpart KKKK rule language, an overhaul does not trigger the definition of "modification" because it is a like-for-like exchange with the same performance and emissions specifications as the original equipment. In addition, an overhaul is not "reconstruction" as the cost of a routine overhaul is well less than 50% of the cost of a new comparable unit.

This turbine package "commenced construction" in 1973. Routine overhaul exchange of turbine components does not signify a new affected facility per the NSPS provisions in 40 CFR 60.

Because routine overhaul exchange of components on an existing facility does not trigger the definitions of "new", "modification" or "reconstruction" there are no federal NSPS ramifications. Solar recommends a review of the State-issued operating permit for any facility specific requirements associated with the overhaul which typically may include agency notification and/or emissions testing.

Please call me at 858.505.8554 if you have any questions.

Sincerely,

Anthony Pocengal
Solar Turbines Incorporated

cc: Joey Guillen, Solar Turbines

Solar Turbines
A Caterpillar Company

Solar Turbines Incorporated

9330 Sky Park Court
San Diego, CA 92123
Tel: (858) 694-1616

Submitted Electronically

October 3, 2019

Attn: Alena Miro
Enterprise Products

Subject: Centaur 40 – Routine Maintenance Overhaul
South Carlsbad Unit 2 (NM)

The Centaur 40 turbine (S/N CC79419) at the above facility underwent a routine maintenance overhaul utilizing Solar Turbine's engine exchange program in September 2018.

The overhauled turbine core (gas producer and power turbine) that Solar Turbines provided Enterprise is a like-kind replacement with the same guarantees on performance and emissions as the core that was replaced.

Per 40 CFR 60, Subparts GG and KKKK rule language, an overhaul does not trigger the definition of "modification" because it is a like-for-like exchange with the same performance and emissions specifications as the original equipment. In addition, the engine exchange is not "reconstruction" as the cost of a routine overhaul is well less than 50% of the cost of a new comparable unit.

The overhauled engine is not "new" as per the NSPS General Provisions in 40 CFR 60, Subpart A, this turbine "commenced construction" in 1979. Routine overhaul exchange of turbine components does not signify a new affected facility per either of the Subpart GG or KKKK definitions.

Because routine overhaul exchange of components on an existing facility does not trigger the definitions of "new", "modification" or "reconstruction", there are no NSPS ramifications due to this activity.

Please call me at 858.505.8554 if you have any questions.

Sincerely,

Anthony Pocengal
Solar Turbines Incorporated

cc: Joey Guillen, Solar Turbines Incorporated

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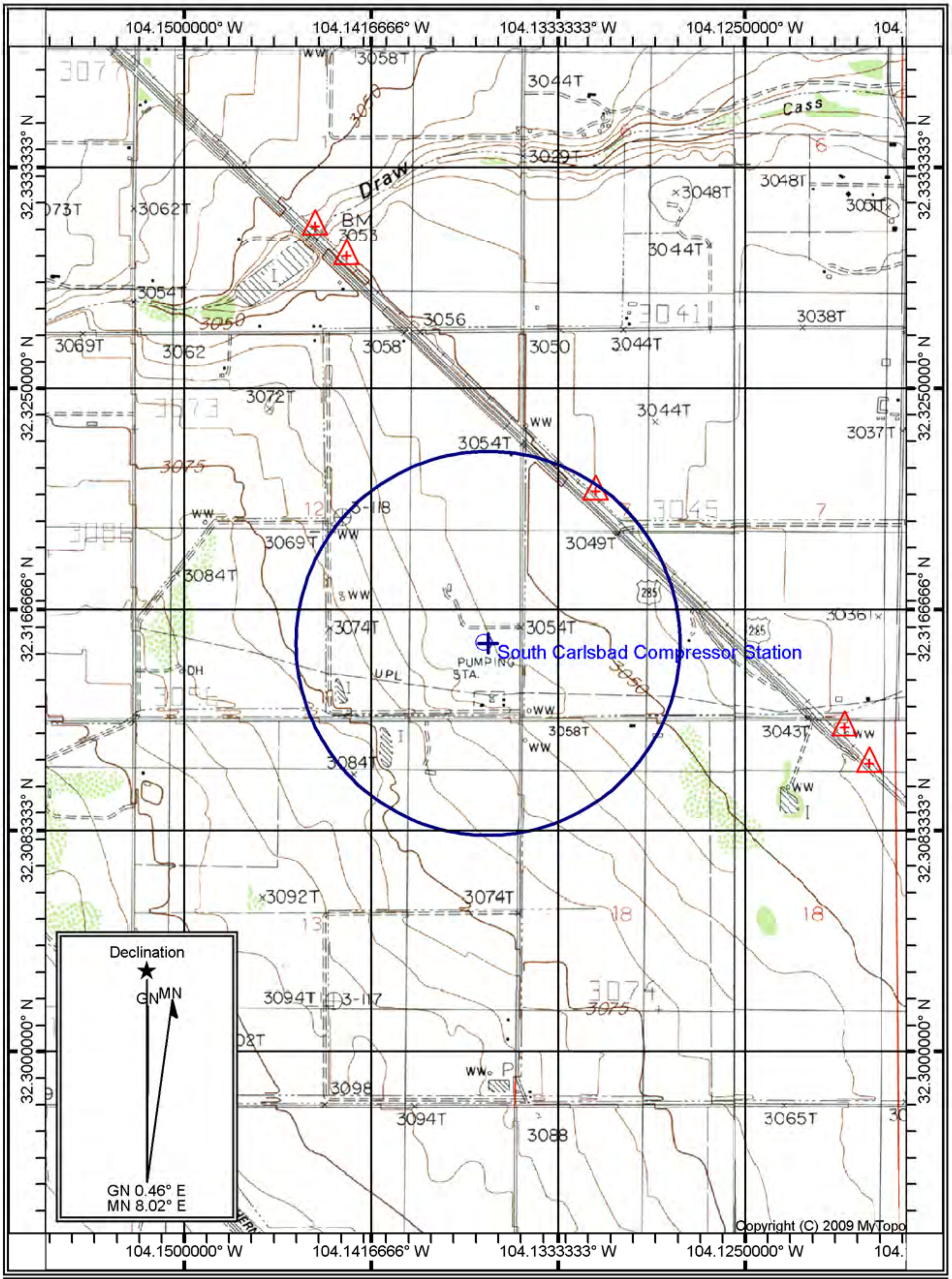
Section 8

Map(s)

A map such as a 7.5 minute topographic quadrangle showing the exact location of the source. The map shall also include the following:

The UTM or Longitudinal coordinate system on both axes	An indicator showing which direction is north
A minimum radius around the plant of 0.8km (0.5 miles)	Access and haul roads
Topographic features of the area	Facility property boundaries
The name of the map	The area which will be restricted to public access
A graphical scale	

A topographic map is attached on the following page.



Map Name: OTIS
Horizontal Datum: WGS84
Print Date: 07/15/20
Scale: 1 inch = 2,000 ft.
Map Center: 032.3155315° N 104.1370278° W

Section 10

Written Description of the Routine Operations of the Facility

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A written description of the routine operations of the facility. Include a description of how each piece of equipment will be operated, how controls will be used, and the fate of both the products and waste generated. For modifications and/or revisions, explain how the changes will affect the existing process. In a separate paragraph describe the major process bottlenecks that limit production. The purpose of this description is to provide sufficient information about plant operations for the permit writer to determine appropriate emission sources.

