NMED AIR QUALITY
INITIAL TITLE V APPLICATION

Crestwood New Mexico Pipeline LLC
Willow Lake Gas Processing Plant

Prepared By:

Kaitlyn Lopez – Manager, Air Quality

Crestwood Midstream Partners LP
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May 2022

Project 223201.0056

Trinity Consultants
9400 Holly Ave NE, Bldg 3, Ste 300, Albuquerque, NM 87122 / P 505.266.6611 / **trinityconsultants.com**

May 19, 2022

Permit Programs Manager
NMED Air Quality Bureau
525 Camino de los Marquez Suite 1
Santa Fe, NM 87505-1816

RE: Initial Title V Application
Crestwood New Mexico Pipeline LLC – Willow Lake Gas Processing Plant

Permit Programs Manager:

On behalf of Crestwood New Mexico Pipeline LLC (Crestwood) we are submitting an initial Title V application for the existing Willow Lake Gas Processing Plant (Willow Lake). The facility is currently authorized under NSR 5142-M8 and is located at 393 Higby Hole Rd in Malaga, NM 88263. This application is being submitted pursuant to 20.2.70.300.B.2 NMAC as a result of the facility exceeding Title V thresholds in the NSR 5142-M7 application. Details are included in Section 3 of the application.

The format and content of this application are consistent with the Bureau's current policy regarding Title V applications; it is a complete application package using the most current Universal Application forms. Enclosed are two (2) hard copies of the application (one original and one copy), including the original certification, and one disk containing the electronic files. No application fees are required for Title V applications. Please feel free to contact either myself at (505) 266-6611 or Kaitlyn Lopez, Air Quality Manager for Crestwood, at (713) 380-3249 if you have any questions regarding this application.

Sincerely,

Michael Celente

Michael Celente
Senior Consultant

Cc:
Kaitlyn Lopez (Crestwood)
Mason McLean (Crestwood)
Trinity Project File 223201.0056

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		AIRS No.:

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. See Section 1-I for submittal instructions for other permits.

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: ☐ a 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.: N/A in the amount of N/A

☑ 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: **20.2.70.300.B.(2) 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 (see 1st 3 to 5 #s of permit IDEA ID No.): 32575	Updating Permit/NOI #: N/A
1	Facility Name: Willow Lake Gas Processing Plant	Plant primary SIC Code (4 digits): 1321	
		Plant NAIC code (6 digits): 211130	
a	Facility Street Address (If no facility street address, provide directions from a prominent landmark): 393 Higby Hole Rd, Malaga, NM 88263		
2	Plant Operator Company Name: Crestwood New Mexico Pipeline LLC	Phone/Fax: (832) 519-2200	
a	Plant Operator Address: 811 Main Street, Suite 3400 Houston, TX 77002		

b	Plant Operator's New Mexico Corporate ID or Tax ID: 4407086	
3	Plant Owner(s) name(s): Crestwood New Mexico Pipeline LLC	Phone/Fax: (832) 519-2200
a	Plant Owner(s) Mailing Address(s): 811 Main Street, Suite 3400 Houston, TX 77002	
4	Bill To (Company): Crestwood New Mexico Pipeline LLC	Phone/Fax: (832) 519-2200
a	Mailing Address: 811 Main Street, Suite 3400 Houston, TX 77002	E-mail: Kaitlyn.Lopez@crestwoodlp.com
5	☑ Preparer: Michael Celente ☑ Consultant: Trinity Consultants Inc.	Phone/Fax: (505) 266-6611
a	Mailing Address: 9400 Holly Ave. NE, Bldg. 3, Ste 300, Albuquerque, NM 87122	E-mail: mcelente@trinityconsultants.com
6	Plant Operator Contact: Will Jaquess	Phone/Fax: (432) 255-8714
a	Address: 393 Higby Hole Rd, Malaga, NM 88263	E-mail: william.jaquess@crestwoodlp.com
7	Air Permit Contact: Kaitlyn Lopez	Title: Manager, Air Quality
a	E-mail: Kaitlyn.Lopez@crestwoodlp.com	Phone/Fax: (713) 380-3249
b	Mailing Address: 811 Main Street, Suite 3400 Houston, TX 77002	
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: TBD; With the authorization of this application the facility will have a Title V permit.
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: NSR #5142-M8
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: 5.63 MMscf/hour	Daily: 135 MMscf/day	Annually: 49,275 MMscf/year
b	Proposed	Hourly: 5.63 MMscf/hour	Daily: 135 MMscf/day	Annually: 49,275 MMscf/year
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: 5.63 MMscf/hour	Daily: 135 MMscf/day	Annually: 49,275 MMscf/year
b	Proposed	Hourly: 5.63 MMscf/hour	Daily: 135 MMscf/day	Annually: 49,275 MMscf/year

Section 1-D: Facility Location Information

1	Section: 20 & 29	Range: 28E	Township: 24S	County: Eddy County	Elevation (ft): 3,018
2	UTM Zone: ☐ 12 or ☑ 13			Datum: ☐ NAD 27 ☐ NAD 83 ☑ WGS 84	
a	UTM E (in meters, to nearest 10 meters): 584,520 m E			UTM N (in meters, to nearest 10 meters): 3,562,400 m N	
b	**AND** Latitude (deg., min., sec.): 32°11'41.94"N			Longitude (deg., min., sec.): 104°6'11.91"W	
3	Name and zip code of nearest New Mexico town: Malaga, NM 88263				
4	Detailed Driving Instructions from nearest NM town (attach a road map if necessary): From Malaga, from the intersection of US 285 and Black River Village Rd., travel west for 1.7 miles. Turn left onto Higby Hole Rd. and continue for 0.7 miles. Turn right onto an access road, immediately turn left, and continue for 0.3 miles. Turn right and continue for 0.1 miles. Take a left at the fork and continue for 0.4 miles. Turn right and continue for 0.5 miles and arrive at the facility.				
5	The facility is 2.7 miles SW of Malaga, NM.				
6	Status of land at facility (check one): ☑ Private ☐ Indian/Pueblo ☐ Federal BLM ☐ Federal Forest Service ☐ Other (specify)				
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: Malaga, NM and Loving, NM; Indian Tribes: N/A; 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/aqb/modeling/class1areas.html)? ☑ Yes ☐ No (20.2.72.206.A.7 NMAC) If yes, list all with corresponding distances in kilometers: 21.6 km from Texas border, 25.6 km from Carlsbad Caverns National Park				
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): 25.6 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: 1750 m from occupied structure to the north.				
12	Method(s) used to delineate the Restricted Area: Fencing "**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? N/A				

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 ($\frac{\text{hours}}{\text{day}}$): 24	($\frac{\text{days}}{\text{week}}$): 7	($\frac{\text{weeks}}{\text{year}}$): 52	($\frac{\text{hours}}{\text{year}}$): 8,760		
2	Facility's maximum daily operating schedule (if less than 24 $\frac{\text{hours}}{\text{day}}$)? Start: N/A	☐AM ☐PM	End: N/A	☐AM ☐PM		
3	Month and year of anticipated start of construction: N/A – This is a Title V Application					
4	Month and year of anticipated construction completion: N/A – This is a Title V Application					

5	Month and year of anticipated startup of new or modified facility: N/A – This is a Title V Application
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:		
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): Ben Hansen	Phone: 832-519-2200
a	R.O. Title: Senior Vice President, Operations	R.O. e-mail: ben.hansen@crestwoodlp.com
b	R. O. Address: 811 Main St., Ste 3400, Houston, TX 77002	
2	Alternate Responsible Official (20.2.70.300.D.2 NMAC):Jonathan Smith	Phone: 432-255-8736
a	A. R.O. Title: Vice President, Operations	A. R.O. e-mail: jonathan.smith@crestwoodlp.com
b	A. R. O. Address: 393 Higby Hole Rd, Malaga, NM	
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): N/A	
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.): Crestwood Midstream Partners, LP	
a	Address of Parent Company: 811 Main St, Suite 3400, Houston, TX 77002	
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: Jonathan Smith, 432-255-8736	

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: Texas – 21.7 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 Mike Celente

Email mcelente@trinityconsultants.com

Phone number (505) 266-6611

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.

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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 Classification Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
C-1100	Engine	Caterpillar	G3608	BEN00538	2370 hp	2370 hp	12/16/2008 > 6/12/2006	OxCat-1100 C-1100	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
C-1200	Engine	Waukesha	P9390GSI	C-17865/2	1980 hp	1980 hp	3/1/2008 > 6/12/2006	NSCR-1200 C-1200	20200253	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SRB	N/A
C-2300	Engine	Waukesha	VHP-L7044GSI	5283703535	1680 hp	1680 hp	3/1/2014 > 7/1/2010	NSCR-2300 C-2300	20200253	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SRB	N/A
C-2400	Engine	Waukesha	VHP-L7044GSI	5283704347	1680 hp	1680 hp	12/1/2014 > 7/1/2010	NSCR-2400 C-2400	20200253	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SRB	N/A
C-1110	Engine	Caterpillar	G3606	JFE01238	1875 hp	1875 hp	>7/1/2010 >7/1/2010	OxCat-1110 C-1110	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
C-1120	Engine	Caterpillar	G3606	JFE01236	1875 hp	1875 hp	>7/1/2010 >7/1/2010	OxCat-1120 C-1120	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
C-1130	Engine	Caterpillar	G3606	JFE01241	1875 hp	1875 hp	>7/1/2010 >7/1/2010	OxCat-1130 C-1130	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
C-1140	Engine	Caterpillar	G3606	JFE01260	1875 hp	1875 hp	>7/1/2010 >7/1/2010	OxCat-1140 C-1140	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
C-1150	Engine	Caterpillar	G3606	JFE01259	1875 hp	1875 hp	>7/1/2010 >7/1/2010	OxCat-1150 C-1150	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
C-1160	Engine	Caterpillar	G3606	TBD	1875 hp	1875 hp	>7/1/2010 >7/1/2010	OxCat-1160 C-1160	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
C-1170	Engine	Caterpillar	G3606	TBD	1875 hp	1875 hp	>7/1/2010 >7/1/2010	OxCat-1170 C-1170	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
C-1180	Engine	Caterpillar	G3606	TBD	1875 hp	1875 hp	>7/1/2010 >7/1/2010	OxCat-1180 C-1180	20200254	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
WL2-FL & WL2-FL Blowdown	Process Flare and Blowdown Flaring	Zeeco	UFX-12-45	N/A	65 scf/hr Pilot	65 scf/hr Pilot	2015 >1/2016	N/A WL2-FL	31000205	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
WL1-FL & WL1-FL Blowdown	Process Flare and Blowdown Flaring	Zeeco	AFDS-10D/30-60	N/A	55 scf/hr Pilot	55 scf/hr Pilot	2020 >1/2014	N/A WL1-FL	31000205	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
DEHY-803	TEG Dehydrator	KWI	N/A	1480588-C	25 MMSCFD	25 MMSCFD	2015 >1/2014	HTR-803 HTR-803	31000227	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
DEHY-804	TEG Dehydrator	KWI	N/A	280115-C	3.5 MMSCFD	3.5 MMSCFD	2014 >1/2014	HTR-804 HTR-804	31000227	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
DEHY-EG	EG Dehydrator	Valerus	N/A	N/A	35 MMSCFD	35 MMSCFD	2015 >1/2016	WL2-FL WL2-FL	31000227	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
DEHY-805	TEG Dehydrator	KWI	N/A	100146-C	65 MMSCFD	65 MMSCFD	2018 >1/2014	HTR-805 HTR-805	31000227	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
DEHY-1505	TEG Dehydrator	KWI	N/A	N/A	80 MMSCFD	80 MMSCFD	TBD >1/2014	HTR-1505 HTR-1505	31000227	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
HTR-803	DEHY 803 Reboiler	FLAMECO	SB18-12	1406-92M	0.5 MMBtu/hr	0.5 MMBtu/hr	2015 >1/2014	N/A HTR-803	31000228	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
HTR-804	DEHY-804 Reboiler	KWI	N/A	1580717-0	0.125 MMBtu/hr	0.125 MMBtu/hr	2015 2015	N/A HTR-804	31000228	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
HTR-802	Regen Gas Heater	Heat Recovery Corp.	N/A	N/A	2.0 MMBtu/hr	2.0 MMBtu/hr	2013 N/A	N/A HTR-802	31000404	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
HTR-805	DEHY-805 Reboiler	FLAMECO	SB36-18	1801-620	1.5 MMBtu/hr	1.5 MMBtu/hr	N/A >1/2014	N/A HTR-805	31000228	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A

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 Classification Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
HTR-1505	DEHY-1505 Reboiler	TBD	TBD	TBD	1.5 MMBtu/hr	1.5 MMBtu/hr	N/A >1/2014	N/A HTR-1505	31000228	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
HTR-730	Hot Oil Heater	Heatec	HCI-5010-30	HI14-167	6.83 MMBtu/hr	6.83 MMBtu/hr	2/2015 >1/2016	N/A HTR-730	31000404	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
WL1-TK601	Condensate Tank	N/A	N/A	N/A	210 bbl	210 bbl	>8/23/2011 >8/23/2011	WL1-VRU / WLCS-VRU N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
WL1-TK602	Condensate Tank	N/A	N/A	N/A	210 bbl	210 bbl	>8/23/2011 >8/23/2011	WL1-VRU / WLCS-VRU N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
WL1-TK603	Condensate Tank	N/A	N/A	N/A	210 bbl	210 bbl	>8/23/2011 >8/23/2011	WL1-VRU / WLCS-VRU N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
WL2-TK8101	Condensate Tank	N/A	N/A	N/A	400 bbl	400 bbl	>9/18/2015 >9/18/2015	WL2-VRU N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
WL2-TK8102	Condensate Tank	N/A	N/A	N/A	400 bbl	400 bbl	>9/18/2015 >9/18/2015	WL2-VRU N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
WLCS-TK2301	Condensate Tank	N/A	N/A	N/A	400 bbl	400 bbl	>9/18/2015 >9/18/2015	WL1-VRU / WLCS-VRU N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
WLCS-TK2302	Condensate Tank	N/A	N/A	N/A	400 bbl	400 bbl	>9/18/2015 >9/18/2015	WL1-VRU / WLCS-VRU N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
WLCS-TK2303	Condensate Tank	N/A	N/A	N/A	400 bbl	400 bbl	>9/18/2015 >9/18/2015	WL1-VRU / WLCS-VRU N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
WLCS-TK2304	Condensate Tank	N/A	N/A	N/A	400 bbl	400 bbl	>9/18/2015 >9/18/2015	WL1-VRU / WLCS-VRU N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
ATM LOAD	Atmospheric Loading	N/A	N/A	N/A	791400 bbl/yr	791400 bbl/yr	N/A N/A	N/A N/A	40600197	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
NGL LOAD	NGL Loading	N/A	N/A	N/A	54,750,000 gal/yr	54,750,000 gal/yr	N/A N/A	N/A N/A	40600197	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
FUG-1	Willow Lake Plant 1 - Fugitive emissions	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	31000220	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
FUG-2	Willow Lake Plant 2 and Willow Lake Compressor Station - Fugitive emissions	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	31000220	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
PIGGING	Pig Receiver and Launcher	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	31000211	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
SSM/M	Startup, Shutdown, Maintenance, and Malfunction	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/air-quality/air-quality-title-v-operating-permits-guidance-page/. 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]	
NGL-1	NGL Pressurized Bullet Tank	TBD	TBD	90,000	20.2.72.202.B(5) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			TBD	gallons	N/A	TBD	
NGL-2	NGL Pressurized Bullet Tank	TBD	TBD	60,000	20.2.72.202.B(5) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			TBD	gallons	N/A	TBD	
NGL-3	NGL Pressurized Bullet Tank	TBD	TBD	60,000	20.2.72.202.B(5) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			TBD	gallons	N/A	TBD	
NGL-4	NGL Pressurized Bullet Tank	TBD	TBD	60,000	20.2.72.202.B(5) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			TBD	gallons	N/A	TBD	
AST-4	Methanol	Unknown	N/A	500	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	gallons	N/A	TBD	
AST-5	Triethylene Glycol	Unknown	N/A	520	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
AST-7	Lube Oil	Unknown	N/A	500	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
AST-8	Antifreeze	Unknown	N/A	500	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
AST-9	Lube Oil	Unknown	N/A	500	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
AST-10	Antifreeze	Unknown	N/A	500	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
AST-11	Used Oil	Unknown	N/A	540	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
AST-12	Triethylene Glycol	Unknown	N/A	500	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
AST-13	Emulsion Breaker	Unknown	N/A	130	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
AST-14	Soap	Unknown	N/A	300	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	

Unit Number	Source Description	Manufacturer	Model No. / Serial No.	Max Capacity / Capacity Units	List Specific 20.2.72.202 NMAC Exemption (e.g. 20.2.72.202.B.5) / Insignificant Activity citation (e.g. IA List Item #1.a)	Date of Manufacture /Reconstruction[2] / Date of Installation /Construction[2]	For Each Piece of Equipment, Check Onc
AST-15	Degreaser	Unknown	N/A	300	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
AST-16	Compressor Oil	Unknown	N/A	500	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
AST-17	Compressor Oil	Unknown	N/A	500	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
AST-2-2	Engine Oil	Unknown	N/A	1000	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
AST-3-2	Antifreeze	Unknown	N/A	1000	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
AST-4-2	Ethylene Glycol	Unknown	N/A	500	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
AST-5-2	Methanol	Unknown	N/A	60	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	bbl	N/A	TBD	
AST-6-2	Waste Oil	Unknown	N/A	500	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
AST-8-2	Compressor Oil	Unknown	N/A	1000	20.2.72.202.B(2) NMAC	TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	gallons	N/A	TBD	
HAUL	Unpaved Haul Road Emissions	Unknown	N/A	N/A	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	N/A	N/A	TBD	

[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
OxCat-1100	Oxidation Catalyst	>6/12/2006	CO, VOC, HCHO	C-1100	64% CO, 75% VOC, 75% HCHO	Catalyst Data
NSCR-1200	Non-Selective Catalytic Reduction	>6/12/2006	NO_X, CO, VOC, HCHO	C-1200	85% NO_X, 85% CO, 60% VOC, 80% HCHO	Catalyst Data
NSCR-2300	Non-Selective Catalytic Reduction	>6/12/2006	NO_X, CO, VOC, HCHO	C-2300	92.5% NO_X, 91.3% CO, 71.4% VOC, 76% HCHO	Catalyst Data
NSCR-2400	Non-Selective Catalytic Reduction	>6/12/2006	NO_X, CO, VOC, HCHO	C-2400	92.5% NO_X, 91.3% CO, 71.4% VOC, 76% HCHO	Catalyst Data
OxCat-1110	Oxidation Catalyst	TBD	CO, VOC, HCHO	C-1110	90% CO, 50% VOC, 85% HCHO	Catalyst Data
OxCat-1120	Oxidation Catalyst	TBD	CO, VOC, HCHO	C-1120	90% CO, 50% VOC, 85% HCHO	Catalyst Data
OxCat-1130	Oxidation Catalyst	TBD	CO, VOC, HCHO	C-1130	90% CO, 50% VOC, 85% HCHO	Catalyst Data
OxCat-1140	Oxidation Catalyst	TBD	CO, VOC, HCHO	C-1140	90% CO, 50% VOC, 85% HCHO	Catalyst Data
OxCat-1150	Oxidation Catalyst	TBD	CO, VOC, HCHO	C-1150	90% CO, 50% VOC, 85% HCHO	Catalyst Data
OxCat-1160	Oxidation Catalyst	TBD	CO, VOC, HCHO	C-1160	90% CO, 50% VOC, 85% HCHO	Catalyst Data
OxCat-1170	Oxidation Catalyst	TBD	CO, VOC, HCHO	C-1170	90% CO, 50% VOC, 85% HCHO	Catalyst Data
OxCat-1180	Oxidation Catalyst	TBD	CO, VOC, HCHO	C-1180	90% CO, 50% VOC, 85% HCHO	Catalyst Data
WL2-FL	Process Flare	2016	VOC, HAP, H_2S	DEHY-EG	98%	Manufacturer Data
WL1-FL	Process Flare	TBD	VOC, HAP, H_2S	WL1-TK601 - WL1-TK603; WLCS-TK2301 - WLCS-TK2304 DEHY-803, DEHY-804, DEHY-805, DEHY-1505	98%	Manufacturer Data
WL2-VRU	Vapor Recovery Unit	TBD	VOC, HAP, H_2S	WL2-TK8101 & WL2-TK8102	95%	5% VRU Downtime
WL1-VRU	Vapor Recovery Unit	TBD	VOC, HAP, H_2S	WL1-TK601 - WL1-TK603; WLCS-TK2301 - WLCS-TK2304 DEHY-803, DEHY-804, DEHY-805, DEHY-1505	95%	5% VRU Downtime
WLCS-VRU	Vapor Recovery Unit	TBD	VOC, HAP, H_2S	WL1-TK601 - WL1-TK603; WLCS-TK2301 - WLCS-TK2304 DEHY-803, DEHY-804, DEHY-805, DEHY-1505	95%	5% VRU Downtime
HTR-803[2]	Dehydrator Reboiler	> 2014	VOC, HAP, H_2S	DEHY-803	98%	Engineering Estimate
HTR-804[2]	Dehydrator Reboiler	> 2014	VOC, HAP, H_2S	DEHY-804	98%	Engineering Estimate
HTR-805[2]	Dehydrator Reboiler	> 2014	VOC, HAP, H_2S	DEHY-805	98%	Engineering Estimate

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

[2] Dehydrator flash tank emissions are routed into the reboiler fuel lines (assumed 98% DRE).

The post-condenser regenerator emissions are routed to the firebox when the reboiler is firing and glow plug when the reboiler is not firing (assumed 98% DRE).

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
C-1100	2.61	11.44	14.37	62.93	4.12	18.05	0.23	1.01	0.16	0.69	0.16	0.69	0.16	0.69	1.10E-04	4.82E-04	-	-
C-1200	56.75	248.55	39.29	172.07	2.14	9.37	0.23	0.99	0.30	1.31	0.30	1.31	0.30	1.31	1.08E-04	4.73E-04	-	-
C-2300	49.26	215.76	42.59	186.56	0.78	3.41	0.19	0.85	0.26	1.13	0.26	1.13	0.26	1.13	9.32E-05	4.08E-04	-	-
C-2400	49.26	215.76	42.59	186.56	0.78	3.41	0.19	0.85	0.26	1.13	0.26	1.13	0.26	1.13	9.32E-05	4.08E-04	-	-
C-1110	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	-	-
C-1120	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	-	-
C-1130	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	-	-
C-1140	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	-	-
C-1150	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	-	-
C-1160	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	-	-
C-1170	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	-	-
C-1180	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	-	-
WL2-FL	0.0091	0.040	0.018	0.080	-	-	0.00093	0.0041	-	-	-	-	-	-	2.32E-05	1.02E-04	-	-
WL2-FL Blowdown	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WL1-FL	0.0300	0.131	0.060	0.262	-	-	0.00304	0.0133	-	-	-	-	-	-	7.61E-05	3.33E-04	-	-
WL1-FL Blowdown	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEHY-803	-	-	-	-	82.14	359.76	-	-	-	-	-	-	-	-	9.60E-03	4.20E-02	-	-
DEHY-804	-	-	-	-	7.91	34.63	-	-	-	-	-	-	-	-	9.00E-04	3.94E-03	-	-
DEHY-EG	-	-	-	-	1.82	7.97	-	-	-	-	-	-	-	-	9.40E-03	4.12E-02	-	-
DEHY-805	-	-	-	-	176.64	773.68	-	-	-	-	-	-	-	-	2.05E-02	8.98E-02	-	-
DEHY-1505	-	-	-	-	177.06	775.50	-	-	-	-	-	-	-	-	2.04E-02	8.94E-02	-	-
HTR-803	0.049	0.21	0.041	0.18	0.0027	0.012	0.0073	0.032	0.0037	0.016	0.0037	0.016	0.0037	0.016	3.50E-06	1.53E-05	-	-
HTR-804	0.012	0.054	0.010	0.045	0.00067	0.0030	0.0018	0.0080	0.00093	0.0041	0.00093	0.0041	0.00093	0.0041	8.75E-07	3.83E-06	-	-
HTR-802	0.20	0.86	0.16	0.72	0.011	0.047	0.029	0.13	0.015	0.065	0.015	0.065	0.015	0.065	1.40E-05	6.13E-05	-	-
HTR-730	0.67	2.93	0.56	2.46	0.037	0.16	0.10	0.44	0.051	0.22	0.051	0.22	0.051	0.22	4.78E-05	2.10E-04	-	-
HTR-805	0.15	0.64	0.12	0.54	0.0081	0.035	0.022	0.096	0.011	0.049	0.011	0.049	0.011	0.049	1.05E-05	4.60E-05	-	-
HTR-1505	0.15	0.64	0.12	0.54	0.0081	0.035	0.022	0.096	0.011	0.049	0.011	0.049	0.011	0.049	1.05E-05	4.60E-05	-	-
WL1-TK601	-	-	-	-	53.28	198.22	-	-	-	-	-	-	-	-	0.0014	3.82E-03	-	-
WL1-TK602	-	-	-	-	53.28	198.22	-	-	-	-	-	-	-	-	0.0014	3.82E-03	-	-
WL1-TK603	-	-	-	-	53.28	198.22	-	-	-	-	-	-	-	-	0.0014	3.82E-03	-	-
WL2-TK8101	-	-	-	-	94.33	46.96	-	-	-	-	-	-	-	-	0.0023	9.01E-04	-	-
WL2-TK8102	-	-	-	-	94.33	46.96	-	-	-	-	-	-	-	-	0.0023	9.01E-04	-	-
WLCS-TK2301	-	-	-	-	488.81	371.48	-	-	-	-	-	-	-	-	0.016	0.0107	-	-
WLCS-TK2302	-	-	-	-	488.81	371.48	-	-	-	-	-	-	-	-	0.016	0.0107	-	-
WLCS-TK2303	-	-	-	-	488.81	371.48	-	-	-	-	-	-	-	-	0.016	1.07E-02	-	-
WLCS-TK2304	-	-	-	-	488.81	371.48	-	-	-	-	-	-	-	-	0.016	1.07E-02	-	-
ATM LOAD	-	-	-	-	93.95	84.33	-	-	-	-	-	-	-	-	0.00193	0.00237	-	-
NGL LOAD	-	-	-	-	0.0031	0.013	-	-	-	-	-	-	-	-	-	-	-	-
FUG-1	-	-	-	-	5.66	24.77	-	-	-	-	-	-	-	-	6.24E-05	2.73E-04	-	-
FUG-2	-	-	-	-	8.82	38.65	-	-	-	-	-	-	-	-	5.93E-05	2.60E-04	-	-
PIGGING	-	-	-	-	0.30	1.31	-	-	-	-	-	-	-	-	4.99E-06	2.19E-05	-	-
SSM/M	-	-	-	-	-	10.00	-	-	-	-	-	-	-	-	-	1.00	-	-
Totals	**175.67**	**769.46**	**212.70**	**931.62**	**2882.12**	**4390.62**	**2.69**	**11.80**	**2.20**	**9.63**	**2.20**	**9.63**	**2.20**	**9.63**	**0.14**	**1.33**	**-**	**-**

[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
C-1100	2.61	11.44	5.22	22.89	1.03	4.51	0.23	1.01	0.16	0.69	0.16	0.69	0.16	0.69	1.10E-04	4.82E-04		
C-1200	8.51	37.28	5.89	25.81	0.69	3.02	0.23	0.99	0.30	1.31	0.30	1.31	0.30	1.31	1.08E-04	4.73E-04		
C-2300	3.70	16.22	3.70	16.22	0.27	1.17	0.19	0.85	0.26	1.13	0.26	1.13	0.26	1.13	9.32E-05	4.08E-04		
C-2400	3.70	16.22	3.70	16.22	0.27	1.17	0.19	0.85	0.26	1.13	0.26	1.13	0.26	1.13	9.32E-05	4.08E-04		
C-1110	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04		
C-1120	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04		
C-1130	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04		
C-1140	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04		
C-1150	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04		
C-1160	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04		
C-1170	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04		
C-1180	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04		
WL2-FL	0.28	1.23	0.56	2.45	0.036	0.16	0.018	0.080	-	-	-	-	-	-	2.11E-04	9.25E-04		
WL1-FL	10.88	2.57	21.73	5.121	49.02	4.58	0.19	0.031	-	-	-	-	-	-	2.11E-03	5.30E-04		
DEHY-803	-	-	-	-	1.37	6.01	-	-	-	-	-	-	-	-	2.26E-04	9.88E-04		
DEHY-804	-	-	-	-	0.13	0.58	-	-	-	-	-	-	-	-	2.16E-05	9.46E-05		
DEHY-EG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
DEHY-805	-	-	-	-	2.94	12.90	-	-	-	-	-	-	-	-	4.80E-04	2.10E-03		
DEHY-1505	-	-	-	-	0.43	1.88	-	-	-	-	-	-	-	-	2.09E-04	9.13E-04		
HTR-803	0.049	0.21	0.041	0.18	0.0027	0.012	0.0073	0.032	0.0037	0.016	0.0037	0.016	0.0037	0.016	3.50E-06	1.53E-05		
HTR-804	0.012	0.054	0.010	0.045	0.00067	0.0030	0.0018	0.0080	0.00093	0.0041	0.00093	0.0041	0.00093	0.0041	8.75E-07	3.83E-06		
HTR-802	0.20	0.86	0.16	0.72	0.011	0.047	0.029	0.13	0.015	0.065	0.015	0.065	0.015	0.065	1.40E-05	6.13E-05		
HTR-730	0.67	2.93	0.56	2.46	0.037	0.16	0.10	0.44	0.051	0.22	0.051	0.22	0.051	0.22	4.78E-05	2.10E-04		
HTR-805	0.15	0.64	0.12	0.54	0.0081	0.035	0.022	0.096	0.011	0.049	0.011	0.049	0.011	0.049	1.05E-05	4.60E-05		
HTR-1505	0.15	0.64	0.12	0.54	0.0081	0.035	0.022	0.096	0.011	0.049	0.011	0.049	0.011	0.049	1.05E-05	4.60E-05		
WL1-TK601	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
WL1-TK602	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
WL1-TK603	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
WL2-TK8101	-	-	-	-	94.33	2.35	-	-	-	-	-	-	-	-	0.0023	4.51E-05		
WL2-TK8102	-	-	-	-	94.33	2.35	-	-	-	-	-	-	-	-	0.0023	4.51E-05		
WLCS-TK2301	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
WLCS-TK2302	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
WLCS-TK2303	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
WLCS-TK2304	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
ATM LOAD	-	-	-	-	39.54	2.73	-	-	-	-	-	-	-	-	6.35E-05	5.34E-05		
NGL LOAD	-	-	-	-	0.0031	0.013	-	-	-	-	-	-	-	-	-	-		
FUG-1	-	-	-	-	5.66	24.77	-	-	-	-	-	-	-	-	6.24E-05	2.73E-04		
FUG-2	-	-	-	-	8.82	38.65	-	-	-	-	-	-	-	-	5.93E-05	2.60E-04		
Totals	**47.45**	**162.73**	**49.11**	**125.07**	**304.734**	**132.49**	**2.90**	**11.89**	**2.20**	**9.63**	**2.20**	**9.63**	**2.20**	**9.63**	**0.009**	**0.012**		

[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
WL2-FL Blowdown	110.23	2.87	220.06	5.72	159.39	4.14	0.41	0.011	-	-	-	-	-	-	4.49E-03	1.17E-04	-	-
WL1-FL Blowdown	9.17	0.24	18.31	0.48	13.26	0.34	0.034	0.00089	-	-	-	-	-	-	3.74E-04	9.71E-06	-	-
PIGGING	-	-	-	-	0.30	1.31	-	-	-	-	-	-	-	-	4.99E-06	2.19E-05	-	-
SSM/M	-	-	-	-	-	10.00	-	-	-	-	-	-	-	-	-	1.00	-	-
Totals	**119.40**	**3.10**	**238.36**	**6.20**	**172.95**	**15.80**	**0.45**	**0.012**	**-**	**-**	**-**	**-**	**-**	**-**	**4.87E-03**	**1.00**	**-**	**-**

[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
N/A - The facility does not have any special stacks.																	
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)			
C-1100	C-1100	Vertical	No	40	857	269.1	N/A	N/A	123.33	3.33
C-1200	C-1200	Vertical	No	20	1177	162.9	N/A	N/A	74.67	1.67
C-2300	C-2300	Vertical	No	23	1152	123.3	N/A	N/A	115.29	1.92
C-2400	C-2400	Vertical	No	23	1152	123.3	N/A	N/A	115.29	1.92
C-1110	C-1110	Vertical	No	29	835	203.6	N/A	N/A	93.30	2.40
C-1120	C-1120	Vertical	No	29	835	203.6	N/A	N/A	93.30	2.40
C-1130	C-1130	Vertical	No	29	835	203.6	N/A	N/A	93.30	2.40
C-1140	C-1140	Vertical	No	29	835	203.6	N/A	N/A	93.30	2.40
C-1150	C-1150	Vertical	No	29	835	203.6	N/A	N/A	93.30	2.40
C-1160	C-1160	Vertical	No	45	835	203.6	N/A	N/A	93.30	2.40
C-1170	C-1170	Vertical	No	60	835	203.6	N/A	N/A	93.30	2.40
C-1180	C-1180	Vertical	No	14	835	203.6	N/A	N/A	93.30	2.40
WL2-FL*	WL2-FL	Vertical	No	45	1832	N/A	N/A	N/A	65.60	21.68
WL1-FL*	WL1-FL	Vertical	No	60	1832	N/A	N/A	N/A	65.60	9.80
HTR-803	HTR-803	Vertical	No	14	600	3.5	N/A	N/A	4.39	1.00
HTR-804	HTR-804	Vertical	No	11	600	0.9	N/A	N/A	4.41	0.50
HTR-802	HTR-802	Vertical	Yes	19	600	13.8	N/A	N/A	25.51	0.83
HTR-805	HTR-805	Vertical	Yes	23	600	10.4	N/A	N/A	9.68	1.17
HTR-1505	HTR-1505	Vertical	Yes	17	600	10.4	N/A	N/A	5.86	1.50
HTR-730	HTR-730	Vertical	Yes	16	600	47.2	N/A	N/A	15.01	2.00

* Flare diameters are effective diameters used in the air dispersion modeling. Supporting calculations are included in the Excel workbook submitted in conjunction with this application.