The facility is a natural gas compressor station or transport of natural gas. Gas enters the facility through a separator and is compressed by three gas turbine-driven compressors (Units 1, 2, & 5) and five 4-stroke lean burn compressor engines (Units 6, 7, 8, 9, & 10). The gas is then routed through a dehydrator, Unit 3, where water is removed. The water from the dehydrator regenerator, which contains some hydrocarbons, is routed through a condenser to recover salable hydrocarbons, which are routed to T-006. The non-condensable gas from the condenser is routed to ECD-1 with a 100% capture efficiency and a 98% DRE. The gas stream from the flash tank is sent to the reboiler as fuel. When the reboiler does not call for fuel, the flash gas is sent to ECD-1 with a 100% capture efficiency and a 98% DRE. After inlet compression, gas is sent directly to a chiller and cold separator, where liquids (primarily water) condense and are removed from the stream. The dry gas stream then goes to a pipeline for transport.

Liquids from the inlet separator are routed to a 3-phase separator, where water, hydrocarbon liquids, and gas are separated. The gas stream from the 3-phase separator is used as turbine fuel (along with makeup fuel if needed from the discharge residue gas stream and/or the gas stream from the condensate stabilizer). The water goes to tanks for storage. The hydrocarbon liquids from the 3-phase separator and from the cold separator go to the condensate stabilizer where the water and hydrocarbons are further separated. Liquid hydrocarbons and water are stored in separate tanks, and hydrocarbon gases are added to the turbine fuel stream.

In the event of an emergency, the gas streams from the 3-phase separator and from the condensate stabilizer may be routed to the flare. During non-routine conditions such as when gas must be released from portions of the facility for maintenance or in the event of an emergency, some VOCs will be directed to the flare. Gas from the 3-phase separator and stabilizer overheads will be directed to the flare in the event of a plant shutdown. Additionally, during an emergency shutdown, pressure vessels or the gas contents of the refrigeration system may be released to the flare; however, the quantity of gas in these vessels or systems is less than the assumed maximum gas volume from the 3-phase separator and stabilizer overheads.

Section 11

Source Determination

Source submitting under 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC

Sources applying for a construction permit, PSD permit, or operating permit shall evaluate surrounding and/or associated sources (including those sources directly connected to this source for business reasons) and complete this section. Responses to the following questions shall be consistent with the Air Quality Bureau's permitting guidance, Single Source Determination Guidance, which may be found on the Applications Page in the Permitting Section of the Air Quality Bureau website.

Typically, buildings, structures, installations, or facilities that have the same SIC code, that are under common ownership or control, and that are contiguous or adjacent constitute a single stationary source for 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC applicability purposes. Submission of your analysis of these factors in support of the responses below is optional, unless requested by NMED.

A. Identify the emission sources evaluated in this section (list and describe)**:**
All sources listed in Table2-A of this application.

B. Apply the 3 criteria for determining a single source:

SIC Code: Surrounding or associated sources belong to the same 2-digit industrial grouping (2-digit SIC code) as this facility, OR surrounding or associated sources that belong to different 2-digit SIC codes are support facilities for this source.

☑ **Yes** ☐ **No**

Common Ownership or Control: Surrounding or associated sources are under common ownership or control as this source.

☑ **Yes** ☐ **No**

Contiguous or Adjacent: Surrounding or associated sources are contiguous or adjacent with this source.

☑ **Yes** ☐ **No**

C. Make a determination:

☑ The source, as described in this application, constitutes the entire source for 20.2.70, 20.2.72, 20.2.73, or 20.2.74 NMAC applicability purposes. If in "A" above you evaluated only the source that is the subject of this application, all "**YES**" boxes should be checked. If in "A" above you evaluated other sources as well, you must check **AT LEAST ONE** of the boxes "**NO**" to conclude that the source, as described in the application, is the entire source for 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC applicability purposes.

☐ The source, as described in this application, **does not** constitute the entire source for 20.2.70, 20.2.72, 20.2.73, or 20.2.74 NMAC applicability purposes (A permit may be issued for a portion of a source). The entire source consists of the following facilities or emissions sources (list and describe):

Section 12

Section 12.A

PSD Applicability Determination for All Sources

(Submitting under 20.2.72, 20.2.74 NMAC)

A PSD applicability determination for all sources. For sources applying for a significant permit revision, apply the applicable requirements of 20.2.74.AG and 20.2.74.200 NMAC and to determine whether this facility is a major or minor PSD source, and whether this modification is a major or a minor PSD modification. It may be helpful to refer to the procedures for Determining the Net Emissions Change at a Source as specified by Table A-5 (Page A.45) of the EPA New Source Review Workshop Manual to determine if the revision is subject to PSD review.

A. This facility is:
   - ☑ **a minor PSD source before and after this modification (if so, delete C and D below).**
   - ☐ **a major PSD source before this modification. This modification will make this a PSD minor source.**
   - ☐ **an existing PSD Major Source that has never had a major modification requiring a BACT analysis.**
   - ☐ **an existing PSD Major Source that has had a major modification requiring a BACT analysis**
   - ☐ **a new PSD Major Source after this modification.**

B. **This facility is a minor source. With this permit application emissions for this facility will be less than 250 tpy for all regulated pollutants making this a PSD minor source.**

Section 13

Determination of State & Federal Air Quality Regulations

This section lists each state and federal air quality regulation that may apply to your facility and/or equipment that are stationary sources of regulated air pollutants.

Not all state and federal air quality regulations are included in this list. Go to the Code of Federal Regulations (CFR) or to the Air Quality Bureau's regulation page to see the full set of air quality regulations.

Required Information for Specific Equipment:
For regulations that apply to specific source types, in the 'Justification' column **provide any information needed to determine if the regulation does or does not apply**. **For example**, to determine if emissions standards at 40 CFR 60, Subpart IIII apply to your three identical stationary engines, we need to know the construction date as defined in that regulation; the manufacturer date; the date of reconstruction or modification, if any; if they are or are not fire pump engines; if they are or are not emergency engines as defined in that regulation; their site ratings; and the cylinder displacement.

Required Information for Regulations that Apply to the Entire Facility:
See instructions in the 'Justification' column for the information that is needed to determine if an 'Entire Facility' type of regulation applies (e.g. 20.2.70 or 20.2.73 NMAC).

Regulatory Citations for Regulations That Do Not, but Could Apply:
If there is a state or federal air quality regulation that does not apply, but you have a piece of equipment in a source category for which a regulation has been promulgated, you must **provide the low level regulatory citation showing why your piece of equipment is not subject to or exempt from the regulation. For example** if you have a stationary internal combustion engine that is not subject to 40 CFR 63, Subpart ZZZZ because it is an existing 2 stroke lean burn stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, your citation would be 40 CFR 63.6590(b)(3)(i). **We don't want a discussion of every non-applicable regulation, but if it is possible a regulation could apply, explain why it does not. For example,** if your facility is a power plant, you do not need to include a citation to show that 40 CFR 60, Subpart OOO does not apply to your non-existent rock crusher.

Regulatory Citations for Emission Standards:
For each unit that is subject to an emission standard in a source specific regulation, such as 40 CFR 60, Subpart OOO or 40 CFR 63, Subpart HH, include the low level regulatory citation of that emission standard. Emission standards can be numerical emission limits, work practice standards, or other requirements such as maintenance. **Here are examples:** a glycol dehydrator is subject to the general standards at 63.764C(1)(i) through (iii); an engine is subject to 63.6601, Tables 2a and 2b; a crusher is subject to 60.672(b), Table 3 and all transfer points are subject to 60.672(e)(1)

Federally Enforceable Conditions:
All federal regulations are federally enforceable. All Air Quality Bureau State regulations are federally enforceable except for the following: affirmative defense portions at 20.2.7.6.B, 20.2.7.110(B)(15), 20.2.7.11 through 20.2.7.113, 20.2.7.115, and 20.2.7.116; 20.2.37; 20.2.42; 20.2.43; 20.2.62; 20.2.63; 20.2.86; 20.2.89; and 20.2.90 NMAC. Federally enforceable means that EPA can enforce the regulation as well as the Air Quality Bureau and federally enforceable regulations can count toward determining a facility's potential to emit (PTE) for the Title V, PSD, and nonattainment permit regulations.