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		Acrolein ☑ HAP or ☐ TAP		Methanol ☑ HAP or ☐ TAP		n-Hexane ☑ HAP or ☐ TAP		Pollutant Name ☐ HAP or ☐ TAP		Pollutant Name ☐ HAP or ☐ TAP		Pollutant Name ☐ 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	lb/hr	ton/yr
C-1100	C-1100	0.43	1.90	0.21	0.91	0.10	0.44	0.062	0.27	0.030	0.13	0.013	0.059						
C-1200	C-1200	0.35	1.51	0.17	0.73	0.043	0.19	0.041	0.18	0.047	0.21	-	-						
C-2300	C-2300	0.20	0.87	0.044	0.19	0.037	0.16	0.035	0.15	0.041	0.18	-	-						
C-2400	C-2400	0.20	0.87	0.044	0.19	0.037	0.16	0.035	0.15	0.041	0.18	-	-						
C-1110	C-1110	0.29	1.27	0.12	0.54	0.074	0.32	0.045	0.20	0.022	0.097	0.0098	0.043						
C-1120	C-1120	0.29	1.27	0.12	0.54	0.074	0.32	0.045	0.20	0.022	0.097	0.0098	0.043						
C-1130	C-1130	0.29	1.27	0.12	0.54	0.074	0.32	0.045	0.20	0.022	0.097	0.0098	0.043						
C-1140	C-1140	0.29	1.27	0.12	0.54	0.074	0.32	0.045	0.20	0.022	0.097	0.0098	0.043						
C-1150	C-1150	0.29	1.27	0.12	0.54	0.074	0.32	0.045	0.20	0.022	0.097	0.0098	0.043						
C-1160	C-1160	0.29	1.27	0.12	0.54	0.074	0.32	0.045	0.20	0.022	0.097	0.0098	0.043						
C-1170	C-1170	0.29	1.27	0.12	0.54	0.074	0.32	0.045	0.20	0.022	0.097	0.0098	0.043						
C-1180	C-1180	0.29	1.27	0.12	0.54	0.074	0.32	0.045	0.20	0.022	0.097	0.0098	0.043						
WL2-FL	WL2-FL	7.82E-04	0.0034	-	-	-	-	-	-	-	-	-	-						
WL2-FL	WL2-FL Blowdown	21.73	0.56	-	-	-	-	-	-	-	-	-	-						
WL1-FL	WL1-FL	2.14	0.13	-	-	-	-	-	-	-	-	-	-						
WL1-FL	WL1-FL Blowdown	1.81	0.047	-	-	-	-	-	-	-	-	-	-						
DEHY-803	DEHY-803	0.092	0.40	-	-	-	-	-	-	-	-	0.052	0.23						
DEHY-804	DEHY-804	0.0089	0.039	-	-	-	-	-	-	-	-	0.0050	0.022						
DEHY-EG	DEHY-EG	-	-	-	-	-	-	-	-	-	-	-	-						
DEHY-805	DEHY-805	0.20	0.87	-	-	-	-	-	-	-	-	0.11	0.49						
DEHY-1505	DEHY-1505	0.079	0.34	-	-	-	-	-	-	-	-	0.018	0.080						
HTR-803	HTR-803	9.22E-04	0.0040	3.68E-05	1.61E-04	-	-	-	-	-	-	8.82E-04	3.86E-03						
HTR-804	HTR-804	2.30E-04	0.0010	9.19E-06	4.03E-05	-	-	-	-	-	-	2.21E-04	9.66E-04						
HTR-802	HTR-802	0.0037	0.016	1.47E-04	6.44E-04	-	-	-	-	-	-	0.0035	0.015						
HTR-730	HTR-730	0.013	0.055	5.02E-04	2.20E-03	-	-	-	-	-	-	0.012	0.053						
HTR-805	HTR-805	0.0028	0.012	1.10E-04	4.83E-04	-	-	-	-	-	-	0.0026	0.012						
HTR-1505	HTR-1505	0.0028	0.012	1.10E-04	4.83E-04	-	-	-	-	-	-	0.0026	0.012						
WL1-FL	WL1-TK601	-	-	-	-	-	-	-	-	-	-	-	-						
WL1-FL	WL1-TK602	-	-	-	-	-	-	-	-	-	-	-	-						
WL1-FL	WL1-TK603	-	-	-	-	-	-	-	-	-	-	-	-						
WL2-TK8101	WL2-TK8101	1.88	0.059	-	-	-	-	-	-	-	-	1.51	0.047						
WL2-TK8102	WL2-TK8102	1.88	0.059	-	-	-	-	-	-	-	-	1.51	0.047						
WL1-FL	WLCS-TK2301	-	-	-	-	-	-	-	-	-	-	-	-						
WL1-FL	WLCS-TK2302	-	-	-	-	-	-	-	-	-	-	-	-						
WL1-FL	WLCS-TK2303	-	-	-	-	-	-	-	-	-	-	-	-						
WL1-FL	WLCS-TK2304	-	-	-	-	-	-	-	-	-	-	-	-						
N/A	ATM LOAD	1.26	0.09	-	-	-	-	-	-	-	-	1.00	0.08						
N/A	NGL LOAD	-	-	-	-	-	-	-	-	-	-	-	-						
N/A	FUG-1	0.35	1.53	-	-	-	-	-	-	0.033	0.14	-	-						
N/A	FUG-2	0.88	3.85	-	-	-	-	-	-	0.35	1.55	-	-						
N/A	PIGGING	0.012	0.055	-	-	-	-	-	-	-	-	-	-						
N/A	SSM/M	-	1.00	-	-	-	-	-	-	-	-	-	-						
Totals:		**35.82**	**24.42**	**1.46**	**6.37**	**0.81**	**3.54**	**0.54**	**2.34**	**0.72**	**3.17**	**4.31**	**1.49**						

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 (MScf/hr)	Annual Usage (MMScf/yr)	% Sulfur (gr/100 scf)	% Ash
C-1100	Natural Gas	Pipeline Quality Natural Gas	1020	15.40	134.93	5	N/A
C-1200	Natural Gas	Pipeline Quality Natural Gas	1020	15.13	132.50	5	N/A
C-2300	Natural Gas	Pipeline Quality Natural Gas	1020	13.04	114.26	5	N/A
C-2400	Natural Gas	Pipeline Quality Natural Gas	1020	13.04	114.26	5	N/A
ENG-1	Natural Gas	Pipeline Quality Natural Gas	1020	13.90	121.74	5	N/A
ENG-2	Natural Gas	Pipeline Quality Natural Gas	1020	13.90	121.74	5	N/A
ENG-3	Natural Gas	Pipeline Quality Natural Gas	1020	13.90	121.74	5	N/A
ENG-4	Natural Gas	Pipeline Quality Natural Gas	1020	13.90	121.74	5	N/A
ENG-5	Natural Gas	Pipeline Quality Natural Gas	1020	13.90	121.74	5	N/A
ENG-6	Natural Gas	Pipeline Quality Natural Gas	1020	13.90	121.74	5	N/A
ENG-7	Natural Gas	Pipeline Quality Natural Gas	1020	13.90	121.74	5	N/A
ENG-8	Natural Gas	Pipeline Quality Natural Gas	1020	13.90	121.74	5	N/A
WL2-FL	Natural Gas	Pipeline Quality Natural Gas, Process Gas	1020	0.065	0.57	5	N/A
WL1-FL	Natural Gas	Pipeline Quality Natural Gas, Process Gas	1020	0.213	1.87	5	N/A
HTR-803	Natural Gas	Pipeline Quality Natural Gas, Process Gas	1020	0.49	4.29	5	N/A
HTR-804	Natural Gas	Pipeline Quality Natural Gas, Process Gas	1020	0.12	1.07	5	N/A
HTR-802	Natural Gas	Pipeline Quality Natural Gas, Process Gas	1020	1.96	17.18	5	N/A
HTR-730	Natural Gas	Pipeline Quality Natural Gas, Process Gas	1020	6.70	58.66	5	N/A
HTR-805	Natural Gas	Pipeline Quality Natural Gas, Process Gas	1020	1.47	12.88	5	N/A
HTR-1505	Natural Gas	Pipeline Quality Natural Gas, Process Gas	1020	1.47	12.88	5	N/A

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)
WL1-TK601	40400311	Condensate and Produced Water	Condensate and Produced Water	6.2	37.8	65.9	11.4	74.7	11.4
WL1-TK602	40400311	Condensate and Produced Water	Condensate and Produced Water	6.2	37.8	65.9	11.4	74.7	11.4
WL1-TK603	40400311	Condensate and Produced Water	Condensate and Produced Water	6.2	37.8	65.9	11.4	74.7	11.4
WL2-TK8101	40400311	Condensate and Produced Water	Condensate and Produced Water	7.2	38.1	63.3	11.7	70.5	11.7
WL2-TK8102	40400311	Condensate and Produced Water	Condensate and Produced Water	7.2	38.1	63.3	11.7	70.5	11.7
WLCS-TK2301	40400311	Condensate and Produced Water	Condensate and Produced Water	7.2	48.5	65.8	11.3	74.7	11.3
WLCS-TK2302	40400311	Condensate and Produced Water	Condensate and Produced Water	7.2	48.5	65.8	11.3	74.7	11.3
WLCS-TK2303	40400311	Condensate and Produced Water	Condensate and Produced Water	7.2	48.5	65.8	11.3	74.7	11.3
WLCS-TK2304	40400311	Condensate and Produced Water	Condensate and Produced Water	7.2	48.5	65.8	11.3	74.7	11.3

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			
WL1-TK601	>8/23/2011	Condensate and Produced Water	N/A	FX	210	33	3.0	2.3	Tan	Tan	New	1,839,600	208.57
WL1-TK602	>8/23/2011	Condensate and Produced Water	N/A	FX	210	33	3.0	2.3	Tan	Tan	New	1,839,600	208.57
WL1-TK603	>8/23/2011	Condensate and Produced Water	N/A	FX	210	33	3.0	2.3	Tan	Tan	New	1,839,600	208.57
WL2-TK8101	>9/15/2015	Condensate and Produced Water	N/A	FX	400	64	3.7	3.0	White	White	New	420,000	25.00
WL2-TK8102	>9/15/2015	Condensate and Produced Water	N/A	FX	400	64	3.7	3.0	White	White	New	420,000	25.00
WLCS-TK2301	>9/15/2015	Condensate and Produced Water	N/A	FX	400	64	3.7	3.0	Tan	Tan	New	6,720,000	400.00
WLCS-TK2302	>9/15/2015	Condensate and Produced Water	N/A	FX	400	64	3.7	3.0	Tan	Tan	New	6,720,000	400.00
WLCS-TK2303	>9/15/2015	Condensate and Produced Water	N/A	FX	400	64	3.7	3.0	Tan	Tan	New	6,720,000	400.00
WLCS-TK2304	>9/15/2015	Condensate and Produced Water	N/A	FX	400	64	3.7	3.0	Tan	Tan	New	6,720,000	400.00

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)**
Inlet Gas	Natural Gas	Gas	135 MMSCFD	Residue Gas	Natural Gas	Gas	135 MMSCFD
				Condensate	Mixed Hydrocarbons	Liquid	395700 bbl/yr
				Produced Water	Mixed Hydrocarbons and Water	Liquid	395700 bbl/yr
				NGL	Natural Gas Liquids	Liquid	54750000 gal/yr

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 is located at the 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 parametric emissions measurement equipment is located at the 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**								
C-1100	**mass GHG**	10092.43	0.015	0.15									10092.59	
	CO_2e	10092.43	4.52	3.79										10100.74
C-1200	**mass GHG**	7904.77	0.015	0.15									7904.93	
	CO_2e	7904.77	4.44	3.72										7912.93
C-2300	**mass GHG**	6816.39	0.013	0.13									6816.54	
	CO_2e	6816.39	3.83	3.21										6823.43
C-2400	**mass GHG**	6816.39	0.013	0.13									6816.54	
	CO_2e	6816.39	3.83	3.21										6823.43
C-1110	**mass GHG**	7268.18	0.014	0.14									7268.33	
	CO_2e	7268.18	4.08	3.42										7275.68
C-1120	**mass GHG**	7268.18	0.014	0.14									7268.33	
	CO_2e	7268.18	4.08	3.42										7275.68
C-1130	**mass GHG**	7268.18	0.014	0.14									7268.33	
	CO_2e	7268.18	4.08	3.42										7275.68
C-1140	**mass GHG**	7268.18	0.014	0.14									7268.33	
	CO_2e	7268.18	4.08	3.42										7275.68
C-1150	**mass GHG**	7268.18	0.014	0.14									7268.33	
	CO_2e	7268.18	4.08	3.42										7275.68
C-1160	**mass GHG**	7268.18	0.014	0.14									7268.33	
	CO_2e	7268.18	4.08	3.42										7275.68
C-1170	**mass GHG**	7268.18	0.014	0.14									7268.33	
	CO_2e	7268.18	4.08	3.42										7275.68
C-1180	**mass GHG**	7268.18	0.014	0.14									7268.33	
	CO_2e	7268.18	4.08	3.42										7275.68
WL2-FL	**mass GHG**	1007.12	0.002	0.02									1007.14	
	CO_2e	1007.12	0.57	0.47										1008.16

WL2-FL Blowdown	**mass GHG**	2431.15	0.005	0.05									2431.20	
	CO_2e	2431.15	1.36	1.14										2433.66
WL1-FL	**mass GHG**	2662.93	0.005	0.05									2662.98	
	CO_2e	2662.93	1.50	1.25										2665.68
WL1-FL Blowdown	**mass GHG**	202.27	0.000	0.00									202.28	
	CO_2e	202.27	0.11	0.10										202.48
DEHY-803	**mass GHG**	7.34	-	10.30									17.64	
	CO_2e	7.34	-	257.46										264.80
DEHY-804	**mass GHG**	0.70	-	0.99									1.70	
	CO_2e	0.70	-	24.76										25.46
DEHY-EG	**mass GHG**	-	-	-									-	
	CO_2e	-	-	-										-
DEHY-805	**mass GHG**	15.76	-	22.12									37.87	
	CO_2e	15.76	-	552.91										568.67
DEHY-1505	**mass GHG**	2.27	-	1.30									3.56	
	CO_2e	2.27	-	32.38										34.64
HTR-803	**mass GHG**	256.18	0.000	0.00									256.19	
	CO_2e	256.18	0.14	0.12										256.44
HTR-804	**mass GHG**	64.04	0.000	0.00									64.05	
	CO_2e	64.04	0.04	0.03										64.11
HTR-802	**mass GHG**	1024.72	0.002	0.02									1024.74	
	CO_2e	1024.72	0.58	0.48										1025.78
HTR-730	**mass GHG**	3499.75	0.007	0.07									3499.82	
	CO_2e	3499.75	1.97	1.65										3503.36
HTR-805	**mass GHG**	768.54	0.001	0.01									768.56	
	CO_2e	768.54	0.43	0.36										769.33
HTR-1505	**mass GHG**	768.54	0.001	0.01									768.56	
	CO_2e	768.54	0.43	0.36										769.33
WL1-TK601	**mass GHG**	-	-	-										
	CO_2e	-	-	-										
WL1-TK602	**mass GHG**	-	-	-										
	CO_2e	-	-	-										

WL1-TK603	**mass GHG**	-	-	-										
	CO_2e	-	-	-										
WL2-TK8101	**mass GHG**	0.00	-	0.25									0.26	
	CO_2e	0.00	-	6.36										6.36
WL2-TK8102	**mass GHG**	0.00	-	0.25									0.26	
	CO_2e	0.00	-	6.36										6.36
WLCS-TK2301	**mass GHG**	-	-	-										
	CO_2e	-	-	-										
WLCS-TK2302	**mass GHG**	-	-	-										
	CO_2e	-	-	-										
WLCS-TK2303	**mass GHG**	-	-	-										
	CO_2e	-	-	-										
WLCS-TK2304	**mass GHG**	-	-	-										
	CO_2e	-	-	-										
ATM LOAD	**mass GHG**	0.17	-	1.80									1.97	
	CO_2e	0.17	-	45.09										45.26
FUG-1	**mass GHG**	0.61	-	48.18									48.79	
	CO_2e	0.61	-	1204.46										1205.08
FUG-2	**mass GHG**	0.50	-	39.05									39.56	
	CO_2e	0.50	-	976.27										976.78
PIGGING	**mass GHG**	0.01	-	8.56									8.57	
	CO_2e	0.01	-	213.96										213.97
SSM/M	**mass GHG**	-	-	-									-	
	CO_2e	-	-	-										-
Total	**mass GHG**	79912.07	0.15	84.79									102622.90	
	CO_2e	79912.07	43.70	2119.83										105911.69

[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.

Application Summary: Crestwood New Mexico Pipeline LLC (Crestwood) owns and operates the Willow Lake Gas Processing Plant (Willow Lake), which is currently permitted under NSR 5142-M8. With the issuance of NSR 5142-M7 the facility exceeded the Title V operating thresholds and therefore Crestwood is submitting this initial Title V application pursuant 20.2.70.300.(B).2 NMAC within 12 months after the source commences operation as a Part 70 Source.

This Title V application seeks to incorporate the following NSR permitting actions:

Summary of Permitting Actions to be Incorporated

Permit	Date Issued	Application Type	Changes
NSR # 5142-M8	2/11/2022	NSR Significant Revision	• Add three (3) natural gas-fired Caterpillar G3606 4SLB compressor engines rated at 1875 hp and associated compressors (Units C-1160 through C-1180); • Add one (1) 400 bbl produced water/condensate tank associated with the compressor station (Unit WLCS-TK2304); • Add one (1) Triethylene Glycol dehydration unit rated at 80 MMSCFD (Unit DEHY-1505) and one (1) associated 1.5 MMBtu/hr reboiler (Unit HTR-1505); • A thorough review of emission calculations was completed for all existing units and pertinent updates were made as applicable. These include the following: • Updating formaldehyde control efficiency for existing compressor engines based on updated catalyst guarantees (Units C-2300 and C-2400, C-1110 through C-1150); • Revising WL1-FL calculations to account for truck loading vapors from WL1 and WLCS tanks as well as flash tank vapors from the dehydration units (Units DEHY-803, DEHY-804, DEHY-805, and DEHY-1505) in the event flash gas is not burned as fuel, and VRU is out of service for maintenance; • Revising WL Compressor Station tank and atmospheric truck loading calculations based on estimated increases in liquid throughputs (Units

			WLCS-TK2301 through WLCS-TK2303, and ATM LOAD); • Updating fugitive component counts and separating fugitive components based on federal regulatory applicability (Units FUG-1 and FUG-2) and estimated component increases; • Updating unit numbering from ENG-1 through ENG-5 to C-1110 through C-1150; • Updating control device numbering on engines from C-1 through C-9 to Oxcat-1100, NSCR-1200, NSCR-2300, NSCR-2400 and OxCat-1110 through OxCat-1150.
NSR # 5142-M7	2/3/2022*	NSR Administrative Revision	• Like-kind engine replacement of Unit C-2400.
NSR # 5142-M7	9/14/2021*	NSR Administrative Revision	• Updated fugitive piping components for additional pumps installed for facility discharge pipeline.
NSR # 5142-M7	12/24/2020	NSR Significant Revision	• Add five (5) natural gas-fired Caterpillar G3606 4SLB compressor engines rated at 1875 hp and associated compressors (Units ENG-1 through ENG-5); • Add three (3) 400 bbl produced water/condensate tanks at Willow Lake 1 associated with the new compressor station (Units WLCS-TK2301 through WLCS-TK2303); • Revise existing reboiler representation from one (1) 0.75 MMBtu/hr unit to one (1) existing 0.5 MMBtu/hr reboiler (Unit HTR-803); and one (1) 0.125 MMBtu/hr reboiler (Unit HTR-804); • Add One (1) process flare at Willow Lake 1 (Unit WL1-FL); • Increase the capacity of one (1) triethylene glycol (TEG) dehydrator (Unit DEHY-805) to 65 MMscf/day; • Update facility-wide fugitive emissions to take into account new equipment (Unit FUG); • Addition of new miscellaneous equipment/emission sources including: Pig Receivers and Launchers (Unit PIGGING), Slug Catcher, Filters, Scrubbers and Compressor Blowdowns (Units WL1-FL Blowdown and WL2-FL Blowdown); • A thorough review of emission calculations was completed for all existing units and pertinent updates were made as applicable. These include the following: o Updating HAP calculation methodology from GRI HAPCalc to AP-42 for all engines and heaters/reboilers (Units C-1100, C-1200, C-2300 and C-2400, ENG-1 through ENG-5, HTR-803, HTR-804, HTR-802, HTR-805, HTR-730) o Updating Willow Lake 2 flare destruction efficiency from 95% to 98% (Unit WL2-FL); o Updating tank calculation methodology form E&P Tanks to BR&E ProMax (Units WL1-TK601 through WL1-TK603, WL2-TK8101 and WL2-TK8102); o Updating condensate loading methodology to

			BR&E ProMax (Unit ATM LOAD); o Updating haul road inputs to NMED's most recent default values for silt content and wet days (Unit HAUL); o Updated liquids and gas analyses; and o Conservative addition of 4 ppm H_2S to existing fuel gas and facility gas and liquid analyses.

* The date listed for the administrative revisions is the date the application was submitted to the NMED. Per the New Mexico Administrative Code (NMAC), "the administrative permit revision is effective upon receipt of the notification by the department (20.2.72.219.A(3) NMAC)).

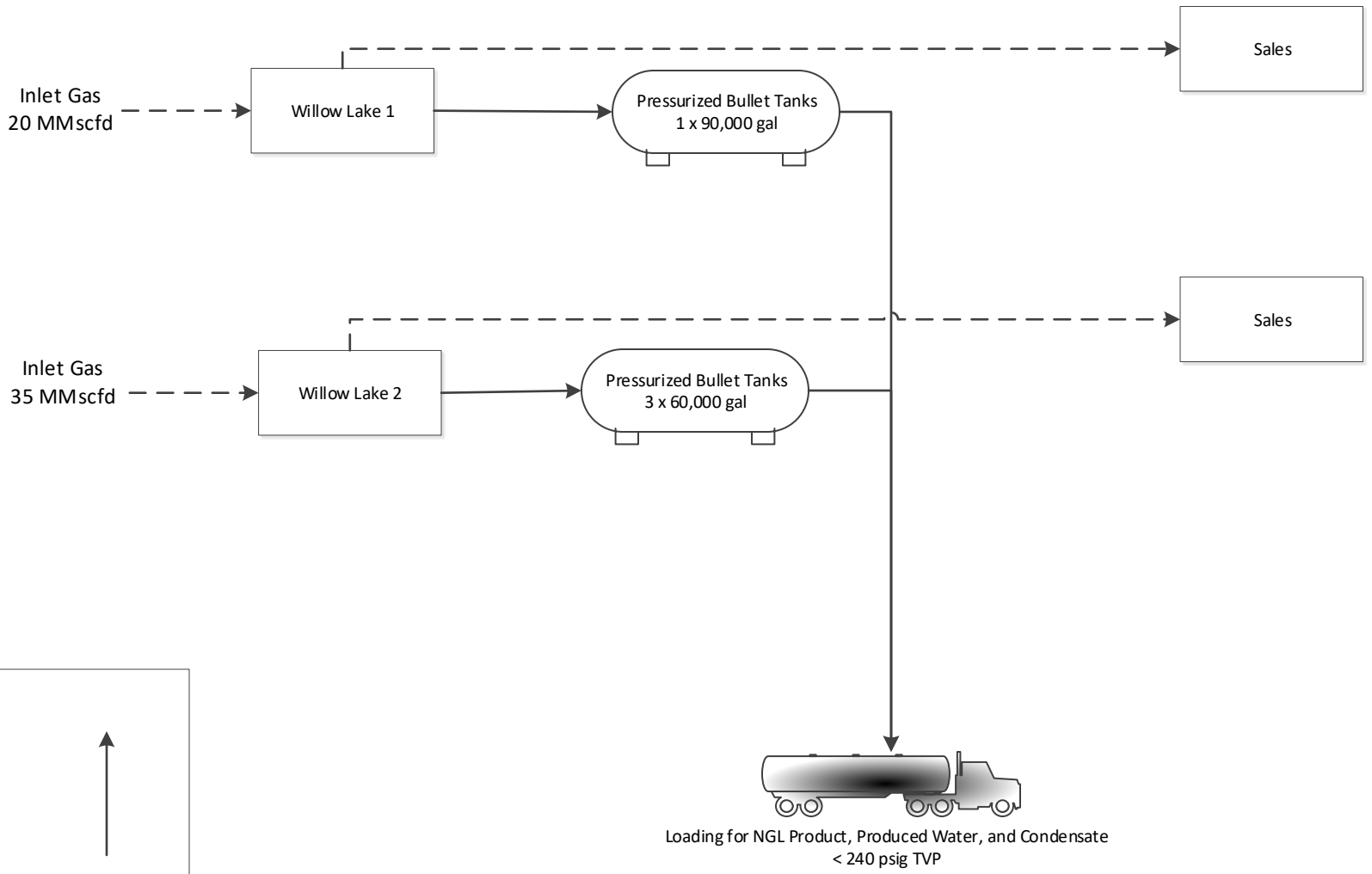
Section 4

Process Flow Sheet

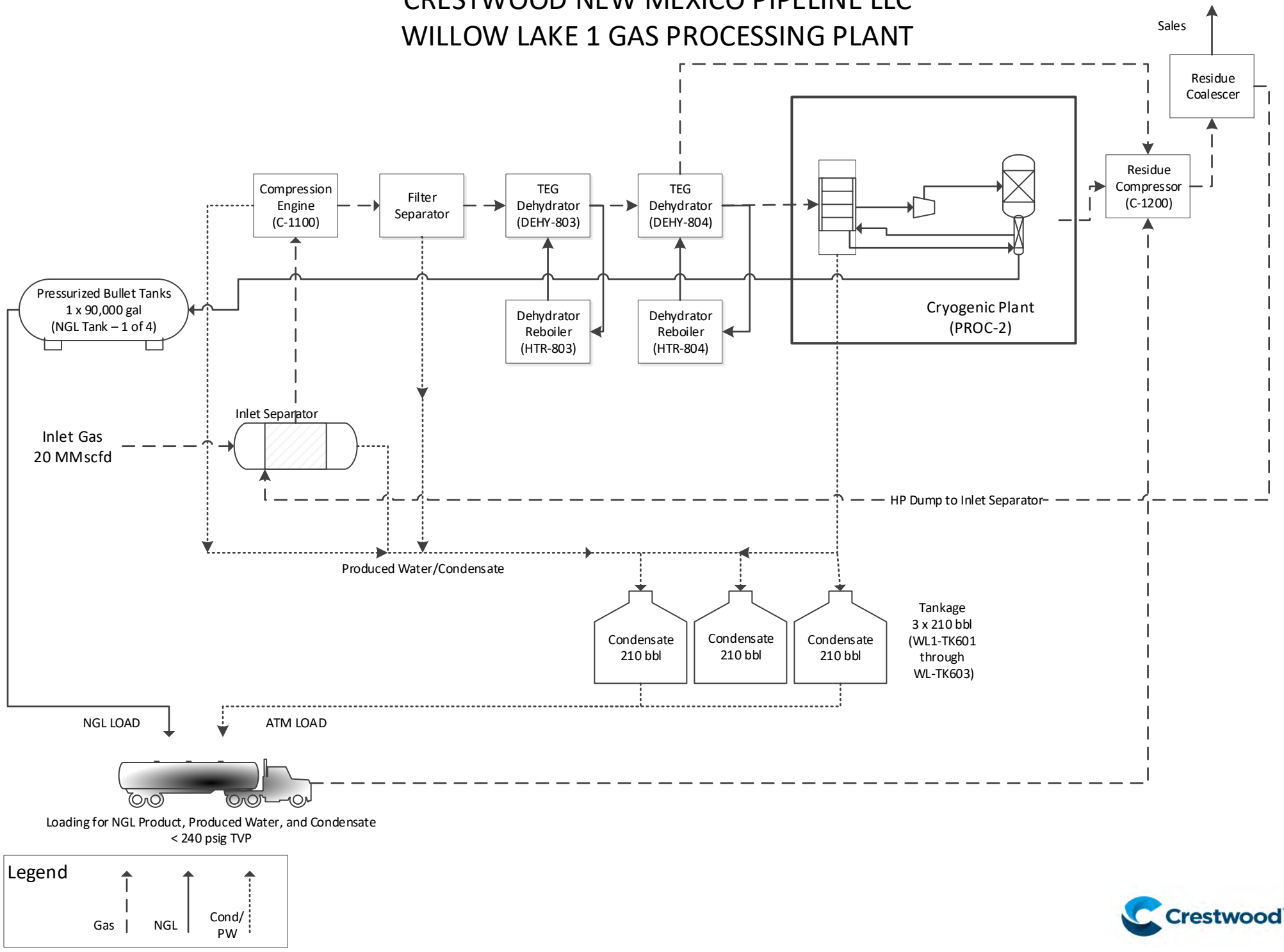
A **process flow sheet** and/or block diagram indicating the individual equipment, all emission points and types of control applied to those points. The unit numbering system should be consistent throughout this application.

Process flow diagrams are attached.

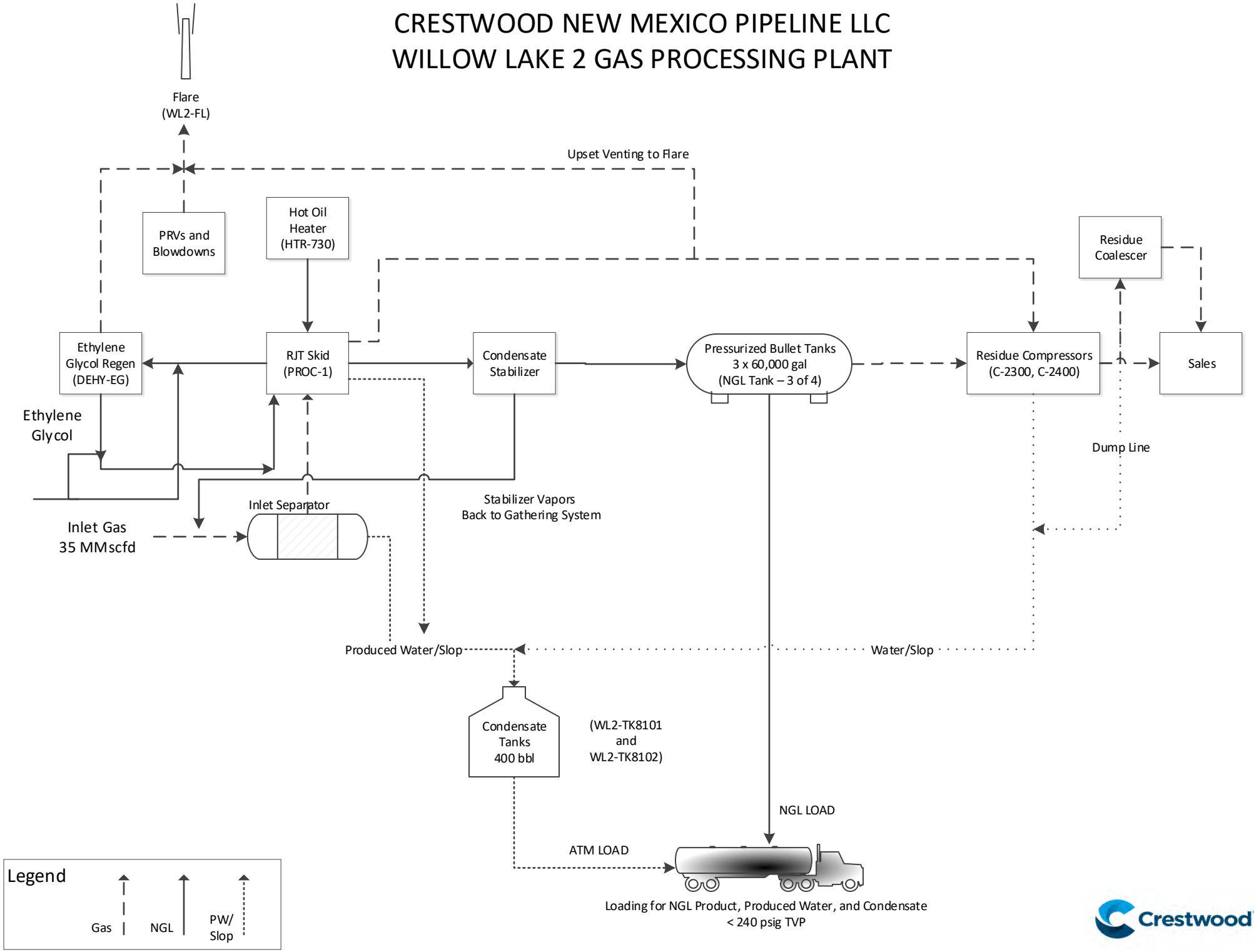
CRESTWOOD NEW MEXICO PIPELINE LLC
WILLOW LAKE GAS PROCESSING PLANT



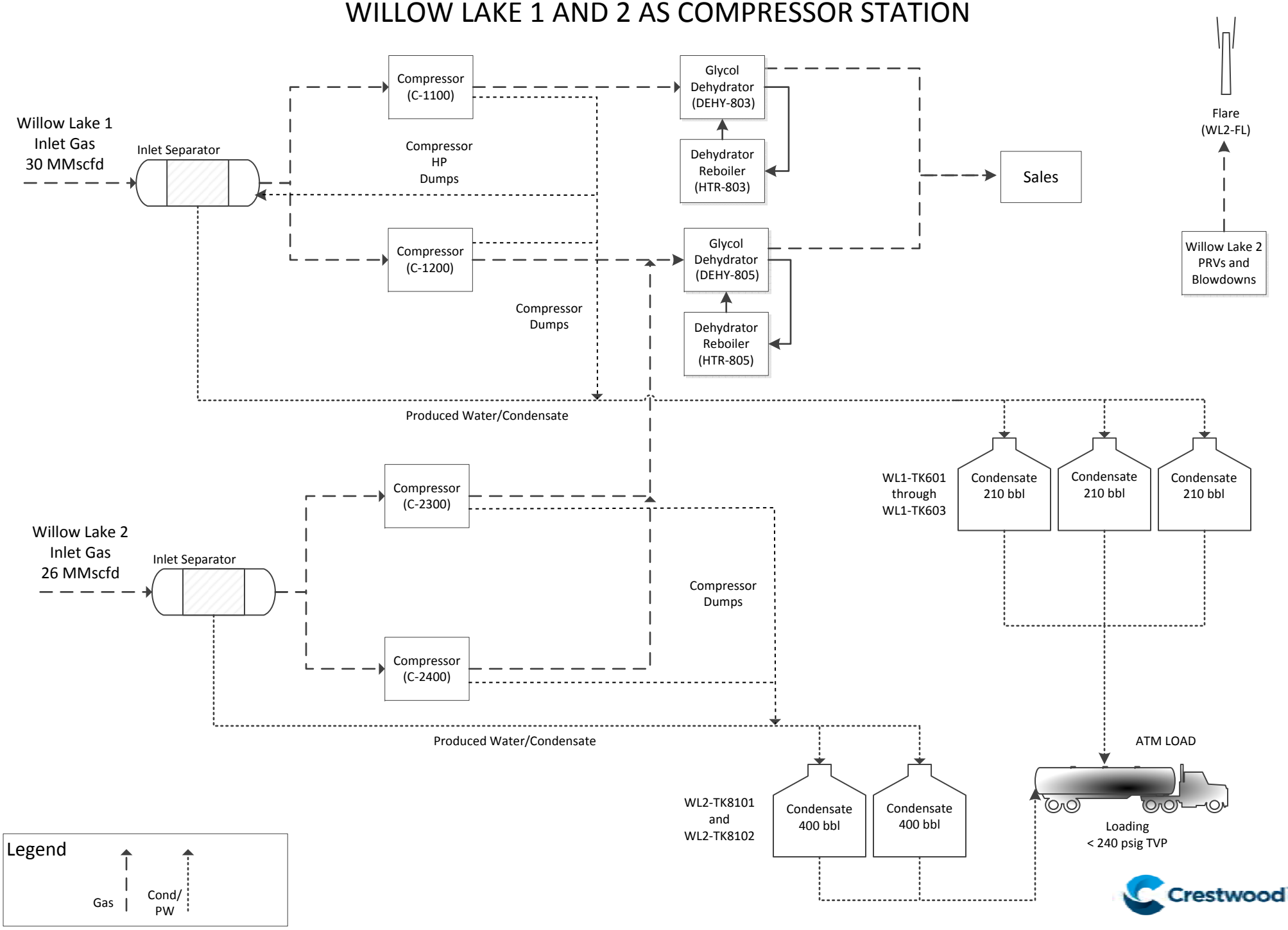
CRESTWOOD NEW MEXICO PIPELINE LLC
WILLOW LAKE 1 GAS PROCESSING PLANT



CRESTWOOD NEW MEXICO PIPELINE LLC
WILLOW LAKE 2 GAS PROCESSING PLANT



CRESTWOOD NEW MEXICO PIPELINE LLC
WILLOW LAKE 1 AND 2 AS COMPRESSOR STATION



PR-1010
INLET PIG RECEIVER
FROM BLACK RIVER
PR-1020
INLET PIG RECEIVER
FROM TOMAHAWK
FROM WL-1
V-1000
SLUG CATCHER
BLOWDOWN
V-5110
HP FLARE KO
P-5110
HP FLARE KO PUMP
FL-5100
FLARE
PILOT GAS
FROM WL-1
V-5120
LP FLARE KO
P-5120
LP FLARE KO PUMP
LP DRAIN
RECYCLE
F-1500
COALESCING VORTEX FILTER
TO WL-1
C-1110
C-1120
C-1130
C-1140
C-1150
C-1160
C-1170
C-1180
COMPRESSOR
F-1506
TEG DISCHARGE
VORTEX FILTER
T-1505
TEG CONTACTOR
SK-1507/1509
TEG REGEN SKID
WITH BTEX SKID
BTEX
V-3100
FUEL GAS SCRUBBER
FROM WL-1
HP DRAIN
LP DRAIN
C-2500
VRU COMPRESSOR
TK-2301
LIQUID
STORAGE
TANK
TK-2302
LIQUID
STORAGE
TANK
TK-2303
LIQUID
STORAGE
TANK
TK-2304
LIQUID
STORAGE
TANK
TRUCK LOADING