INCLUDE ANY OTHER INFORMATION NEEDED TO COMPLETE AN APPLICABILITY DETERMINATION OR THAT IS RELEVENT TO YOUR FACILITY'S NOTICE OF INTENT OR PERMIT.

EPA Applicability Determination Index for 40 CFR 60, 61, 63, etc: http://cfpub.epa.gov/adi/

Table for State Regulations:

State Regulation Citation	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification: (You may delete instructions or statements that do not apply in the justification column to shorten the document.)
20.2.1 NMAC	General Provisions	Yes	Facility	General Provisions apply to Notice of Intent, Construction, and Title V permit applications.
20.2.3 NMAC	Ambient Air Quality Standards NMAAQS	Yes	Facility	20.2.3 NMAC is a SIP approved regulation that limits the maximum allowable concentration of Total Suspended Particulates, Sulfur Compounds, Carbon Monoxide and Nitrogen Dioxide. The facility meets maximum allowable concentrations of TSP, SO_2, H_2S, NO_x, and CO under this regulation.
20.2.7 NMAC	Excess Emissions	Yes	Facility	This regulation establishes requirements for the facility if operations at the facility result in any excess emissions. The owner or operator will operate the source at the facility having an excess emission, to the extent practicable, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions. The facility will also notify the NMED of any excess emission per 20.2.7.110 NMAC.
20.2.23 NMAC	Fugitive Dust Control	No	N/A	This regulation does not apply as the facility has no need of fugitive dust control measures as the facility does not generate enough particulate matter.
20.2.33 NMAC	Gas Burning Equipment - Nitrogen Dioxide	No	N/A	This facility does not have gas burning equipment (external combustion emission sources, such as gas fired boilers and heaters) having a heat input of greater than 1,000,000 million British Thermal Units per year per unit. The facility is not subject to this regulation and does not have emission sources that meet the applicability requirements under 20.2.33.108 NMAC.
20.2.34 NMAC	Oil Burning Equipment: NO_2	No	N/A	This facility does not have oil burning equipment (external combustion emission sources, such as oil fired boilers and heaters) having a heat input of greater than 1,000,000 million British Thermal Units per year per unit. The facility is not subject to this regulation and does not have emission sources that meet the applicability requirements under 20.2.34.108 NMAC.
20.2.35 NMAC	Natural Gas Processing Plant – Sulfur	Yes	Facility	This regulation establishes sulfur emission standards for natural gas processing plants. This facility is a new natural gas processing plant as defined in 20.2.35.7.B NMAC. The facility does not meet the minimum sulfur emission requirement of an average of 5 tpy [20.2.35.110.A NMAC]. This facility is subject to the stack height, recordkeeping, and reporting requirements of this regulation [20.2.35.111-112 NMAC].
20.2.37 and 20.2.36 NMAC	Petroleum Processing Facilities and Petroleum Refineries	N/A	N/A	These regulations were repealed by the Environmental Improvement Board. If you had equipment subject to 20.2.37 NMAC before the repeal, your combustion emission sources are now subject to 20.2.61 NMAC.
20.2.38 NMAC	Hydrocarbon Storage Facility	No	N/A	This facility is not a petroleum production facility as defined in 20.2.38.7.D NMAC. Natural gas enters this facility via pipeline and inlet separator. Condensate stored at this facility comes from the pipeline, not a well. Accordingly, the tanks at this facility do not meet the definition of a tank battery as defined in 20.2.38.7.E.
20.2.39 NMAC	Sulfur Recovery Plant - Sulfur	No	N/A	This regulation establishes sulfur emission standards for sulfur recovery plants that are not part of petroleum or natural gas processing facilities. This regulation does not apply to the facility because this facility does not have a sulfur recovery plant.
20.2.50 NMAC	Oil and Gas Sector – Ozone Precursor Pollutants	Yes	1, 2, 3b, 5, 6, 7, 8, 9, 10, ECD, Flare	This regulation establishes emission standards for volatile organic compounds (VOC) and oxides of nitrogen (NOx) for oil and gas production, processing, compression, and transmission sources. 20.2.50 NMAC subparts below: Check the box for the subparts that are applicable: ☒ 113 – Engines and Turbines – Enterprise will comply with the requirements of this subpart. ☒ 114 – Compressor Seals – Reciprocating compressors located at boosting stations are subject to the requirements of this subpart. ☒ 115 – Control Devices and Closed Vent Systems – Enterprise will comply with the requirements of this subpart.

State Regulation Citation	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification: (You may delete instructions or statements that do not apply in the justification column to shorten the document.)
				☒ 116 – Equipment Leaks and Fugitive Emissions – Enterprise will comply with the requirements of this subpart. ☐ 117 – Natural Gas Well Liquid Unloading – N/A – This facility does not contain natural gas wells; therefore, they are not subject to the requirements of this subpart. ☐ 118 – Glycol Dehydrators – N/A – The glycol dehydrator has a PTE of less than 2 tpy and will therefore not be subject to this subpart. ☐ 119 – Heaters – N/A – The firing rates of the heaters are less than 20 MMBtu/hr; therefore, they are not subject to this subpart. ☒ 120 – Hydrocarbon Liquid Transfers – This facility trucks out more than 13 times a year and is therefore subject to this subpart. ☐ 121 – Pig Launching and Receiving – N/A – Pig launching and receiving operations at this facility are below 1 tpy and will therefore not be subject to this subpart. ☒ 122 – Pneumatic Controllers and Pumps – Any natural-gas driven controllers or pumps at the facility will comply with the applicable requirements of this rule. ☐ 123 – Storage Vessels – N/A – The permitted PTE for the storage tanks is less than the applicability thresholds; therefore, the requirements of this subpart do not apply. ☐ 124 – Well Workovers – N/A – There are no oil or natural gas wells located at this facility; therefore, this subpart does not apply. ☐ 125 – Small Business Facilities – N/A – This facility does not qualify as a small business facility; therefore, this subpart does not apply. ☐ 126 – Produced Water Management Unit – N/A – There are no produced water management units located at this facility; therefore, this subpart does not apply. ☐ 127 – Flowback Vessels and Preproduction Operations – N/A – There are no wells located at this facility; therefore, this subpart does not apply.
20.2.61.109 NMAC	Smoke & Visible Emissions	Yes	1, 2, 3b, 5, 6, 7, 8, 9, 10 ECD, Flare	This regulation establishes controls on smoke and visible emissions from certain sources, including stationary combustion equipment. This regulation is applicable to the following stationary combustion units: 1, 2, 3b, 5, 6, 7, 8, 9, 10, ECD, and Flare.
20.2.70 NMAC	Operating Permits	Yes	Facility	This regulation establishes requirements for obtaining an operating permit. This facility is a major source with respect to Title V and is permitted under P-130-R4. The facility will comply with all operating permit conditions as applicable.
20.2.71 NMAC	Operating Permit Fees	Yes	Facility	This regulation establishes a schedule of operating permit emission fees. The facility is subject to 20.2.70 NMAC and is therefore subject to requirements of this regulation.
20.2.72 NMAC	Construction Permits	Yes	Facility	This regulation establishes the requirements for obtaining a construction permit. This facility is subject to the requirements of this subpart and complies with NSR Permit 0220-M12R1.
20.2.73 NMAC	NOI & Emissions Inventory Requirements	Yes	Facility	This regulation establishes emission inventory requirements. The facility meets the applicability requirements of 20.2.73.300 NMAC. The facility will meet all applicable reporting requirements under 20.2.73.300.B.1 NMAC.
20.2.74 NMAC	Permits – Prevention of Significant Deterioration (PSD)	No	Facility	This regulation establishes requirements for obtaining a prevention of significant deterioration permit. This facility is not a major source with respect to PSD and is therefore not subject to 20.2.74 NMAC.
20.2.75 NMAC	Construction Permit Fees	Yes	Facility	This regulation establishes a schedule of operating permit emission fees. This facility is subject to 20.2.72 NMAC and in turn subject to 20.2.75 NMAC. The facility is exempt from annual fees under this part (20.2.75.11.E NMAC) as it is subject to fees pursuant to 20.2.71 NMAC.