NO.	REVISION	BY	CHK.	DATE
0	ISSUED FOR CONSTRUCTION BOTH PHASES	AS	HS	02/11/21

Crestwood

WILLOW LAKE COMPRESSOR STATION
PROCESS FLOW DIAGRAM
OVERVIEW PFD
EDDY COUNTY, NEW MEXICO

DRAWN BY	S. PSHICHENKO	DATE	07/16/20
CHK. BY	H. SIEBERT	SCALE	NONE
DESIGNED BY		APPR. BY	E. AHRENS

A.F.E. NO.	200229	DWG. DESC:	
PRINT ISSUED	FOR CONSTRUCTION	DWG. NO.	WLC-PFD-0100

WLC-PFD-0100.dwg Printed on: Feb 09, 2021 by ALSantiago

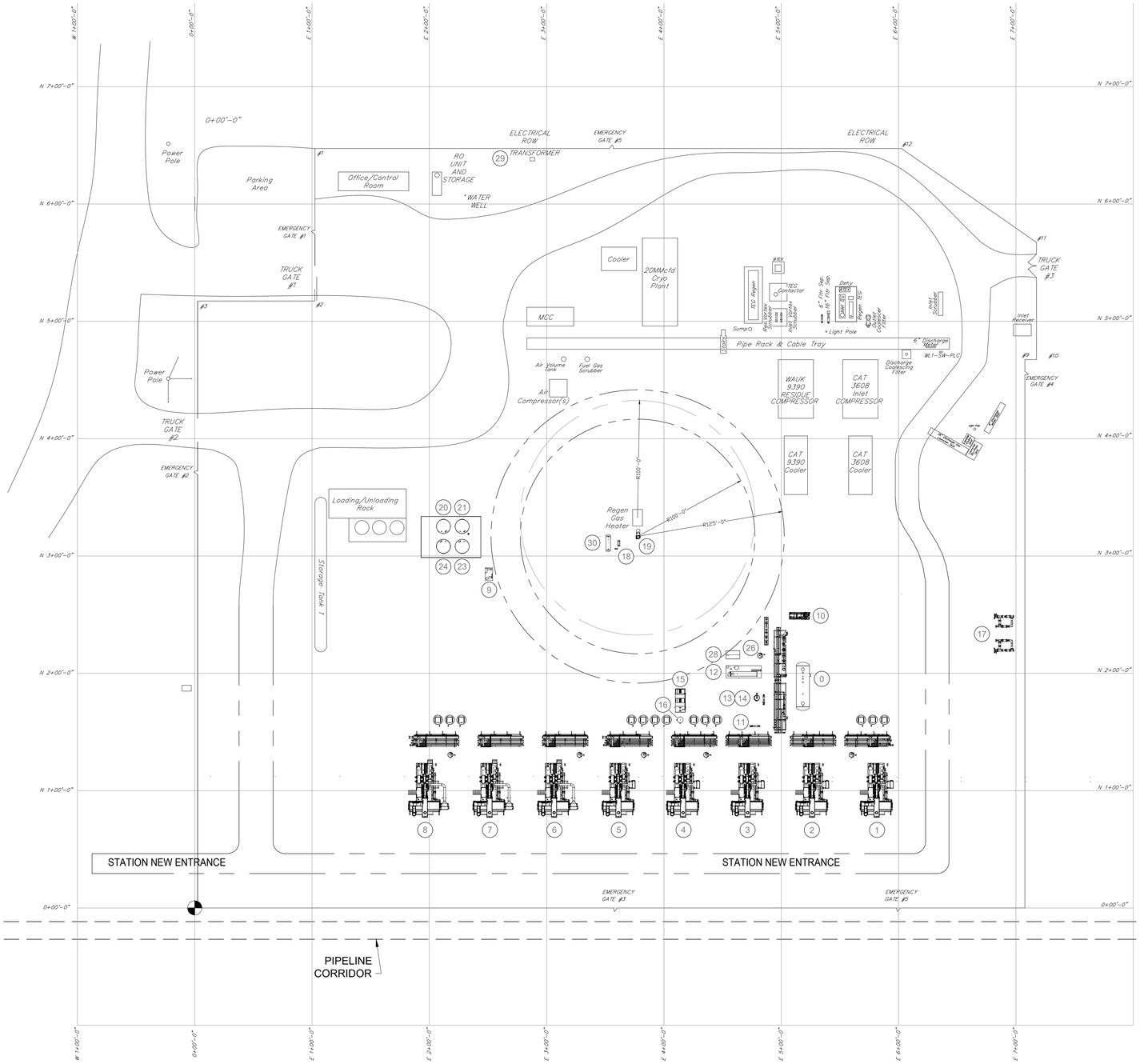
Section 5

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 facility plot plan is attached.

PLANT NORTH



0 50' 100'

B	REISSUED FOR REVIEW	JAL	EA	02/09/2021	DRAWN BY MT	DATE	
A	ISSUED FOR REVIEW	MT	SS	05/21/2020	CHK. BY	SCALE 1"=100'	
NO.	REVISION	BY	CHK.	DATE	DESIGNED BY	APPR. BY	

Crestwood

WILLOW LAKE 1
OVERALL PLOT PLAN
CONCEPT LAYOUT
MALAGA, NM

A.F.E. NO.

PRINT ISSUED ISSUED FOR REVIEW

DWG. NO. 0501

C03-100.dwg Plotted on: Feb 09, 2021 by: John.Liebbers

EQUIPMENT LEGEND

0. PIG RECEIVERS
1. SLUG CATCHER
2. INLET COMPRESSOR
3. INLET COMPRESSOR
4. INLET COMPRESSOR
5. INLET COMPRESSOR
6. INLET COMPRESSOR
7. INLET COMPRESSOR
8. INLET COMPRESSOR
9. INLET COMPRESSOR
10. COALESCING VORTEX FILTER
11. TEG REGENERATION SKID
12. TEG CONTACTOR
13. TEG AFTER SCRUBBER
14. BTEX SKID
15. GAS DISCHARGE METER SKID
16. INSTRUMENT AIR COMPRESSOR
17. INSTRUMENT AIR RECEIVER
18. FUEL GAS SKID (SCRUBBER)
19. TRANSFORMER
20. LP FLARE DRUM PUMP
21. HP FLARE KO DRUM & PUMP
22. FL-5100 FLARE
23. LIQUID TANK
24. LIQUID TANK
25. LIQUID TANK
26. LIQUID TANK
27. VRU

NO.	REVISION	BY	CHK.	DATE
B	REISSUED FOR REVIEW	JAL	EA	02/10/2021
A	ISSUED FOR REVIEW	MT	SS	05/21/2020

Crestwood

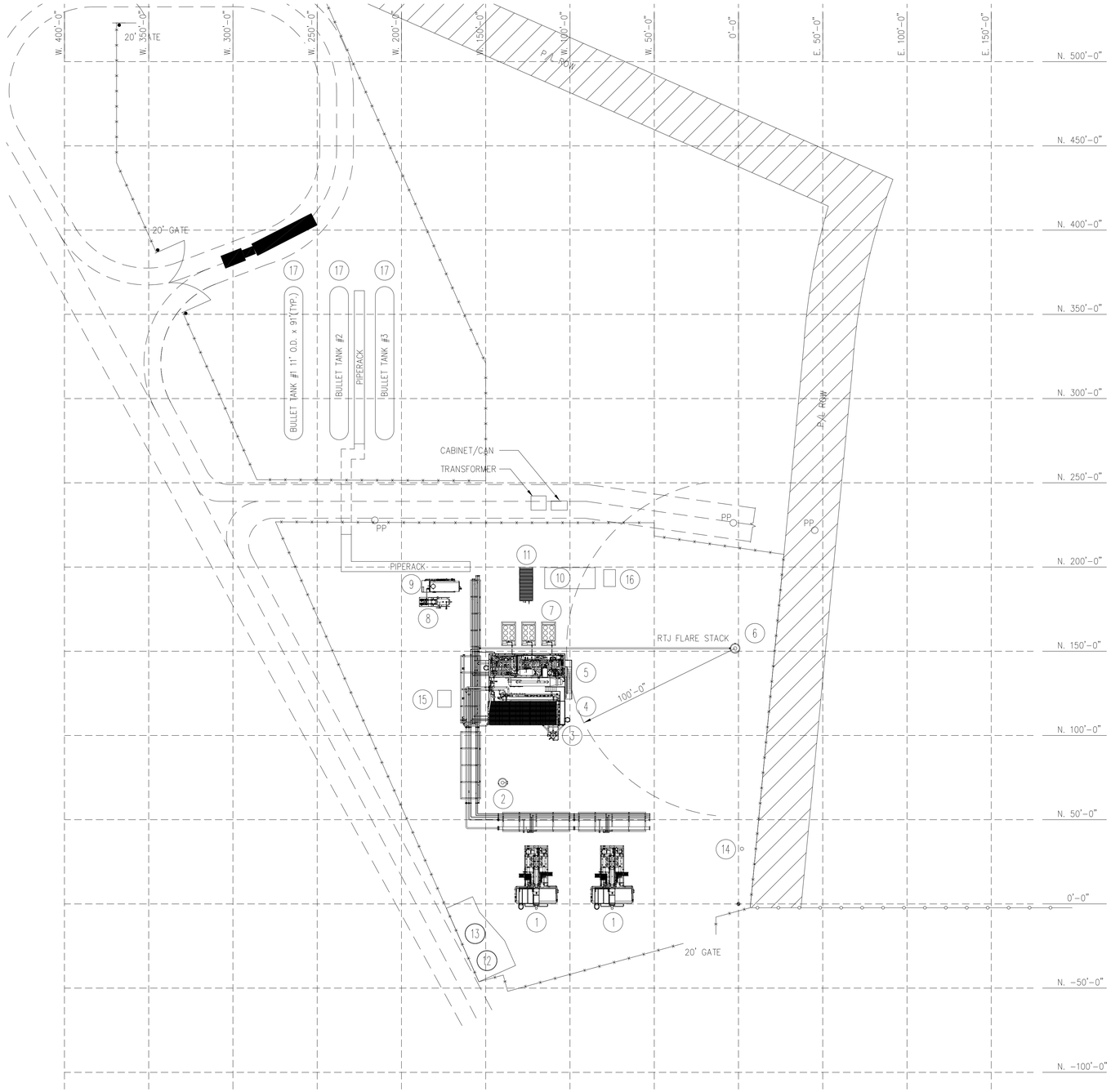
DRAWN BY	MT	DATE	
CHK. BY		SCALE	1"=100'
DESIGNED BY		APPR. BY	

WILLOW LAKE 1
PLOT PLAN LEGEND
CONCEPT LAYOUT
MALAGA, NM

A.F.E. NO.			
PRINT ISSUED	ISSUED FOR REVIEW	DWG. NO.	0502

C03-0502.dwg Plotted on Feb 10, 2021 by JohnLuebbers

PLANT NORTH



ITEM	EQUIPMENT DESCRIPTION
1	Compressor
2	Inlet Separator
3	Process Skid #1
4	Process Skid #2
5	Process Skid #3
6	Flare
7	Hycon Oil Coolers
8	Hot Oil Pump Skid
9	Hot Oil Heater
10	MCC Building
11	Instrument Air
12	Slop Tank #1
13	Slop Tank #2
14	Coalescing Filter
15	Building
16	Switchboard
17	Bullet Tank

NO.	REVISION	BY	CHK.	DATE
1	AS-BUILT, MOC 000001091	RB	CGT	08/22/18
0	RECORD DRAWING	EFA	GJS	02/22/17

Crestwood

WILLOW LAKE GAS PLANT 2
OVERALL SITE PLAN

MALAGA, NM

DRAWN BY REB	DATE 12/03/15	A.F.E. NO.	
CHK. BY	SCALE NTS	PRINT ISSUED	DWG. NO. 0501
DESIGNED BY	APPR. BY		

0501 OVERALL SITE PLAN_AS-BUILT.dwg Plotted on: Sep 11, 2018 by NYYANKOV

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.

Emission calculations are attached.

Compressor Engines (Units C-1100, C-1200, C-2300, C-2400, and C-1110 through C-1180)
Manufacturer and catalyst data was used to calculate engine NO_X, CO, VOC, and HCHO emissions. Emission factors from AP-42 Tables 3.2-1 and 2 were used to calculate PM and all other HAP emissions. A fuel gas sulfur content of 5 gr/100 scf was assumed to calculated SO_2 emissions and a fuel gas hydrogen sulfide content of 0.25 gr/100 scf was used to calculate H_2S emissions.

Glycol Dehydrators (Units DEHY-803, DEHY-804, DEHY-EG, DEHY-805, DEHY-1505)
GRI GlyCalc 4.0 was used to calculate emissions from TEG and EG Dehydrators. A recent representative gas analysis (dated 5/28/2020) was used along with design specifications from facility engineers. 40 CFR 98 Subpart A was used to calculate GHG emissions.

Heaters and Reboilers (Units HTR-802, HTR-803, HTR-804, HTR-805, HTR-730, HTR-1505)
Heater and reboiler emissions were calculated using emission factors from AP-42 Tables 1.4-1, 1.4-2, and 1.4-3. GHG emissions were calculated using emission factors and GWPs in 40 CFR 98 Subparts A and C.

Fugitive Components (Units FUG-1 and FUG-2)
Fugitive component emissions were calculated using emission factors from Table 2-4 of EPA Protocol for Equipment Leak Emission Estimates (1995). A representative gas analysis (dated 5/28/2020) and liquid compositions calculated using BR&E ProMax was used in these calculations.

Storage Tanks (Units WL1-TK601 through WL1-TK603, WL2-TK8101 and WL2-TK8102, WLCS-TK2301 to WLCS-TK2304)
Tanks emission calculations were performed using BR&E ProMax using a condensate liquid analysis (dated 5/28/2020). WLCS tank emissions were based on an updated pressurized condensate analysis (dated 8/19/2021).

Condensate Loading (Unit ATM LOAD)
Condensate loading emission calculations were performed using BR&E ProMax using a condensate liquid analysis dated 5/28/2020. Loading vapors associated with WL1 and WLCS are routed to a flare (WL1-FL), while loading vapors associated with WL2 are uncontrolled.

Natural Gas Liquid Loading (Unit NGL LOAD)
NGL loading emissions were calculated using loading hose dimensions, volumes, and throughputs. Physical properties of NGLs were estimated.

Unpaved Haul Road (Unit HAUL)
Haul road emissions were calculated in accordance with AP-42 Section 13.2.2.3, liquid density and production rates and truck volume capacities and weights. Haul roads are exempt pursuant to 20.2.72.202.B(5) NMAC.

Process Flares (Units WL1-FL and WL2-FL)
Process flare emissions were calculated with tank, loading and dehydrator emissions and properties from BR&E ProMax, GRI GlyCalc 4.0, and TNRCC RG-109 emission factors.

Miscellaneous Equipment (Units WL1-FL Blowdown, WL2-FL Blowdown, PIGGING)
Engineer estimates for blowdown volumes and frequency were used to calculated engine blowdown emissions. A gas analysis dated 05/28/2020 and a residue gas analysis were used to estimate blowdown gas composition. Flaring emissions were calculated using TNRCC RG-109 emission factors. Pig receiver and launcher emissions were calculated using estimated component volumes and a facility inlet gas analysis (dated 2/17/2020).

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)

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Maximum Uncontrolled Emissions

Unit	NO_x		CO		VOCs		SO_2		TSP		PM_{10}		$PM_{2.5}$		H_2S		CO_2e
	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
C-1100	2.61	11.44	14.37	62.93	4.12	18.05	0.23	1.01	0.16	0.69	0.16	0.69	0.16	0.69	1.10E-04	4.82E-04	10100.74
C-1200	56.75	248.55	39.29	172.07	2.14	9.37	0.23	0.99	0.30	1.31	0.30	1.31	0.30	1.31	1.08E-04	4.73E-04	7912.93
C-2300	49.26	215.76	42.59	186.56	0.78	3.41	0.19	0.85	0.26	1.13	0.26	1.13	0.26	1.13	9.32E-05	4.08E-04	6823.43
C-2400	49.26	215.76	42.59	186.56	0.78	3.41	0.19	0.85	0.26	1.13	0.26	1.13	0.26	1.13	9.32E-05	4.08E-04	6823.43
C-1110	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
C-1120	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
C-1130	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
C-1140	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
C-1150	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
C-1160	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
C-1170	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
C-1180	2.07	9.05	9.09	39.83	2.03	8.87	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
WL2-FL	0.0091	0.040	0.018	0.080	-	-	9.29E-04	4.07E-03	-	-	-	-	-	-	2.32E-05	1.02E-04	-
WL2-FL Blowdown	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WL1-FL	0.0300	0.131	0.060	0.262	-	-	0.00304	0.0133	-	-	-	-	-	-	7.61E-05	3.33E-04	-
WL1-FL Blowdown	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEHY-803	-	-	-	-	82.14	359.76	-	-	-	-	-	-	-	-	9.60E-03	4.20E-02	10733.76
DEHY-804	-	-	-	-	7.91	34.63	-	-	-	-	-	-	-	-	9.00E-04	3.94E-03	1032.26
DEHY-EG	-	-	-	-	1.82	7.97	-	-	-	-	-	-	-	-	9.40E-03	4.12E-02	156.76
DEHY-805	-	-	-	-	176.64	773.68	-	-	-	-	-	-	-	-	2.05E-02	8.98E-02	23051.90
DEHY-1505	-	-	-	-	177.06	775.50	-	-	-	-	-	-	-	-	2.04E-02	8.94E-02	23117.48
HTR-803	0.049	0.21	0.041	0.18	0.0027	0.012	0.0073	0.032	0.0037	0.016	0.0037	0.016	0.0037	0.016	3.50E-06	1.53E-05	256.44
HTR-804	0.012	0.054	0.010	0.045	0.00067	0.0030	0.0018	0.0080	0.00093	0.0041	0.00093	0.0041	0.00093	0.0041	8.75E-07	3.83E-06	64.11
HTR-802	0.20	0.86	0.16	0.72	0.011	0.047	0.029	0.13	0.015	0.065	0.015	0.065	0.015	0.065	1.40E-05	6.13E-05	1025.78
HTR-730	0.67	2.93	0.56	2.46	0.037	0.16	0.10	0.44	0.051	0.22	0.051	0.22	0.051	0.22	4.78E-05	2.10E-04	3503.36
HTR-805	0.15	0.64	0.12	0.54	0.0081	0.035	0.022	0.096	0.011	0.049	0.011	0.049	0.011	0.049	1.05E-05	4.60E-05	769.33
HTR-1505	0.15	0.64	0.12	0.54	0.0081	0.035	0.022	0.096	0.011	0.049	0.011	0.049	0.011	0.049	1.05E-05	4.60E-05	769.33
WL1-TK601	-	-	-	-	53.28	198.22	-	-	-	-	-	-	-	-	1.37E-03	3.82E-03	555.69
WL1-TK602	-	-	-	-	53.28	198.22	-	-	-	-	-	-	-	-	1.37E-03	3.82E-03	555.69
WL1-TK603	-	-	-	-	53.28	198.22	-	-	-	-	-	-	-	-	1.37E-03	3.82E-03	555.69
WL2-TK8101	-	-	-	-	94.33	46.96	-	-	-	-	-	-	-	-	2.32E-03	9.01E-04	127.22
WL2-TK8102	-	-	-	-	94.33	46.96	-	-	-	-	-	-	-	-	2.32E-03	9.01E-04	127.22
WLCS-TK2301	-	-	-	-	488.81	371.48	-	-	-	-	-	-	-	-	1.60E-02	1.07E-02	510.06
WLCS-TK2302	-	-	-	-	488.81	371.48	-	-	-	-	-	-	-	-	1.60E-02	1.07E-02	510.06
WLCS-TK2303	-	-	-	-	488.81	371.48	-	-	-	-	-	-	-	-	1.60E-02	1.07E-02	510.06
WLCS-TK2304	-	-	-	-	488.81	371.48	-	-	-	-	-	-	-	-	1.60E-02	1.07E-02	510.06
ATM LOAD	-	-	-	-	93.95	84.33	-	-	-	-	-	-	-	-	1.93E-03	2.37E-03	45.26
NGL LOAD	-	-	-	-	0.0031	0.013	-	-	-	-	-	-	-	-	-	-	-
FUG-1	-	-	-	-	5.66	24.77	-	-	-	-	-	-	-	-	6.24E-05	2.73E-04	1205.08
FUG-2	-	-	-	-	8.82	38.65	-	-	-	-	-	-	-	-	5.93E-05	2.60E-04	976.78
PIGGING	-	-	-	-	0.30	1.31	-	-	-	-	-	-	-	-	4.99E-06	2.19E-05	213.97
SSM/M	-	-	-	-	-	10.00	-	-	-	-	-	-	-	-	-	1.00	-
Totals	**175.67**	**769.46**	**212.70**	**931.62**	**2882.12**	**4390.62**	**2.69**	**11.80**	**2.20**	**9.63**	**2.20**	**9.63**	**2.20**	**9.63**	**0.14**	**1.33**	**160749.29**