State Regulation Citation	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification: (You may delete instructions or statements that do not apply in the justification column to shorten the document.)
20.2.77 NMAC	New Source Performance	Yes	F-001, 2, 5, 6, 7, 8, 9, 10	This regulation establishes state authority to implement new source performance standards (NSPS) for stationary sources, as amended through January 15, 2017. F-001 applies as it is subject to NSPS OOOOa and units 2 and 5 are subject to NSPS GG. Units 6, 7, 8, 9, & 10 will be subject to JJJJ and OOOOb when the rule is promulgated.
20.2.78 NMAC	Emission Standards for HAPS	No	N/A	This regulation establishes state authority to implement emission standards for hazardous air pollutants subject to 40 CFR Part 61. This facility does not emit hazardous air pollutants which are subject to the requirements of 40 CFR Part 61 and is therefore not subject to this regulation.
20.2.79 NMAC	Permits – Nonattainment Areas	No	Facility	This regulation establishes the requirements for obtaining a nonattainment area permit. The facility is not located in a non-attainment area and therefore is not subject to this regulation.
20.2.80 NMAC	Stack Heights	No	N/A	This regulation establishes requirements for the evaluation of stack heights and other dispersion techniques. This regulation does not apply, as all stacks at the facility will follow good engineering practice.
20.2.82 NMAC	MACT Standards for source categories of HAPS	Yes	3a, 6, 7, 8, 9, 10	The glycol dehydrator at this facility is Subject to the requirements of 40 CFR 63 Subpart HH. Also, the engines 6, 7, 8, 9, & 10 are subject to Subpart ZZZZ. Therefore, this regulation applies.

Table for Applicable Federal Regulations:

Federal Regulation Citation	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification:
40 CFR 50	NAAQS	Yes	Facility	This regulation defines national ambient air quality standards. The facility meets all applicable national ambient air quality standards for NO_x, CO, SO_2, H_2S, PM_{10}, and $PM_{2.5}$ under this regulation.
NSPS 40 CFR 60, Subpart A	General Provisions	Yes	2, 5, 6, 7, 8, 9, 10, F-001	This regulation defines general provisions for relevant standards that have been set under this part. The facility is subject to this regulation because the following subparts apply: - Units 1, 2 & 5 are subject to NSPS GG. - Unit F-001 is subject to the leak detection requirements of NSPS OOOOa. - Units 6, 7, 8, 9, & 10 is subject to JJJJ and will be subject to NSPS OOOOb.
NSPS 40 CFR60.40a, Subpart Da	Subpart Da, Performance Standards for **Electric Utility Steam Generating Units**	No	N/A	This regulation establishes standards of performance for fossil-fuel-fired stream generators. This regulation does not apply as the facility does not have any fossil-fuel-fired steam generating units with a heat input rate of 250 MMBtu/hr [60.40(a)(1)].
NSPS 40 CFR60.40b Subpart Db	**Electric Utility Steam Generating Units**	No	N/A	This regulation establishes standards of performance for electric utility steam generating units. This regulation does not apply because the facility does not operate any electric utility steam generating units.

Federal Regulation Citation	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification:
40 CFR 60.40c, Subpart Dc	Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units	No	N/A	This regulation does not apply as the facility does not have any steam generating units.
NSPS 40 CFR 60, Subpart Ka	Standards of Performance for **Storage Vessels for Petroleum Liquids** for which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and **Prior** to July 23, 1984	No	N/A	This regulation establishes performance standards for storage vessels for petroleum liquids for which construction, reconstruction, or modification commenced after May 18, 1978, and prior to July 23, 1984. The tanks at the facility, which are regulated emission sources, are 300 bbl (12,600 gallons) and 210 bbl (8,820 gallons). The capacities of the tanks at the facility are less than 40,000 gallons and are not subject to this regulation. [40 CFR Part 60.110a(a)]
NSPS 40 CFR 60, Subpart Kb	Standards of Performance for **Volatile Organic Liquid Storage Vessels** (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced **After** July 23, 1984	No	N/A	This regulation establishes performance standards for volatile organic liquid storage vessels (including petroleum liquid storage vessels) for which construction, reconstruction, or modification commenced after July 23, 1984. This facility does not have any storage vessels with a capacity greater than or equal to 75 cubic meters that were constructed, reconstructed or modified after July 23, 1984. This regulation is not applicable.
NSPS 40 CFR 60.330 Subpart GG	**Stationary Gas Turbines**	Yes	1, 2 & 5	This regulation establishes standards of performance for stationary gas turbines with a heat input of 10 MMBtu/hr or greater. Units 1, 2 & 5 each have heat inputs of 35.3 MMBtu/hour and commenced construction after October 3, 1977. Accordingly, these units are subject to this regulation. [60.330(b)]
NSPS 40 CFR 60, Subpart KKK	Leaks of VOC from **Onshore Gas Plants**	No	N/A	This regulation defines standards of performance for equipment leaks of VOC emissions from onshore natural gas processing plants for which construction, reconstruction, or modification commenced after January 20, 1984, and on or before August 23, 2011. The facility is not subject to this regulation because the operations performed at this site are no longer consistent to those carried out at an onshore natural gas processing plant. The removal of the dew point plant ensured that the facility is no longer subject to this regulation.
NSPS 40 CFR Part 60 Subpart LLL	Standards of Performance for **Onshore Natural Gas Processing**: SO_2 Emissions	No	N/A	This regulation establishes standards of performance for SO_2 emissions from onshore natural gas processing for which construction, reconstruction, or modification of the amine sweetening unit commenced after January 20, 1984 and on or before August 23, 2011. This regulation is not applicable as the amine sweetening unit (Unit 4a) commenced construction after August 23, 2011.
NSPS 40 CFR Part 60 Subpart OOOO	Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution for which	No	N/A	This regulation establishes standards of performance for crude oil and natural gas production, transmission, and distribution. Because the dew point plant is being removed this change the facility to be a compressor station; therefore, this regulation does not apply. Facility fugitive emissions are not subject to the leak detection requirements of this regulation. Compressors associated with units 1, 2, 5, and unit EC-1 were manufactured prior to August 23, 2011. Relocation does not constitute a modification; therefore, compressors associated with units 1,2,5 and unit EC-1 are not subject to this regulation. Unit T- 006 is an existing exempt

Federal Regulation Citation	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification:
	construction, modification or reconstruction commenced after August 23, 2011 and before September 18, 2015			tank. This unit was constructed prior to 8/23/2011 and is not subject to this regulation T-008 through T-012 are also constructed prior to 8/23/2011 and are not subject to this regulation.
NSPS 40 CFR Part 60 Subpart OOOOa	Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced **After** September 18, 2015	Yes	F-001	This regulation establishes standards of performance for crude oil and natural gas production, transmission, and distribution. As this facility is a compressor station, fugitive emissions (F-001) are subject to the leak detection requirements of this regulation. Compressors associated with units 1, 2, 5, and unit EC-1 were manufactured prior to August 23, 2011 and prior to September 18, 2015. Relocation does not constitute a modification; therefore, compressors associated with units 1, 2, 5, and EC-a are not subject to this regulation. Unit T-006 is an existing exempt tank. This unit was constructed prior to 8/23/2011 and is not subject to this regulation. Facility wide LDAR monitoring will be conducted by using optical gas imaging for the compressor station. T-008 through T-012 are also constructed prior to 8/23/2011 and prior to 9/18/2015 and are not subject to this regulation.
NSPS 40 CFR Part 60 Subpart OOOOb	Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced **After** November 15, 2021	Yes	6, 7, 8, 9 & 10	This regulation establishes standards of performance for crude oil and natural gas production, transmission, and distribution. As this facility is a compressor station, compressor engines will be subject to the requirements of this regulation. As this rule is not yet finalized, if approved, these units would be subject and will comply with all applicable requirements.
NSPS 40 CFR 60 Subpart IIII	Standards of performance for Stationary Compression Ignition Internal Combustion Engines	No	N/A	This regulation establishes standards of performance for stationary compression ignition internal combustion engines. This rule applies to IC engines (diesel engines) that commenced construction after July 11, 2005. This regulation does not apply, as there are no stationary compression ignition internal combustion engines at this facility.
NSPS 40 CFR Part 60 Subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	Yes	6, 7, 8, 9 & 10	This regulation establishes standards of performance for stationary spark ignition combustion engines. The site has a unit that is a portable non-road engine that will be at the facility for less than 12 months. In accordance with 40 CFR 60.4230(f), this unit is not subject to the requirements of this subpart. Units 6, 7, 8, 9, & 10 are subject to this regulation.
NSPS 40 CFR 60 Subpart TTTT	Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units	No	N/A	This facility does not generate electricity; therefore, this regulation does not apply.
NSPS 40 CFR 60 Subpart UUUU	Emissions Guidelines for Greenhouse Gas Emissions and Compliance Times for Electric Utility Generating Units	No	N/A	This facility does not generate electricity; therefore, this regulation does not apply.

Federal Regulation Citation	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification:
NSPS 40 CFR 60, Subparts WWW, XXX, Cc, and Cf	Standards of performance for Municipal Solid Waste (MSW) Landfills	No	N/A	This facility is not a landfill; therefore, this regulation does not apply.
NESHAP 40 CFR 61 Subpart A	General Provisions	No	N/A	NSPS 40 CFR 61 does not apply to the facility because the facility does not emit or have the triggering substances on site and/or the facility is not involved in the triggering activity. The facility is not subject to this regulation. None of the subparts of Part 61 apply to the facility.
NESHAP 40 CFR 61 Subpart E	National Emission Standards for **Mercury**	No	N/A	The provisions of this subpart are applicable to those stationary sources which process mercury ore to recover mercury, use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide, and incinerate or dry wastewater treatment plant sludge. This facility does not process mercury ore, use mercury chlor-alkali cells, or incinerate or dry wastewater treatment plant sludge. Therefore, this facility is not subject to this regulation.
NESHAP 40 CFR 61 Subpart V	National Emission Standards for **Equipment Leaks** (Fugitive Emission Sources)	No	N/A	This regulation establishes national emission standards for equipment leaks (fugitive emission sources). The facility does not have equipment that operates in volatile hazardous air pollutant (VHAP) service [40 CFR Part 61.240]. The regulated activities subject to this regulation do not take place at this facility. The facility is not subject to this regulation.
MACT 40 CFR 63, Subpart A	General Provisions	Yes	3a, 6, 7, 8, 9, 10	This regulation defines general provisions for relevant standards that have been set under this part. The regulation applies to the glycol dehydrator and the engines 6, 7, 8, 9, & 10 that are subject to MACT ZZZZ and comply by following the requirements of NSPS JJJJ.
MACT 40 CFR 63.760 Subpart HH	**Oil and Natural Gas Production Facilities**	Yes	3a	This regulation establishes national emission standards for hazardous air pollutants from oil and natural gas production facilities. This facility is an Area Source of HAPs, therefore Unit 3 (200 MMscf/day Glycol Dehydrator) is subject to this regulation per 40 CFR 63.760(d)(2).
MACT 40 CFR 63 Subpart HHH	National Emission Standards for Hazardous Air Pollutants From Natural Gas Transmission and Storage Facilities	No	N/A	This regulation establishes national emission standards for hazardous air pollutants from boilers and heaters at major sources for HAPs. This facility is an area source for HAPs therefore this regulation does not apply. [63.1270(a)]. Additionally, this facility is not a natural gas transmission or storage facility, as defined by this regulation.
MACT 40 CFR 63 Subpart DDDDD	National Emission Standards for Hazardous Air Pollutants for Major Industrial, Commercial, and Institutional Boilers & Process Heaters	No	N/A	The facility does not have any heaters or boilers on site; therefore, this regulation does not apply.
MACT 40 CFR 63 Subpart UUUUU	National Emission Standards for Hazardous Air Pollutants Coal & Oil Fire Electric Utility Steam Generating Unit	No	N/A	This subpart establishes national emission limitations and work practice standards for hazardous air pollutants (HAP) emitted from coal- and oil-fired electric utility steam generating units (EGUs) as defined in §63.10042 of this subpart. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations. This facility does not contain the affected units and is therefore not subject to this regulation.

Federal Regulation Citation	Title	Applies? Enter Yes or No	Unit(s) or Facility	Justification:
MACT 40 CFR 63 Subpart ZZZZ	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (**RICE MACT**)	Yes	6, 7, 8, 9, 10	This regulation defines national emissions standards for HAPs from stationary reciprocating Internal Combustion Engines. Unit GEN-1 is a portable non-road engine that will be at the facility for less than 12 months. In accordance with 40 CFR 63.6585(a), this unit is not subject to the requirements of this regulation. The engines 6, 7, 8, 9, & 10 are subject to MACT ZZZZ and comply by following the requirements of NSPS JJJJ.
40 CFR 64	**Compliance Assurance Monitoring**	Yes	3a	The dehydrator (unit 3a) has uncontrolled VOC emission greater than 100 tpy. Unit 3a emissions are controlled by ECD. Thus, Unit 3a is subject to this regulation.
40 CFR 68	**Chemical Accident Prevention**	No	N/A	Enterprise has more than a threshold quantity of a regulated substance in a process, as determined under §68.115, and is therefore subject to this regulation. Enterprise complies by maintaining a Risk Management Plan.
Title IV – Acid Rain 40 CFR 72	**Acid Rain**	No	N/A	This part establishes the acid rain program. This facility is not an acid rain source. This regulation does not apply.
Title IV – Acid Rain 40 CFR 73	**Sulfur Dioxide** Allowance Emissions	No	N/A	This regulation establishes sulfur dioxide allowance emissions for certain types of facilities. This facility is not an acid rain source. This regulation does not apply.
Title IV-Acid Rain 40 CFR 75	**Continuous Emissions Monitoring**	No	N/A	This facility does not produce commercial electricity for sale; therefore, this regulation does not apply.
Title IV – Acid Rain 40 CFR 76	**Acid Rain** Nitrogen Oxides **Emission Reduction Program**	No	N/A	This regulation establishes an acid rain nitrogen oxides emission reduction program. This regulation applies to each coal-fired utility unit that is subject to an acid rain emissions limitation or reduction requirement for SO2. This part does not apply because the facility does not operate any coal-fired units [40 CFR Part 76.1].
Title VI – 40 CFR 82	Protection of **Stratospheric Ozone**	No	N/A	Enterprise owns appliances containing CFCs and is therefore subject to this requirement. However, this requirement imposes no obligations on the facility beyond those imposed on any individual or corporate owner of such appliances, and is mentioned here only in the interest of being thorough. Enterprise uses only certified technicians for the maintenance, service, repair, and disposal of appliances and maintains the appropriate records for this requirement.