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Maximum Controlled Emissions

Unit	NO_x		CO		VOCs		SO_2		TSP		PM_{10}		$PM_{2.5}$		H_2S		CO_2e
	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
C-1100	2.61	11.44	5.22	22.89	1.03	4.51	0.23	1.01	0.16	0.69	0.16	0.69	0.16	0.69	1.10E-04	4.82E-04	10100.74
C-1200	8.51	37.28	5.89	25.81	0.69	3.02	0.23	0.99	0.30	1.31	0.30	1.31	0.30	1.31	1.08E-04	4.73E-04	7912.93
C-2300	3.70	16.22	3.70	16.22	0.27	1.17	0.19	0.85	0.26	1.13	0.26	1.13	0.26	1.13	9.32E-05	4.08E-04	6823.43
C-2400	3.70	16.22	3.70	16.22	0.27	1.17	0.19	0.85	0.26	1.13	0.26	1.13	0.26	1.13	9.32E-05	4.08E-04	6823.43
C-1110	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
C-1120	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
C-1130	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
C-1140	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
C-1150	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
C-1160	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
C-1170	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
C-1180	2.07	9.05	0.91	3.98	0.72	3.17	0.21	0.91	0.14	0.62	0.14	0.62	0.14	0.62	9.93E-05	4.35E-04	7275.68
WL2-FL	0.28	1.23	0.56	2.45	0.036	0.16	0.018	0.080	-	-	-	-	-	-	2.11E-04	9.25E-04	1008.16
WL2-FL Blowdown	110.23	2.87	220.06	5.72	159.39	4.14	0.41	0.011	-	-	-	-	-	-	4.49E-03	1.17E-04	2433.66
WL1-FL	10.88	2.57	21.73	5.12	49.02	4.58	0.19	0.031	-	-	-	-	-	-	2.11E-03	5.30E-04	2665.68
WL1-FL Blowdown	9.17	0.24	18.31	0.48	13.26	0.34	0.034	0.00089	-	-	-	-	-	-	3.74E-04	9.71E-06	202.48
DEHY-803	-	-	-	-	1.37	6.01	-	-	-	-	-	-	-	-	2.26E-04	9.88E-04	264.80
DEHY-804	-	-	-	-	0.13	0.58	-	-	-	-	-	-	-	-	2.16E-05	9.46E-05	25.46
DEHY-EG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEHY-805	-	-	-	-	2.94	12.90	-	-	-	-	-	-	-	-	4.80E-04	2.10E-03	568.67
DEHY-1505	-	-	-	-	0.43	1.88	-	-	-	-	-	-	-	-	2.09E-04	9.13E-04	34.64
HTR-803	0.049	0.21	0.041	0.18	0.0027	0.012	0.0073	0.032	0.004	0.016	0.004	0.016	0.0037	0.016	3.50E-06	1.53E-05	256.44
HTR-804	0.012	0.054	0.010	0.045	0.00067	0.0030	0.0018	0.0080	0.00093	0.0041	0.00093	0.0041	0.00093	0.0041	8.75E-07	3.83E-06	64.11
HTR-802	0.20	0.86	0.16	0.72	0.011	0.047	0.029	0.13	0.015	0.065	0.015	0.065	0.015	0.07	1.40E-05	6.13E-05	1025.78
HTR-730	0.67	2.93	0.56	2.46	0.037	0.16	0.10	0.44	0.051	0.22	0.051	0.22	0.05	0.22	4.78E-05	2.10E-04	3503.36
HTR-805	0.15	0.64	0.12	0.54	0.0081	0.035	0.022	0.096	0.011	0.049	0.011	0.049	0.011	0.049	1.05E-05	4.60E-05	769.33
HTR-1505	0.15	0.64	0.12	0.54	0.0081	0.035	0.022	0.096	0.011	0.049	0.011	0.049	0.011	0.049	1.05E-05	4.60E-05	769.33
WL1-TK601	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WL1-TK602	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WL1-TK603	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WL2-TK8101	-	-	-	-	94.33	2.35	-	-	-	-	-	-	-	-	2.32E-03	4.51E-05	6.36
WL2-TK8102	-	-	-	-	94.33	2.35	-	-	-	-	-	-	-	-	2.32E-03	4.51E-05	6.36
WLCS-TK2301	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WLCS-TK2302	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WLCS-TK2303	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WLCS-TK2304	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ATM LOAD	-	-	-	-	39.54	2.73	-	-	-	-	-	-	-	-	6.35E-05	5.34E-05	45.26
NGL LOAD	-	-	-	-	0.0031	0.013	-	-	-	-	-	-	-	-	-	-	-
FUG-1	-	-	-	-	5.66	24.77	-	-	-	-	-	-	-	-	6.24E-05	2.73E-04	1205.08
FUG-2	-	-	-	-	8.82	38.65	-	-	-	-	-	-	-	-	5.93E-05	2.60E-04	976.78
PIGGING	-	-	-	-	0.30	1.31	-	-	-	-	-	-	-	-	4.99E-06	2.19E-05	213.97
SSM/M	-	-	-	-	-	10.00	-	-	-	-	-	-	-	-	-	1.00	-
Totals	**166.85**	**165.84**	**287.48**	**131.27**	**477.69**	**148.29**	**3.35**	**11.91**	**2.20**	**9.63**	**2.20**	**9.63**	**2.20**	**9.63**	**0.014**	**1.01**	**105911.69**

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Maximum Uncontrolled HAP Emissions

Unit	HCHO		Acetaldehyde		Acrolein		Methanol		Toluene		Ethylbenzene		Xylenes		Benzene		n-Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
C-1100	0.83	3.63	0.13	0.58	8.08E-02	3.54E-01	3.93E-02	1.72E-01	6.41E-03	2.81E-02	6.24E-04	2.73E-03	2.89E-03	1.27E-02	6.91E-03	3.03E-02	1.74E-02	7.64E-02	1.12	4.92
C-1200	0.83	3.63	0.043	0.19	4.06E-02	1.78E-01	4.72E-02	2.07E-01	8.61E-03	3.77E-02	3.83E-04	1.68E-03	3.01E-03	1.32E-02	2.44E-02	1.07E-01	-	-	1.01	4.42
C-2300	0.19	0.81	0.037	0.16	3.50E-02	1.53E-01	4.07E-02	1.78E-01	7.42E-03	3.25E-02	3.30E-04	1.45E-03	2.59E-03	1.14E-02	2.10E-02	9.21E-02	-	-	0.34	1.49
C-2400	0.19	0.81	0.037	0.16	3.50E-02	1.53E-01	4.07E-02	1.78E-01	7.42E-03	3.25E-02	3.30E-04	1.45E-03	2.59E-03	1.14E-02	2.10E-02	9.21E-02	-	-	0.34	1.49
C-1110	0.83	3.62	0.12	0.52	7.29E-02	3.19E-01	3.54E-02	1.55E-01	5.78E-03	2.53E-02	5.63E-04	2.46E-03	2.61E-03	1.14E-02	6.24E-03	2.73E-02	1.57E-02	6.89E-02	1.09	4.78
C-1120	0.83	3.62	0.12	0.52	7.29E-02	3.19E-01	3.54E-02	1.55E-01	5.78E-03	2.53E-02	5.63E-04	2.46E-03	2.61E-03	1.14E-02	6.24E-03	2.73E-02	1.57E-02	6.89E-02	1.09	4.78
C-1130	0.83	3.62	0.12	0.52	7.29E-02	3.19E-01	3.54E-02	1.55E-01	5.78E-03	2.53E-02	5.63E-04	2.46E-03	2.61E-03	1.14E-02	6.24E-03	2.73E-02	1.57E-02	6.89E-02	1.09	4.78
C-1140	0.83	3.62	0.12	0.52	7.29E-02	3.19E-01	3.54E-02	1.55E-01	5.78E-03	2.53E-02	5.63E-04	2.46E-03	2.61E-03	1.14E-02	6.24E-03	2.73E-02	1.57E-02	6.89E-02	1.09	4.78
C-1150	0.83	3.62	0.12	0.52	7.29E-02	3.19E-01	3.54E-02	1.55E-01	5.78E-03	2.53E-02	5.63E-04	2.46E-03	2.61E-03	1.14E-02	6.24E-03	2.73E-02	1.57E-02	6.89E-02	1.09	4.78
C-1160	0.83	3.62	0.12	0.52	7.29E-02	3.19E-01	3.54E-02	1.55E-01	5.78E-03	2.53E-02	5.63E-04	2.46E-03	2.61E-03	1.14E-02	6.24E-03	2.73E-02	1.57E-02	6.89E-02	1.09	4.78
C-1170	0.83	3.62	0.12	0.52	7.29E-02	3.19E-01	3.54E-02	1.55E-01	5.78E-03	2.53E-02	5.63E-04	2.46E-03	2.61E-03	1.14E-02	6.24E-03	2.73E-02	1.57E-02	6.89E-02	1.09	4.78
C-1180	0.83	3.62	0.12	0.52	7.29E-02	3.19E-01	3.54E-02	1.55E-01	5.78E-03	2.53E-02	5.63E-04	2.46E-03	2.61E-03	1.14E-02	6.24E-03	2.73E-02	1.57E-02	6.89E-02	1.09	4.78
WL2-FL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WL2-FL Blowdown	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WL1-FL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WL1-FL Blowdown	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEHY-803	-	-	-	-	-	-	-	-	9.08	39.78	1.23	5.39	4.87	21.32	0.15	0.66	2.59	11.33	17.92	78.47
DEHY-804	-	-	-	-	-	-	-	-	0.90	3.93	0.12	0.54	0.50	2.17	0.015	0.064	0.25	1.08	1.78	7.78
DEHY-EG	-	-	-	-	-	-	-	-	0.0047	0.021	0.0037	0.016	0.013	0.055	0.0034	0.015	0.015	0.065	0.039	0.17
DEHY-805	-	-	-	-	-	-	-	-	19.82	86.79	2.70	11.81	10.81	47.34	0.33	1.43	5.53	24.23	39.18	171.60
DEHY-1505	-	-	-	-	-	-	-	-	20.09	87.97	2.74	12.01	11.13	48.76	0.33	1.44	5.52	24.16	39.81	174.35
HTR-803	3.68E-05	1.61E-04	-	-	-	-	-	-	1.67E-06	7.30E-06	-	-	-	-	1.03E-06	4.51E-06	8.82E-04	3.86E-03	9.22E-04	4.04E-03
HTR-804	9.19E-06	4.03E-05	-	-	-	-	-	-	4.17E-07	1.83E-06	-	-	-	-	2.57E-07	1.13E-06	2.21E-04	9.66E-04	2.30E-04	1.01E-03
HTR-802	1.47E-04	6.44E-04	-	-	-	-	-	-	6.67E-06	2.92E-05	-	-	-	-	4.12E-06	1.80E-05	3.53E-03	1.55E-02	3.69E-03	1.62E-02
HTR-730	5.02E-04	2.20E-03	-	-	-	-	-	-	2.28E-05	9.97E-05	-	-	-	-	1.41E-05	6.16E-05	1.21E-02	5.28E-02	1.26E-02	5.52E-02
HTR-805	1.10E-04	4.83E-04	-	-	-	-	-	-	5.00E-06	2.19E-05	-	-	-	-	3.09E-06	1.35E-05	2.65E-03	1.16E-02	2.77E-03	1.21E-02
HTR-1505	1.10E-04	4.83E-04	-	-	-	-	-	-	5.00E-06	2.19E-05	-	-	-	-	3.09E-06	1.35E-05	2.65E-03	1.16E-02	2.77E-03	1.21E-02
WL1-TK601	-	-	-	-	-	-	-	-	0.10	0.500	6.38E-03	3.42E-02	4.00E-02	2.15E-01	5.59E-02	2.65E-01	0.82	3.95	1.02	4.96
WL1-TK602	-	-	-	-	-	-	-	-	0.10	0.500	6.38E-03	3.42E-02	4.00E-02	2.15E-01	5.59E-02	2.65E-01	0.82	3.95	1.02	4.96
WL1-TK603	-	-	-	-	-	-	-	-	0.10	0.500	6.38E-03	3.42E-02	4.00E-02	2.15E-01	5.59E-02	2.65E-01	0.82	3.95	1.02	4.96
WL2-TK8101	-	-	-	-	-	-	-	-	0.18	0.12	1.19E-02	8.16E-03	7.45E-02	5.13E-02	1.03E-01	6.31E-02	1.51	0.94	1.88	1.18
WL2-TK8102	-	-	-	-	-	-	-	-	0.18	0.12	1.19E-02	8.16E-03	7.45E-02	5.13E-02	1.03E-01	6.31E-02	1.51	0.94	1.88	1.18
WLCS-TK2301	-	-	-	-	-	-	-	-	1.01	0.78	4.04E-02	3.09E-02	1.49E-01	1.14E-01	1.08E+00	8.23E-01	19.53	15.02	21.81	16.76
WLCS-TK2302	-	-	-	-	-	-	-	-	1.01	0.78	4.04E-02	3.09E-02	1.49E-01	1.14E-01	1.08E+00	8.23E-01	19.53	15.02	21.81	16.76
WLCS-TK2303	-	-	-	-	-	-	-	-	1.01	0.78	4.04E-02	3.09E-02	1.49E-01	1.14E-01	1.08E+00	8.23E-01	19.53	15.02	21.81	16.76
WLCS-TK2304	-	-	-	-	-	-	-	-	1.01	0.78	4.04E-02	3.09E-02	1.49E-01	1.14E-01	1.08E+00	8.23E-01	19.53	15.02	21.81	16.76
ATM LOAD	-	-	-	-	-	-	-	-	2.37E-01	1.86E-01	1.36E-02	8.85E-03	7.53E-02	4.21E-02	1.79E-01	1.73E-01	3.03	3.06	3.53	3.47
NGL LOAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FUG-1	-	-	-	-	-	-	0.033	0.14	-	-	-	-	-	-	-	-	-	-	0.35	1.53
FUG-2	-	-	-	-	-	-	0.35	1.55	-	-	-	-	-	-	-	-	-	-	0.88	3.85
PIGGING	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.012	0.055
SSM/M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00
Totals	**8.64**	**37.86**	**1.20**	**5.24**	**0.77**	**3.39**	**0.84**	**3.68**	**54.91**	**223.85**	**7.02**	**30.04**	**28.29**	**121.03**	**5.81**	**8.53**	**100.68**	**138.45**	**209.11**	**577.24**

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Maximum Controlled HAP Emissions

Unit	HCHO		Acetaldehyde		Acrolein		Methanol		Toluene		Ethylbenzene		Xylenes		Benzene		n-Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
C-1100	0.21	0.91	0.10	0.44	6.22E-02	2.72E-01	3.03E-02	1.33E-01	4.94E-03	2.16E-02	4.80E-04	2.10E-03	2.23E-03	9.75E-03	5.32E-03	2.33E-02	1.34E-02	5.88E-02	0.43	1.90
C-1200	0.17	0.73	0.043	0.19	4.06E-02	1.78E-01	4.72E-02	2.07E-01	8.61E-03	3.77E-02	3.83E-04	1.68E-03	3.01E-03	1.32E-02	2.44E-02	1.07E-01	-	-	0.35	1.51
C-2300	0.044	0.19	0.037	0.16	3.50E-02	1.53E-01	4.07E-02	1.78E-01	7.42E-03	3.25E-02	3.30E-04	1.45E-03	2.59E-03	1.14E-02	2.10E-02	9.21E-02	-	-	0.20	0.87
C-2400	0.044	0.19	0.037	0.16	3.50E-02	1.53E-01	4.07E-02	1.78E-01	7.42E-03	3.25E-02	3.30E-04	1.45E-03	2.59E-03	1.14E-02	2.10E-02	9.21E-02	-	-	0.20	0.87
C-1110	0.12	0.54	0.074	0.32	4.53E-02	1.98E-01	2.20E-02	9.65E-02	3.60E-03	1.58E-02	3.50E-04	1.53E-03	1.62E-03	7.10E-03	3.88E-03	1.70E-02	9.78E-03	4.29E-02	0.29	1.27
C-1120	0.12	0.54	0.074	0.32	4.53E-02	1.98E-01	2.20E-02	9.65E-02	3.60E-03	1.58E-02	3.50E-04	1.53E-03	1.62E-03	7.10E-03	3.88E-03	1.70E-02	9.78E-03	4.29E-02	0.29	1.27
C-1130	0.12	0.54	0.074	0.32	4.53E-02	1.98E-01	2.20E-02	9.65E-02	3.60E-03	1.58E-02	3.50E-04	1.53E-03	1.62E-03	7.10E-03	3.88E-03	1.70E-02	9.78E-03	4.29E-02	0.29	1.27
C-1140	0.12	0.54	0.074	0.32	4.53E-02	1.98E-01	2.20E-02	9.65E-02	3.60E-03	1.58E-02	3.50E-04	1.53E-03	1.62E-03	7.10E-03	3.88E-03	1.70E-02	9.78E-03	4.29E-02	0.29	1.27
C-1150	0.12	0.54	0.074	0.32	4.53E-02	1.98E-01	2.20E-02	9.65E-02	3.60E-03	1.58E-02	3.50E-04	1.53E-03	1.62E-03	7.10E-03	3.88E-03	1.70E-02	9.78E-03	4.29E-02	0.29	1.27
C-1160	0.12	0.54	0.074	0.32	4.53E-02	1.98E-01	2.20E-02	9.65E-02	3.60E-03	1.58E-02	3.50E-04	1.53E-03	1.62E-03	7.10E-03	3.88E-03	1.70E-02	9.78E-03	4.29E-02	0.29	1.27
C-1170	0.12	0.54	0.074	0.32	4.53E-02	1.98E-01	2.20E-02	9.65E-02	3.60E-03	1.58E-02	3.50E-04	1.53E-03	1.62E-03	7.10E-03	3.88E-03	1.70E-02	9.78E-03	4.29E-02	0.29	1.27
C-1180	0.12	0.54	0.074	0.32	4.53E-02	1.98E-01	2.20E-02	9.65E-02	3.60E-03	1.58E-02	3.50E-04	1.53E-03	1.62E-03	7.10E-03	3.88E-03	1.70E-02	9.78E-03	4.29E-02	0.29	1.27
WL2-FL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00078	0.0034
WL2-FL Blowdown	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.73	0.56
WL1-FL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.14	0.129
WL1-FL Blowdown	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.81	0.047
DEHY-803	-	-	-	-	-	-	-	-	0.031	0.13	0.0019	0.0082	0.0059	0.026	0.0010	0.0045	0.052	0.23	0.092	0.40
DEHY-804	-	-	-	-	-	-	-	-	0.0030	0.013	0.00018	0.00081	0.00060	0.0026	0.000098	0.00043	0.0050	0.022	0.0089	0.04
DEHY-EG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEHY-805	-	-	-	-	-	-	-	-	0.067	0.29	0.0041	0.018	0.013	0.057	0.0022	0.0097	0.11	0.49	0.20	0.87
DEHY-1505	-	-	-	-	-	-	-	-	0.048	0.21	0.0023	0.010	0.0086	0.038	0.0018	0.0081	0.0182	0.080	0.079	0.34
HTR-803	3.68E-05	1.61E-04	-	-	-	-	-	-	1.67E-06	7.30E-06	-	-	-	-	1.03E-06	4.51E-06	8.82E-04	3.86E-03	9.22E-04	4.04E-03
HTR-804	9.19E-06	4.03E-05	-	-	-	-	-	-	4.17E-07	1.83E-06	-	-	-	-	2.57E-07	1.13E-06	2.21E-04	9.66E-04	2.30E-04	1.01E-03
HTR-802	1.47E-04	6.44E-04	-	-	-	-	-	-	6.67E-06	2.92E-05	-	-	-	-	4.12E-06	1.80E-05	3.53E-03	1.55E-02	3.69E-03	1.62E-02
HTR-730	5.02E-04	2.20E-03	-	-	-	-	-	-	2.28E-05	9.97E-05	-	-	-	-	1.41E-05	6.16E-05	1.21E-02	5.28E-02	1.26E-02	5.52E-02
HTR-805	1.10E-04	4.83E-04	-	-	-	-	-	-	5.00E-06	2.19E-05	-	-	-	-	3.09E-06	1.35E-05	2.65E-03	1.16E-02	2.77E-03	1.21E-02
HTR-1505	1.10E-04	4.83E-04	-	-	-	-	-	-	5.00E-06	2.19E-05	-	-	-	-	3.09E-06	1.35E-05	2.65E-03	1.16E-02	2.77E-03	1.21E-02
WL1-TK601	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WL1-TK602	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WL1-TK603	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WL2-TK8101	-	-	-	-	-	-	-	-	0.18	0.0060	0.012	0.00041	0.074	0.0026	0.10	0.0032	1.51	0.047	1.88	0.059
WL2-TK8102	-	-	-	-	-	-	-	-	0.18	0.0060	0.012	0.00041	0.074	0.0026	0.10	0.0032	1.51	0.047	1.88	0.059
WLCS-TK2301	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WLCS-TK2302	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WLCS-TK2303	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WLCS-TK2304	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ATM LOAD	-	-	-	-	-	-	-	-	0.13	0.0081	0.0092	0.00053	0.058	0.0032	0.066	0.0049	1.00	0.078	1.26	0.095
NGL LOAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FUG-1	-	-	-	-	-	-	0.033	0.14	-	-	-	-	-	-	-	-	-	-	0.35	1.53
FUG-2	-	-	-	-	-	-	0.35	1.55	-	-	-	-	-	-	-	-	-	-	0.88	3.85
PIGGING	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.012	0.055
SSM/M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00
Totals	**1.46**	**6.37**	**0.81**	**3.54**	**0.54**	**2.34**	**0.72**	**3.17**	**0.70**	**0.92**	**0.05**	**0.057**	**0.26**	**0.23**	**0.38**	**0.48**	**4.31**	**1.49**	**35.82**	**24.42**

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Unit: C-1100

Description: CAT G3608 4SLB Inlet Gas Compressor Engine with Oxidation Catalyst

Engine Power[1]:	2370	hp	Mfg. Data - 100% Load (DM8606-02)
Fuel Consumption:	6629	Btu/hp-hr	Mfg. Data - 100% Load (DM8606-02)
Fuel Type:	NG		Mfg. Data
Fuel Heating Value:	1020	Btu/scf	Fuel Gas Analysis
Operating Hours:	8760	hours	Continuous
Fuel Usage:	15402.676	scf/hr	Calculated
Annual Fuel Usage:	134.93	MMScf/yr	Calculated

Uncontrolled Emission Calculations

NO_x[2]	CO[2]	VOC[2]	SO_2[3]	PM[4,5]	H_2S[6]	HCHO[7]	Acetaldehyde[7]	Acrolein[7]	Methanol[7]	Toluene[7]	Ethylbenzene[7]	Xylenes[7]	Benzene[7]	n-Hexane[7]	1,3-Butadiene[7]	2,2,4-TMP[7]	HAPs[7]	
0.5	2.75	0.63																g/hp-hr
			5		0.25													gr/100 scf
			0.014	0.010	7.00E-06	5.28E-02	8.36E-03	5.14E-03	2.50E-03	4.08E-04	3.97E-05	1.84E-04	4.40E-04	1.11E-03	2.67E-04	2.50E-04		lb/MMBtu
2.61	14.37	4.12	0.23	0.16	1.10E-04	0.83	0.13	0.081	0.039	0.0064	0.00062	0.0029	0.0069	0.017	0.0042	0.0039	1.12	lb/hr[8]
11.44	62.93	18.05	1.01	0.69	4.82E-04	3.63	0.58	0.35	0.17	0.028	0.0027	0.013	0.030	0.076	0.018	0.017	4.92	tpy[9]

Controlled Emission Calculations

NO_x	CO	VOC	SO_2	PM	H_2S	HCHO	Acetaldehyde	Acrolein	Methanol	Toluene	Ethylbenzene	Xylenes	Benzene	n-Hexane	1,3-Butadiene	2,2,4-TMP	HAPs[10]	
	64%	75%				75%												Control efficiency[11]
0.5	1.0	0.16					1.94E-02	1.19E-02	5.79E-03	9.45E-04	9.20E-05	4.26E-04	1.02E-03	2.57E-03	6.18E-04	5.79E-04		g/hp-hr [16]
2.61	5.22	1.03	0.23	0.16	1.10E-04	0.21	0.10	0.062	0.030	0.0049	0.00048	0.0022	0.0053	0.013	0.0032	0.0030	0.43	lb/hr[12]
11.44	22.89	4.51	1.01	0.69	4.82E-04	0.91	0.44	0.27	0.13	0.022	0.0021	0.0098	0.023	0.059	0.014	0.013	1.90	tpy[9]

Greenhouse Gas Calculations[13]

CO_2	N_2O	CH_4	CO_2e	
441				g/hp-hr
	0.0001	0.001		kg/MMBtu
1	298	25		GWP[14]
2304.21	0.0035	0.035	2306.11	lb/hr[15]
10092.43	0.015	0.15	10100.74	tpy[9]

Footnotes

[1] No derate being requested

[2] For uncontrolled and controlled emissions, emission factors are taken from catalyst data. VOC emissions factors do not include HCHO. HCHO emissions are added to VOC calculated emissions; therefore, VOC emissions represent Total VOC.

[3] Assumes natural gas sulfur content of 5 gr/100 scf

SO_2 EF (lb/MMBtu) =[(5 gr S/100 scf * 1 lb/7000 gr * 64 lb/lbmol SO_2/32 lb/lbmol S) / HHV (Btu/scf)] * 10^6 Btu/MMBtu

Assume 100% conversion of combusted H_2S into SO_2 and 98% Combustion Efficiency. Additional SO_2 emissions from the combustion of H_2S:

SO_2 (lb/hr) from H_2S = 98%*[(0.25 gr H_2S/100 scf * 1 lb/7000 gr * 64 lb/lbmol SO_2/34 lb/lbmol H_2S) / HHV (Btu/scf)] * (Btu/hp-hr * hp)

[4] Emission Factors from AP-42 Table 3.2-2 (4SLB)

[5] PM includes Condensable + Filterable; assume PM_{10} = $PM_{2.5}$

[6] Assumes a conservative natural gas H_2S content of 0.25 gr/100 scf and 98% conversion to SO_2.

H_2S EF (lb/MMBtu) =2%*[(0.25 gr H_2S/100 scf * 1 lb/7000 gr) / HHV (Btu/scf)] * 10^6 Btu/MMbtu

[7] Uncontrolled HAP emissions based on AP-42 Table 3.2-2 (4SLB)

[8] NO_x, CO, and VOC lb/hr Emission Rate = EF * 1 lb/453.592 g * hp

PM & HAP lb/hr Emission Rate = EF * Fuel Consumption (Btu/hp-hr) * hp * 1 MMBtu/10^6 Btu

[9] tpy = lb/hr * hours of operation * 1 ton/2000 lb

[10] Controlled HAP emissions (lb/hr) = Controlled individual HAPs (lb/hr) + Controlled HCHO (lb/hr)

[11] Catalysts are guaranteed by manufacturer to be at least as efficient as claimed.

[12] lb/hr (controlled) = lb/hr (uncontrolled) * (1 - Control Efficiency)

[13] CO_2 emission factor from manufacturer's data. All other greenhouse gas emission factors are from 40 CFR 98 Subpart C

[14] 40 CFR 98 Subpart A, Table A-1

[15] CO_2 lb/hr = EF (g/hp-hr) * 1 lb/453.592 g * Engine hp

N_2O and CH_4 lb/hr = EF (kg/MMBtu) * 2.20462 lb/kg * Fuel consumption (Btu/hp-hr) * Engine hp * 1 MMBtu/10^6 Btu

CO_2e lb/hr = CO_2 lb/hr + (CH_4 lb/hr * GWP) + (N_2O lb/hr * GWP)

[16] Non-HCHO HAP uncontrolled emission are based on AP-42 emission factors for individual HAPS. AP-42 emission factors are converted into catalyst vendor specific emission factors in g/hp-hr by normalizing speciated emission with respect to the non-HCHO VOC factor.

Example calculation for individual HAP component:

Acrolein EF (g/hp-hr) = Acrolein AP-42 EF (lb/mmbtu) * VOC excl. HCHO vendor EF (g/hp-hr) / [VOC AP-42 EF (lb/mmbtu) - HCHO AP-42 EF (lb/mmbtu)]

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Unit(s): C-1200

Description: Waukesha P9390GSI 4SRB Residue Gas Compressor Engine with NSCR

Engine Power[1]:	1980	hp	
Fuel Consumption:	7792	Btu/hp-hr	Mfg. specs
Fuel Type:	NG		Mfg Data
Fuel Heating Value:	1020	Btu/scf	Fuel Gas Analysis
Operating Hours:	8760	hour	Continuous
Hourly Fuel Usage:	15125.65	scf/hr	
Annual Fuel Usage:	132.50	MMscf/yr	

Uncontrolled Emission Calculations

NO_x[2]	CO[2]	VOC[2]	SO_2[3]	PM[4,5]	H_2S[6]	HCHO[2]	Acetaldehyde[7]	Acrolein[7]	Methanol[7]	Toluene[7]	Ethylbenzene[7]	Xylenes[7]	Benzene[7]	1,3-Butadiene[7]	PAH[7]	HAPs[7]	
13.00	9.00	0.30				0.19											g/hp-hr
			5		0.25												gr/100 scf
			0.014	0.019	7.00E-06		2.79E-03	2.63E-03	3.06E-03	5.58E-04	2.48E-05	1.95E-04	1.58E-03	6.63E-04	1.41E-04		lb/MMBtu
56.75	39.29	2.14	0.23	0.30	1.08E-04	0.83	0.043	0.041	0.047	0.0086	0.00038	0.0030	0.024	0.010	0.0022	1.01	lb/hr[8]
248.55	172.07	9.37	0.99	1.31	4.73E-04	3.63	0.19	0.18	0.21	0.038	0.0017	0.013	0.11	0.045	0.0095	4.42	ton/yr[9]

Controlled Emission Calculations

NO_x	CO	VOC	SO_2	PM	H_2S	HCHO	Acetaldehyde	Acrolein	Methanol	Toluene	Ethylbenzene	Xylenes	Benzene	1,3-Butadiene	PAH	HAPs[10]	
85.0%	85.0%	60.0%				80.0%											Control Efficiency[11]
2.0	1.35	0.12				0.038											g/hp-hr
8.51	5.89	0.69	0.23	0.30	1.08E-04	0.17	0.043	0.041	0.047	0.0086	0.00038	0.0030	0.024	0.010	0.0022	0.35	lb/hr[12]
37.28	25.81	3.02	0.99	1.31	4.73E-04	0.73	0.19	0.18	0.21	0.038	0.0017	0.013	0.11	0.045	0.0095	1.51	ton/yr[9]

Greenhouse Gas Calculations[13]

CO_2	N_2O	CH_4	CO_2e	
53.1	0.0001	0.001		kg/MMBtu
1	298	25		GWP[14]
1804.7	0.0034	0.034	1806.6	lb/hr[15]
7904.8	0.015	0.15	7912.9	tpy

Footnotes

[1] No derate being requested

[2] For uncontrolled and controlled emissions, emission factors are taken from catalyst data. VOC emissions factors do not include HCHO. HCHO emissions are added to VOC calculated emissions; therefore, VOC emissions represent Total VOC.

[3] Assumes natural gas sulfur content of 5 gr/100 scf

SO_2 EF (lb/MMBtu) =[(5 gr S/100 scf * 1 lb/7000 gr * 64 lb/lbmol SO_2/32 lb/lbmol S) / HHV (Btu/scf)] * 10^6 Btu/MMBtu

Assume 100% conversion of combusted H_2S into SO_2 and 98% Combustion Efficiency. Additional SO_2 emissions from the combustion of H_2S:

SO_2 (lb/hr) from H_2S = 98%*[(0.25 gr H_2S/100 scf * 1 lb/7000 gr * 64 lb/lbmol SO_2/34 lb/lbmol H_2S) / HHV (Btu/scf)] * (Btu/hp-hr * hp)

[4] Emission Factors from AP-42 Table 3.2-3 (4SRB)

[5] PM includes Condensable + Filterable; assume PM_{10} = $PM_{2.5}$

[6] Assumes a conservative natural gas H_2S content of 0.25 gr/100 scf and 98% conversion to SO_2.

H_2S EF (lb/MMBtu) =2%*[(0.25 gr H_2S/100 scf * 1 lb/7000 gr) / HHV (Btu/scf)] * 10^6 Btu/MMbtu

[7] Uncontrolled HAP emissions based on AP-42 Table 3.2-3 (4SRB)

[8] NO_x, CO, and VOC lb/hr Emission Rate = EF * 1 lb/453.592 g * hp

PM & HAP lb/hr Emission Rate = EF * Fuel Consumption (Btu/hp-hr) * hp * 1 MMBtu/10^6 Btu

[9] tpy = lb/hr * hours of operation * 1 ton/2000 lb

[10] Controlled HAP emissions (lb/hr) = Uncontrolled Total HAPs (lb/hr) - Uncontrolled HCHO (lb/hr) + Controlled HCHO (lb/hr)

[11] Catalysts are guaranteed by manufacturer to be at least as efficient as claimed.