Section 14

Operational Plan to Mitigate Emissions

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

☒ **Title V Sources** (20.2.70 NMAC)**:** By checking this box and certifying this application the permittee certifies that it has developed an **Operational Plan to Mitigate Emissions During Startups, Shutdowns, and Emergencies** defining the measures to be taken to mitigate source emissions during startups, shutdowns, and emergencies as required by 20.2.70.300.D.5(f) and (g) NMAC. This plan shall be kept on site to be made available to the Department upon request. This plan should not be submitted with this application.

☐ **NSR** (20.2.72 NMAC)**, PSD** (20.2.74 NMAC) **& Nonattainment** (20.2.79 NMAC) **Sources:** By checking this box and certifying this application the permittee certifies that it has developed an **Operational Plan to Mitigate Source Emissions During Malfunction, Startup, or Shutdown** defining the measures to be taken to mitigate source emissions during malfunction, startup, or shutdown as required by 20.2.72.203.A.5 NMAC. This plan shall be kept on site to be made available to the Department upon request. This plan should not be submitted with this application.

☒ **Title V** (20.2.70 NMAC)**, NSR** (20.2.72 NMAC)**, PSD** (20.2.74 NMAC) **& Nonattainment** (20.2.79 NMAC) **Sources:** By checking this box and certifying this application the permittee certifies that it has established and implemented a Plan to Minimize Emissions During Routine or Predictable Startup, Shutdown, and Scheduled Maintenance through work practice standards and good air pollution control practices as required by 20.2.7.14.A and B NMAC. This plan shall be kept on site or at the nearest field office to be made available to the Department upon request. This plan should not be submitted with this application.

Startup and shutdown procedures are either based on manufacturer's recommendations or based on Enterprise's experience with specific equipment. These procedures are designed to proactively address the potential for malfunction to the greatest extent possible. These procedures dictate a sequence of operations that are designed to minimize emissions from the facility during events that result in shutdown and subsequent startup.

Equipment located at this facility is equipped with various safety devices and features that aid in the prevention of excess emissions in the event of an operational emergency. If an operational emergency does occur and excess emissions occur, Enterprise will submit the required Excess Emissions Report as per 20.2.7 NMAC. Corrective action to eliminate the excess emissions and prevent recurrence in the future will be undertaken as quickly as safety allows.

Section 15

Alternative Operating Scenarios

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

Alternative Operating Scenarios: Provide all information required by the department to define alternative operating scenarios. This includes process, material and product changes; facility emissions information; air pollution control equipment requirements; any applicable requirements; monitoring, recordkeeping, and reporting requirements; and compliance certification requirements. Please ensure applicable Tables in this application are clearly marked to show alternative operating scenario.

Construction Scenarios: When a permit is modified authorizing new construction to an existing facility, NMED includes a condition to clearly address which permit condition(s) (from the previous permit and the new permit) govern during the interval between the date of issuance of the modification permit and the completion of construction of the modification(s). There are many possible variables that need to be addressed such as: Is simultaneous operation of the old and new units permitted and, if so for example, for how long and under what restraints? In general, these types of requirements will be addressed in Section A100 of the permit, but additional requirements may be added elsewhere. Look in A100 of our NSR and/or TV permit template for sample language dealing with these requirements. Find these permit templates at: www.env.nm.gov/air-quality/permitting-section-procedures-and-guidance/. Compliance with standards must be maintained during construction, which should not usually be a problem unless simultaneous operation of old and new equipment is requested.

In this section, under the bolded title “Construction Scenarios”, specify any information necessary to write these conditions, such as: conservative-realistic estimated time for completion of construction of the various units, whether simultaneous operation of old and new units is being requested (and, if so, modeled), whether the old units will be removed or decommissioned, any PSD ramifications, any temporary limits requested during phased construction, whether any increase in emissions is being requested as SSM emissions or will instead be handled as a separate Construction Scenario (with corresponding emission limits and conditions, etc.

There are no alternative operating scenarios.

Section 17

Compliance Test History

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

To show compliance with existing NSR permits conditions, you must submit a compliance test history. The table below provides an example.

Compliance Test History Table

Unit No.	Test Description	Test Date
1, 2	Tested for NO_x and CO as required by Title V Permit P118-R2	May 2008
1, 2	Tested for NO_x and CO as required by Title V Permit P118-R2	July 2009
1, 2	Tested for NO_x and CO as required by Title V Permit P118-R2	May 2010
1, 2	Tested for NO_x and CO as required by Title V Permit P118-R2	June 2011
1, 2	Tested for NO_x and CO as required by Title V Permit P118-R2	May 2012
1, 2	Tested for NO_x and CO as required by Title V Permit P118-R2	April 2013
1, 2	Tested for NO_x and CO as required by Title V Permit P118-R2	January 2014
1, 2	Tested for NO_x and CO as required by Title V Permit P118-R2	January 2018
2	Tested for NO_x and CO as required by Title V Permit P118-R2	April 2018
1	Tested for NO_x and CO as required by Title V Permit P118-R2	May 2018
1, 2	Tested for NO_x and CO as required by Title V Permit P118-R2	February 2019
1, 2	Tested for NO_x and CO as required by Title V Permit P118-R2	June 2019
1, 2	Tested for NO_x and CO as required by Title V Permit P118-R2	August 2019
1, 2	Tested for NO_x and CO as required by Title V Permit P118-R2	November 2019
1, 2	Tested for NO_x and CO as required by Title V Permit P118-R2	March 202
1, 2	Tested for NO_x and CO as required by Title V Permit P118-R2	May 2020
5	Tested for NO_x and CO as required by Title V Permit P118-R2	May 2021
5	Tested for NO_x and CO as required by Title V Permit P118-R2	July 2021
1, 2, 5	Tested for NO_x and CO as required by Title V Permit P118-R2	March 2022
1, 2, 5	Tested for NO_x and CO as required by Title V Permit P118-R2	June 2022
1, 2, 5	Tested for NO_x and CO as required by Title V Permit P118-R2	December 2022

Section 19

Requirements for Title V Program

Who Must Use this Attachment:

* Any major source as defined in 20.2.70 NMAC.
* Any source, including an area source, subject to a standard or other requirement promulgated under Section 111 - Standards of Performance for New Stationary Sources, or Section 112 Hazardous Air Pollutants, of the 1990 federal Clean Air Act ("federal Act"). Non-major sources subject to Sections 111 or 112 of the federal Act are exempt from the obligation to obtain an 20.2.70 NMAC operating permit until such time that the EPA Administrator completes rulemakings that require such sources to obtain operating permits. In addition, sources that would be required to obtain an operating permit solely because they are subject to regulations or requirements under Section 112(r) of the federal Act are exempt from the requirement to obtain an Operating Permit.
* Any Acid Rain source as defined under title IV of the federal Act. The Acid Rain program has additional forms. See www.env.nm.gov/air-quality/air-quality-title-v-operating-permits-guidance-page/. Sources that are subject to both the Title V and Acid Rain regulations are encouraged to submit both applications simultaneously.
* Any source in a source category designated by the EPA Administrator ("Administrator"), in whole or in part, by regulation, after notice and comment.

19.1 - 40 CFR 64, Compliance Assurance Monitoring (CAM) (20.2.70.300.D.10.e NMAC)

Any source subject to 40CFR, Part 64 (Compliance Assurance Monitoring) must submit all the information required by section 64.7 with the operating permit application. The applicant must prepare a separate section of the application package for this purpose; if the information is already listed elsewhere in the application package, make reference to that location. Facilities not subject to Part 64 are invited to submit periodic monitoring protocols with the application to help the AQB to comply with 20.2.70 NMAC. Sources subject to 40 CFR Part 64, must submit a statement indicating your source's compliance status with any enhanced monitoring and compliance certification requirements of the federal Act.

This facility has a CAM Plan for the Glycol Dehydrator at the facility. A modified CAM Plan for the Glycol Dehydrator is attached following Section 19.

19.2 - Compliance Status (20.2.70.300.D.10.a & 10.b NMAC)

Describe the facility's compliance status with each applicable requirement at the time this permit application is submitted. This statement should include descriptions of or references to all methods used for determining compliance. This statement should include descriptions of monitoring, recordkeeping and reporting requirements and test methods used to determine compliance with all applicable requirements. Refer to Section 2, Tables 2-N and 2-O of the Application Form as necessary. (20.2.70.300.D.11 NMAC) For facilities with existing Title V permits, refer to most recent Compliance Certification for existing requirements. Address new requirements such as CAM, here, including steps being taken to achieve compliance.

Enterprise believes that the South Carlsbad Compressor Station complies with each applicable state and federal regulation identified in Section 13 (Determination of State & Federal Air Quality Regulations). In the event that Enterprise discovers new information affecting the compliance status of the facility, Enterprise will make appropriate notifications and/or take corrective actions to maintain the required compliance.

19.3 - Continued Compliance (20.2.70.300.D.10.c NMAC)

Provide a statement that your facility will continue to be in compliance with requirements for which it is in compliance at the time of permit application. This statement must also include a commitment to comply with other applicable requirements as they come into effect during the permit term. This compliance must occur in a timely manner or be consistent with such schedule expressly required by the applicable requirement.

As described in Section 19.2 Enterprise states that South Carlsbad Compressor Station will continue to be operated in compliance with applicable requirements for which it is in compliance as of the date of submittal of this application.

In addition, Enterprise will meet additional applicable requirements that become effective during the permit term in a timely manner or on such a time schedule as expressly required by the applicable requirement. In the event that Enterprise should discover new information affecting the compliance status of the South Carlsbad Compressor Station, Enterprise will make appropriate notifications and/or take corrective actions as appropriate.

19.4 - Schedule for Submission of Compliance (20.2.70.300.D.10.d NMAC)

You must provide a proposed schedule for submission to the department of compliance certifications during the permit term. This certification must be submitted annually unless the applicable requirement or the department specifies a more frequent period. A sample form for these certifications will be attached to the permit.

Compliance certification will be submitted annually as required by NMAC 20.2.70.300.D.10.d.

19.5 - Stratospheric Ozone and Climate Protection

In addition to completing the four (4) questions below, you must submit a statement indicating your source's compliance status with requirements of Title VI, Section 608 (National Recycling and Emissions Reduction Program) and Section 609 (Servicing of Motor Vehicle Air Conditioners).

---

1. Does your facility have any air conditioners or refrigeration equipment that uses CFCs, HCFCs or other ozone-depleting substances? ☐ **Yes** ☒ **No**

2. Does any air conditioner(s) or any piece(s) of refrigeration equipment contain a refrigeration charge greater than 50 lbs? ☐ **Yes** ☒ **No**

   (If the answer is yes, describe the type of equipment and how many units are at the facility.)

3. Do your facility personnel maintain, service, repair, or dispose of any motor vehicle air conditioners (MVACs) or appliances ("appliance" and "MVAC" as defined at 82. 152)? ☐ **Yes** ☒ **No**

4. Cite and describe which Title VI requirements are applicable to your facility (i.e. 40 CFR Part 82, Subpart A through G.)

Enterprise does not service, maintain, repair, or dispose of appliances that use Class I or Class II chemicals chlorofluorocarbons, halon, carbon tetrachloride, methyl chloroform or hydrochlorofluorocarbon) and that motor vehicle air conditioners are not serviced at the Red Raider Compressor Station. Therefore, the requirements of Title VI, Sections 608 and 609 of the Clean Air Act are not applicable to the Red Raider Compressor Station.

19.6 - Compliance Plan and Schedule

Applications for sources, which are not in compliance with all applicable requirements at the time the permit application is submitted to the department, must include a proposed compliance plan as part of the permit application package. This plan shall include the information requested below:

A. Description of Compliance Status: (20.2.70.300.D.11.a NMAC)
A narrative description of your facility's compliance status with respect to all applicable requirements (as defined in 20.2.70 NMAC) at the time this permit application is submitted to the department.

B. Compliance plan: (20.2.70.300.D.11.B NMAC)
A narrative description of the means by which your facility will achieve compliance with applicable requirements with which it is not in compliance at the time you submit your permit application package.

C. Compliance schedule: (20.2.70.300D.11.c NMAC)
A schedule of remedial measures that you plan to take, including an enforceable sequence of actions with milestones, which will lead to compliance with all applicable requirements for your source. This schedule of compliance must be at least as stringent as that contained in any consent decree or administrative order to which your source is subject. The obligations of any consent decree or administrative order are not in any way diminished by the schedule of compliance.

D. Schedule of Certified Progress Reports: (20.2.70.300.D.11.d NMAC)
A proposed schedule for submission to the department of certified progress reports must also be included in the compliance schedule. The proposed schedule must call for these reports to be submitted at least every six (6) months.

E. Acid Rain Sources: (20.2.70.300.D.11.e NMAC)
If your source is an acid rain source as defined by EPA, the following applies to you. For the portion of your acid rain source subject to the acid rain provisions of title IV of the federal Act, the compliance plan must also include any additional requirements under the acid rain provisions of title IV of the federal Act. Some requirements of title IV regarding the schedule and methods the source will use to achieve compliance with the acid rain emissions limitations may supersede the requirements of title V and 20.2.70 NMAC. You will need to consult with the Air Quality Bureau permitting staff concerning how to properly meet this requirement.

NOTE: The Acid Rain program has additional forms. See www.env.nm.gov/air-quality/air-quality-title-v-operating-permits-guidance-page/. Sources that are subject to both the Title V and Acid Rain regulations are **encouraged** to submit both applications **simultaneously**.

Based on information and belief formed after reasonable inquiry and as described in Section 19.2, and with this filing, Enterprise states that South Carlsbad Compressor Station is in compliance with applicable requirements. No compliance plan, compliance schedule, or compliance reports are required. In addition, based on information and belief formed after reasonable inquiry Enterprise states that South Carlsbad Compressor Station is not an acid rain source as defined at 40 CFR 72.6.

19.7 - 112(r) Risk Management Plan (RMP)

Any major sources subject to section 112(r) of the Clean Air Act must list all substances that cause the source to be subject to section 112(r) in the application. The permittee must state when the RMP was submitted to and approved by EPA.

Any major sources subject to section 112(r) of the Clean Air Act must list all substances that cause the source to be subject to section 112(r) in the application. The permittee must state when the RMP was submitted to and approved by EPA.

19.8 - Distance to Other States, Bernalillo, Indian Tribes and Pueblos

Will the property on which the facility is proposed to be constructed or operated be closer than 80 km (50 miles) from other states, local pollution control programs, and Indian tribes and pueblos (20.2.70.402.A.2 and 20.2.70.7.B NMAC)?

(If the answer is yes, state which apply and provide the distances.)

Texas – 34.7 km; No Tribes or pueblos or local pollution control programs within 80 km.

19.9 - Responsible Official

Provide the Responsible Official as defined in 20.2.70.7.AD NMAC:

Responsible Official: Graham Bacon
R.O. Title: Executive Vice President-EHS&T
R.O. Address: PO Box 4324, Houston TX 77210-4324
Phone: (713) 381-6595
R.O. email: environmental@eprod.com

Enterprise Products Operating LLC – South Carlsbad Compressor Station

COMPLIANCE ASSURANCE MONITORING PLAN FOR GLYCOL DEHYDRATOR

I. Background

A. Emissions Unit

Description: Glycol Dehydrator (Still Vent & Flash Tank)

Identification: 3a

Facility: South Carlsbad Compressor Station

B. Applicable Regulation, Emission Limit, and Pre-CAM Monitoring Requirements

Regulation: Operation and reporting requirements created in NSR Permit 0220-M12 et seq; 40 CFR 60 Subpart HH.

Emission limits: Uncontrolled – VOC: 322.57 tpy

HAPs: 84.9 tpy

Controlled – VOC: 0.00 tpy

HAPs: 0.00 tpy

C. Control Technology, Capture System, Bypass, PER

Controls: Enclosed Combustion Device

Capture System: Enclosed Combustion Device

Potential pre-control device emissions: 322.57 tpy VOC, 84.9 tpy HAP, 0.18 tpy H_2S. Under 40 CFR §64.2(a) this is a CAM affected unit.

Potential post-control device emissions: 0.0 tpy VOC, 0.0 tpy HAP, 0.0 tpy H_2S. The ECD will control the flash tank and BTEX still vent vapors of the glycol dehydrator (Unit 3a). The ECD will be used as a primary controller for the dehydrator flash tank. When gas is not sent to the ECD, it will be used as fuel for the reboiler. The ECD destruction removal efficiency (DRE) is 98%.

II. Monitoring Approach

The key elements of the monitoring approach are presented in the attached table.

III. Response to Excursion

Per 40 CFR §64.1, excursion is defined as “a departure from an indicator range established for monitoring under this part, consistent with any averaging period specified for averaging the results of the monitoring.” Excursions of the enclosed combustion device will trigger an inspection, corrective action, and reporting.

Monitoring Approach: South Carlsbad Compressor Station (ECD-1)

	Indicator No. 1	**Indicator No. 2**
I. Indicator	Proper equipment operation	Glycol pump recirculation rate
Measurement Approach	Semi-annual inspections shall demonstrate compliance with allowable emission limits.	Monitoring the circulation rate shall demonstrate compliance with allowable emission limits.
II. Indicator Range	All equipment is operating in accordance with site-specific operation and maintenance plan or there is a deficiency.	The glycol pump circulation rate shall not exceed 50 gallons per minute.
III. Performance Criteria A. Data Representativeness	Compliance with allowable emissions is assumed if the glycol dehydrator, control equipment, reboiler, and all associated equipment are operating in accordance with the site-specific operation and maintenance plan.	Compliance with allowable emission limits is assumed if the glycol pump is operated according to and within the limits of the emissions calculations included in the permit application.
B. QA/QC Practices and Criteria	Dehydrator still vent (regenerator) shall be routed via hard piping to a condenser that meets heat dissipation of 7.66E-1 MMBtu/hr. Non-condensable gases from the condenser and flash gases shall be routed via hard piping to the enclosed combustion device (unit ECD). Inspection of the glycol dehydrator, control equipment, and the reboiler.	The permittee shall operate and maintain the glycol pump and associated equipment in accordance with the manufacturer recommended procedure or site-specific operation and maintenance plan. Inspection of the pump rate setting.
C. Monitoring Frequency	Inspection shall be performed semi-annually.	Inspection shall be performed quarterly.
D. Data Collection Procedures	Records shall be kept of the person conducting the inspection, the results of all equipment inspections, and any maintenance or repairs needed to bring the equipment into compliance.	Records shall be kept of the circulation rate, name of the person monitoring the circulation rate, the date and time of the readings, and records of any required adjustments, calibration, or any maintenance or repairs. Deficiencies identified, resultant repairs or maintenance performed, and dates of actions taken shall be recorded.
E. Averaging Period	Not applicable	Not applicable

Monitoring Approach (Continued)

	Indicator No. 3	Indicator No. 4
I. Indicator	Glycol dehydrator gas flow rate	Dehydrator inlet gas analysis
Measurement Approach	Monitoring the flow rate of gas to the glycol dehydrator shall demonstrate compliance with allowable emission limits.	Perform an extended analysis on the dehydrator inlet gas and complete emissions calculations to comply with allowable emission limits.
II. Indicator Range	The flow rate of gas to the glycol dehydrator shall not exceed 200 MMscf/day.	A GRI-GLYCalc analysis shall be performed and emissions compared with allowable emission limits.
III. Performance Criteria A. Data Representativeness	Compliance with allowable emission limits is assumed if the flow rate of gas to the glycol dehydrator is within the limits of the emissions calculations included in the permit application.	Compliance with allowable emission limits will be determined based on the extended gas analysis and GRI-GLYCalc analysis.
B. QA/QC Practices and Criteria	A gas flow meter equipped with a chart recorder or data logger shall be installed to monitor gas flow to the dehydrator. The flow meter shall be operated, calibrated, and maintained as specified by the manufacturer or equivalent site-specific operation and maintenance plan and as necessary to ensure correct and accurate readings.	Comparison of calculated actual emission rate and allowable emission limits.
C. Monitoring Frequency	Total flow rate shall be recorded daily.	Extended gas analysis shall be conducted annually.
D. Data Collection Procedures	Records shall be kept for flow meter certifications, calibrations, breakdowns, reasons for breakdown, and corrective actions.	Records shall be maintained of laboratory sample documentation; all parameters used in the emission calculation; detailed calculation results; actual controlled emission rates; and the most current emission factors for NO_X and CO.
E. Averaging Period	Not applicable	Not applicable.

Monitoring Approach (Continued)

	Indicator No. 5	Indicator No. 6
I. Indicator	Condenser temperature indicator	ECD adequate combustion
Measurement Approach	A deviation from expected operating conditions shall be monitored by an alarm if the condenser temperature goes outside of ideal conditions.	Adequate combustion shall be monitored by a thermocouple with alarm that signals non-combustion of gas.
II. Indicator Range	No alarm or alarm.	No alarm or alarm.
III. Performance Criteria A. Data Representativeness	Compliance with allowable emission limits is assumed if the condenser is operating according to manufacturer recommendations.	Compliance with allowable emission limits is assumed if the ECD is operating according to manufacturer recommendations.
B. QA/QC Practices and Criteria	Proper operation of the condenser is achieved by maintaining the alarm system.	Proper operation of the flare is achieved by maintaining the non-combustion thermocouple with an alarm system. Operators will record the date and result of each such maintenance activity, as well as repairs or replacements made.
C. Monitoring Frequency	The alarm will be tested annually.	The thermocouple and alarm system will be tested twice a year by turning off the thermocouples and recording the time required for the alarm to respond.
D. Data Collection Procedures	Records shall be maintained of annual testing.	Records shall be maintained of ECD shutdown for any reason, including failure to deliver fuel, and of inspection and maintenance to the flare.
E. Averaging Period	Annually	Semi-Annually

Section 20

Other Relevant Information

Other relevant information. Use this attachment to clarify any part in the application that you think needs explaining. Reference the section, table, column, and/or field. Include any additional text, tables, calculations or clarifying information.

Additionally, the applicant may propose specific permit language for AQB consideration. In the case of a revision to an existing permit, the applicant should provide the old language and the new language in track changes format to highlight the proposed changes. If proposing language for a new facility or language for a new unit, submit the proposed operating condition(s), along with the associated monitoring, recordkeeping, and reporting conditions. In either case, please limit the proposed language to the affected portion of the permit.

No other relevant information is being submitted as part of this application.

Section 22: Certification

Company Name: Enterprise Field Services, LLC

I, Bradley J. Cooley__________________, hereby certify that the information and data submitted in this application are true and as accurate as possible, to the best of my knowledge and professional expertise and experience.

Signed this ____ day of _______________, _______, upon my oath or affirmation, before a notary of the State of

__________________________________.

____ ________________________
*Signature Date

Bradley J. Cooley___________________________ Senior Director_________
Printed Name Title

Scribed and sworn before me on this ____ day of ________________________, ________.

My authorization as a notary of the State of _____________________________ expires on the

________________ day of _____________________, ____________.

____ ________________________
Notary's Signature Date

____
Notary's Printed Name

*For Title V applications, the signature must be of the Responsible Official as defined in 20.2.70.7.AE NMAC.