[12] lb/hr (controlled) = lb/hr (uncontrolled) * (1 - Control Efficiency)

[13] Greenhouse gas emission factors are from 40 CFR 98 Subpart C

[14] 40 CFR 98 Subpart A, Table A-1

[15] CO_2, N_2O, and CH_4 lb/hr = EF (kg/MMBtu) * 2.20462 lb/kg * Fuel consumption (Btu/hp-hr) * Engine hp * 1 MMBtu/10^6 Btu

CO_2e lb/hr = CO_2 lb/hr + (CH_4 lb/hr * GWP) + (N_2O lb/hr * GWP)

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Unit(s):	C-2300, C-2400		
Description:	Waukesha VHP-L7044GSI	4SRB	
Engine Power[1]:	1680	hp	
Fuel Consumption:	7919	Btu/hp-hr	Mfg. specs
Fuel Type:	NG		Mfg Data
Fuel Heating Value:	1020	Btu/scf	Fuel Gas Analysis
Operating Hours:	8760	hour	Continuous
Hourly Fuel Usage:	13043.06	scf/hr	
Annual Fuel Usage:	114.26	MMscf/yr	

Uncontrolled Emission Calculations

NO_x[2]	CO[2]	VOC[2]	SO_2[3]	PM[4,5]	H_2S[6]	HCHO[2]	Acetaldehyde[7]	Acrolein[7]	Methanol[7]	Toluene[7]	Ethylbenzene[7]	Xylenes[7]	Benzene[7]	1,3-Butadiene[7]	PAH[7]	HAPs[7]	
13.30	11.50	0.16				0.050											g/hp-hr
			5		0.25												gr/100 scf
			0.014	0.019	7.00E-06		2.79E-03	2.63E-03	3.06E-03	5.58E-04	2.48E-05	1.95E-04	1.58E-03	6.63E-04	1.41E-04		lb/MMBtu
49.26	42.59	0.78	0.19	0.26	9.32E-05	0.19	0.037	0.035	0.041	0.0074	0.00033	0.0026	0.021	0.0088	0.0019	0.34	lb/hr[8]
215.76	186.56	3.41	0.85	1.13	4.08E-04	0.81	0.16	0.15	0.18	0.033	0.0014	0.011	0.092	0.039	0.0082	1.49	ton/yr[9]

Controlled Emission Calculations

NO_x	CO	VOC	SO_2	PM	H_2S	HCHO	Acetaldehyde	Acrolein	Methanol	Toluene	Ethylbenzene	Xylenes	Benzene	1,3-Butadiene	PAH	HAPs[10]	
92.5%	91.3%	71.4%				76.0%											Control Efficiency[11]
1.00	1.00	0.060				0.012											g/hp-hr
3.70	3.70	0.27	0.19	0.26	9.32E-05	0.044	0.037	0.035	0.041	0.0074	0.00033	0.0026	0.021	0.009	0.0019	0.20	lb/hr[12]
16.22	16.22	1.17	0.85	1.13	4.08E-04	0.19	0.16	0.15	0.18	0.033	0.0014	0.011	0.092	0.039	0.0082	0.87	ton/yr[9]

Greenhouse Gas Calculations[13]

CO_2	N_2O	CH_4	CO_2e	
53.1	0.0001	0.001		kg/MMBtu
1	298	25		GWP[14]
1556.3	0.0029	0.029	1557.9	lb/hr[15]
6816.4	0.013	0.13	6823.4	tpy

Footnotes

[1] No derate being requested

[2] For uncontrolled and controlled emissions, emission factors are taken from catalyst data. VOC emissions factors do not include HCHO. HCHO emissions are added to VOC calculated emissions; therefore, VOC emissions represent Total VOC.

[3] Assumes natural gas sulfur content of 5 gr/100 scf

SO_2 EF (lb/MMBtu) =[(5 gr S/100 scf * 1 lb/7000 gr * 64 lb/lbmol SO_2/32 lb/lbmol S) / HHV (Btu/scf)] * 10^6 Btu/MMBtu

Assume 100% conversion of combusted H_2S into SO_2 and 98% Combustion Efficiency. Additional SO_2 emissions from the combustion of H_2S:

SO_2 (lb/hr) from H_2S = 98%*[(0.25 gr H_2S/100 scf * 1 lb/7000 gr * 64 lb/lbmol SO_2/34 lb/lbmol H_2S) / HHV (Btu/scf)] * (Btu/hp-hr * hp)

[4] Emission Factors from AP-42 Table 3.2-3 (4SRB)

[5] PM includes Condensable + Filterable; assume PM_{10} = $PM_{2.5}$

[6] Assumes a conservative natural gas H_2S content of 0.25 gr/100 scf and 98% conversion to SO_2.

H_2S EF (lb/MMBtu) =2%*[(0.25 gr H_2S/100 scf * 1 lb/7000 gr) / HHV (Btu/scf)] * 10^6 Btu/MMbtu

[7] Uncontrolled HAP emissions based on AP-42 Table 3.2-3 (4SRB)

[8] NO_x, CO, and VOC lb/hr Emission Rate = EF * 1 lb/453.592 g * hp

PM & HAP lb/hr Emission Rate = EF * Fuel Consumption (Btu/hp-hr) * hp * 1 MMBtu/10^6 Btu

[9] tpy = lb/hr * hours of operation * 1 ton/2000 lb

[10] Controlled HAP emissions (lb/hr) = Uncontrolled Total HAPs (lb/hr) - Uncontrolled HCHO (lb/hr) + Controlled HCHO (lb/hr)

[11] Catalysts are guaranteed by manufacturer to be at least as efficient as claimed.

[12] lb/hr (controlled) = lb/hr (uncontrolled) * (1 - Control Efficiency)

[13] Greenhouse gas emission factors are from 40 CFR 98 Subpart C

[14] 40 CFR 98 Subpart A, Table A-1

[15] CO_2, N_2O, and CH_4 lb/hr = EF (kg/MMBtu) * 2.20462 lb/kg * Fuel consumption (Btu/hp-hr) * Engine hp * 1 MMBtu/10^6 Btu

CO_2e lb/hr = CO_2 lb/hr + (CH_4 lb/hr * GWP) + (N_2O lb/hr * GWP)

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Unit: C-1110 through C-1180
Description: Eight (8) CAT G3606 4SLB Inlet Gas Compressor Engine with Oxidation Catalyst

Engine Power[1]:	1875	hp	Mfg. Data - 100% Load
Fuel Consumption:	7560	Btu/hp-hr	Mfg. Data - 100% Load
Fuel Type:	NG		Mfg. Data
Fuel Heating Value:	1020	Btu/scf	Fuel Gas Analysis
Operating Hours:	8760	hours	Continuous
Fuel Usage:	13897.06	scf/hr	Calculated
Annual Fuel Usage:	121.74	MMScf/yr	Calculated

Uncontrolled Emission Calculations

NO_x[2]	CO[2]	VOC[2]	SO_2[3]	PM[4,5]	H_2S[6]	HCHO[7]	Acetaldehyde[7]	Acrolein[7]	Methanol[7]	Toluene[7]	Ethylbenzene[7]	Xylenes[7]	Benzene[7]	n-Hexane[7]	1,3-Butadiene[7]	2,2,4-TMP[7]	HAPs[7]	
0.50	2.20	0.29				0.2												g/hp-hr
			5		0.25													gr/100 scf
			0.014	0.010	7.00E-06		8.36E-03	5.14E-03	2.50E-03	4.08E-04	3.97E-05	1.84E-04	4.40E-04	1.11E-03	2.67E-04	2.50E-04		lb/MMBtu
2.07	9.09	2.03	0.21	0.14	9.93E-05	0.83	0.12	0.073	0.035	0.0058	0.00056	0.0026	0.0062	0.016	0.0038	0.0035	1.09	lb/hr[8]
9.05	39.83	8.87	0.91	0.62	4.35E-04	3.62	0.52	0.32	0.16	0.025	0.0025	0.011	0.027	0.069	0.017	0.016	4.78	tpy[9]

Controlled Emission Calculations

NO_x	CO	VOC	SO_2	PM	H_2S	HCHO	Acetaldehyde	Acrolein	Methanol	Toluene	Ethylbenzene	Xylenes	Benzene	n-Hexane	1,3-Butadiene	2,2,4-TMP	HAPs[10]	
	90%	50%				85%												Control efficiency[11]
0.50	0.22	0.15				0.03	1.78E-02	1.10E-02	5.33E-03	8.70E-04	8.47E-05	3.92E-04	9.38E-04	2.37E-03	5.69E-04	5.33E-04		g/hp-hr [16]
2.07	0.91	0.72	0.21	0.14	9.93E-05	0.12	0.074	0.045	0.022	0.0036	0.00035	0.0016	0.0039	0.0098	0.0024	0.0022	0.29	lb/hr[12]
9.05	3.98	3.17	0.91	0.62	4.35E-04	0.54	0.32	0.20	0.097	0.016	0.0015	0.0071	0.017	0.043	0.010	0.0097	1.27	tpy[9]

Greenhouse Gas Calculations[13]

CO_2	N_2O	CH_4	CO_2e	
53.1	0.0001	0.001		kg/MMBtu
1	298	25		GWP[14]
1659.40	0.0031	0.031	1661.11	lb/hr[15]
7268.176	0.014	0.14	7275.68	tpy[9]

Footnotes

[1] No derate being requested

[2] For uncontrolled and controlled emissions, emission factors are taken from catalyst data. VOC emissions factors do not include HCHO. HCHO emissions are added to VOC calculated emissions; therefore, VOC emissions represent Total VOC.

[3] Assumes natural gas sulfur content of 5 gr/100 scf
SO_2 EF (lb/MMBtu) =[(5 gr S/100 scf * 1 lb/7000 gr * 64 lb/lbmol SO_2/32 lb/lbmol S) / HHV (Btu/scf)] * 10^6 Btu/MMBtu
Assume 100% conversion of combusted H_2S into SO_2 and 98% Combustion Efficiency. Additional SO_2 emissions from the combustion of H_2S:
SO_2 (lb/hr) from H_2S = 98%*[(0.25 gr H_2S/100 scf * 1 lb/7000 gr * 64 lb/lbmol SO_2/34 lb/lbmol H_2S) / HHV (Btu/scf)] * (Btu/hp-hr * hp)

[4] Emission Factors from AP-42 Table 3.2-2 (4SLB)

[5] PM includes Condensable + Filterable; assume PM_{10} = $PM_{2.5}$

[6] Assumes a conservative natural gas H_2S content of 0.25 gr/100 scf and 98% conversion to SO_2.
H_2S EF (lb/MMBtu) =2%*[(0.25 gr H_2S/100 scf * 1 lb/7000 gr) / HHV (Btu/scf)] * 10^6 Btu/MMbtu

[7] Uncontrolled HAP emissions based on AP-42 Table 3.2-2 (4SLB)

[8] NO_x, CO, and VOC lb/hr Emission Rate = EF * 1 lb/453.592 g * hp
PM & HAP lb/hr Emission Rate = EF * Fuel Consumption (Btu/hp-hr) * hp * 1 MMBtu/10^6 Btu

[9] tpy = lb/hr * hours of operation * 1 ton/2000 lb

[10] Controlled HAP emissions (lb/hr) = Controlled individual HAPs (lb/hr) + Controlled HCHO (lb/hr)

[11] Catalysts are guaranteed by manufacturer to be at least as efficient as claimed.

[12] lb/hr (controlled) = lb/hr (uncontrolled) * (1 - Control Efficiency)

[13] CO_2 emission factor from manufacturer's data. All other greenhouse gas emission factors are from 40 CFR 98 Subpart C

[14] 40 CFR 98 Subpart A, Table A-1

[15] CO_2, N_2O, and CH_4 lb/hr = EF (kg/MMBtu) * 2.20462 lb/kg * Fuel consumption (Btu/hp-hr) * Engine hp * 1 MMBtu/10^6 Btu
CO_2e lb/hr = CO_2 lb/hr + (CH_4 lb/hr * GWP) + (N_2O lb/hr * GWP)

[16] Non-HCHO HAP uncontrolled emission are based on AP-42 emission factors for individual HAPS. AP-42 emission factors are converted into catalyst vendor specific emission factors in g/hp-hr by normalizing speciated emission with respect to the non-HCHO VOC
Example calculation for individual HAP component:
Acrolein EF (g/hp-hr) = Acrolein AP-42 EF (lb/mmbtu) * VOC excl. HCHO vendor EF (g/hp-hr) / [VOC AP-42 EF (lb/mmbtu) - HCHO AP-42 EF (lb/mmbtu)]

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Unit(s): WL2-FL

Description: WL2 Process Flare

Fuel Data

Flare Pilot	65.0	scf/hr	Design
Flare Pilot	0.066	MMBtu/hr	
Ethylene Glycol Dehydrator Regen	1,840.0	scf/hr	GlyCalc
Ethylene Glycol Dehydrator Flash Tank	87.1	scf/hr	GlyCalc
Total flow from Dehy	1,927.1	scf/hr	
	0.001927	MMscf/hr	
	1020.00	Btu/scf[1]	Residue Gas, HHV
	1.966	MMBtu/hr	
	16.881396	MMscf/yr	

Emission Rates

Pilot Gas + Regen + Flash Tank

NOx	CO	VOC[3]	H_2S[3]	SO_2[4]	HAPs	Units	
0.1380	0.2755					lb/MMBtu[2]	TNRCC RG-109
			0.25	5		gr/100 scf	Assumed for Fuel Gas
		1.82	0.0094		0.039	lb/hr	From EG Dehydrator (Unit D3)
0.0091	0.018	-	2.32E-05	9.29E-04	-	lb/hr	Flare Pilot
0.040	0.080	-	1.02E-04	4.07E-03	-	tpy	
0.27	0.54	0.036	0.00019	0.017	0.0008	lb/hr	Controlled Emission Rate
1.19	2.37	0.16	0.00082	0.076	0.0034	tpy	

	NOx	CO	VOC[3]	H_2S[3]	SO_2[4]	HAPs	Units	
Pilot Gas + Regen + Flash Tank	**0.28**	**0.56**	**0.036**	**0.00021**	**0.018**	**0.00078**	**lb/hr**	Controlled Emission Rate
	1.23	**2.45**	**0.16**	**0.0009**	**0.080**	**0.0034**	**tpy**	

Greenhouse Gas Calculations[6]

CO_2	N_2O	CH_4	CO_2e	
53.1	0.0001	0.001		kg/MMBtu
1	298	25		GWP[7]
229.9	0.0004	0.004	230.2	lb/hr[8]
1007.1	0.002	0.019	1008.2	tpy[5]

[1] Based on pipeline quality gas

[2] To be conservative the TNRCC RG-109 emission factors for high-Btu flares were used.

[3] Assumed 98% combustion for H_2S, HAP, and VOC. Pilot H_2S emissions calculated based on 0.25 gr H_2S/100 scf.

[4] Assumed 100% conversion of combusted H_2S to SO_2. SO_2 (lb/hr)= 98% * (64 lb/lbmol SO_2/34 lb/lbmol H_2S)*Uncontrolled H_2S (lb/hr).
Pilot SO_2 emissions based on assumption of 5 gr S/100 scf.

[5] ton/yr = lb/hr * Hours of operation (hr/yr) * 1ton/2000lb

[6] Greenhouse gas emission factors are from 40 CFR 98 Subpart C

[7] 40 CFR 98 Subpart A, Table A-1

[8] CO_2, N_2O and CH_4 lb/hr = EF (kg/MMBtu) * 2.20462lb/kg * Fuel consumption (MMBtu/hr)
CO_2e lb/hr = CO_2 lb/hr + (CH_4 lb/hr * GWP) + (N_2O lb/hr * GWP)

Crestwood New Mexico Pipeline LLC
Willow Lake Gas Processing Plant

Unit(s): **WL2-FL Blowdown**
Description: **Flare - Compressor Downtime Flaring**

Flare Emissions - Residue Compressor Blowdowns - NO_x and CO [1]

Input Data

Total Number of Events =	52	events/year	
Estimated Event Duration [2] =	1	hr/event	
Event Flowrate =	0.625	MMscf/event	Compressor Downtime Volume
Annual Event Hours =	52	hrs/yr	
Gas Stream Heat Value =	1,278	Btu/scf	Residue Gas Analysis
Maximum Hourly Flowrate [3] =	0.625	MMscf/hr	
Annual Flowrate [4] =	32.500	MMscf/yr	
Hourly Gas Stream Heat Input [5] =	799	MMBtu/hr	
Annual Gas Stream Heat Input [6] =	41,535	MMBtu/yr	

Compound	Flare Emission Factors [7] (lb/MMBtu)	Flare Emissions [8, 9] (lb/hr)	Flare Emissions [8, 9] (tpy)
NO_x	0.138	110.23	2.87
CO	0.2755	220.06	5.72

[1] Emergency blowdown of residue gas header is routed to flare.

[2] For events lasting less than 1 hour, it is assumed that no more than 1 event occurs per hour.

[3] Maximum hourly flowrate is not steady-state, but represents the maximum hourly flowrate at the time that a blowdown is routed to the flare.

Hourly Flowrate (MMscf/hr) = Event Flowrate (MMscf/event) / Event Duration (hrs/event)

$$\text{Hourly Flowrate (MMscf/hr)} = \frac{0.625\ \text{MMscf}}{\text{event}} \Big| \frac{\text{event}}{1\ \text{hr}} = \frac{0.625\ \text{MMscf}}{\text{hr}}$$

[4] Annual Flowrate (MMscf/yr) = Event Flowrate (MMscf/event) x Total Number of Event (events/yr)

$$\text{Annual Flowrate (MMscf/yr)} = \frac{0.625\ \text{MMscf}}{\text{event}} \Big| \frac{52\ \text{events}}{\text{yr}} = \frac{32.5\ \text{MMscf}}{\text{yr}}$$

[5] Hourly Gas Stream Heat Input (MMBtu/hr) = Hourly Flowrate (MMscf/hr) x Gas Stream Heat Value (Btu/scf)

$$\text{Hourly Gas Stream Heat Input (MMBtu/hr)} = \frac{0.625\ \text{MMscf}}{\text{hr}} \Big| \frac{1{,}278\ \text{Btu}}{\text{scf}} = \frac{799\ \text{MMBtu}}{\text{hr}}$$

[6] Annual Gas Stream Heat Input (MMBtu/yr) = Annual Flowrate (MMscf/yr) x Gas Stream Heat Value (Btu/scf)

$$\text{Annual Gas Stream Heat Input (MMBtu/yr)} = \frac{32.5\ \text{MMscf}}{\text{yr}} \Big| \frac{1{,}278\ \text{Btu}}{\text{scf}} = \frac{41{,}535\ \text{MMBtu}}{\text{yr}}$$

[7] From TCEQ "Air Permit Guidance For Chemical Sources, Flare And Vapor Oxidizers" (Draft Oct. 2000) Table 4, emission factors for industrial flares combusting high-Btu vapors.

[8] Maximum Potential Hourly Emission Rate (lb/hr) = Flare Emission Factor (lb/MMBtu) x Hourly Gas Stream Heat Input (MMBtu/hr)

$$\text{Example } NO_x \text{ Hourly Emission Rate (lb/hr)} = \frac{0.138\ \text{lb}}{\text{MMBtu}} \Big| \frac{799\ \text{MMBtu}}{\text{hr}} = \frac{110.23\ \text{lb}}{\text{hr}}$$

[9] Maximum Potential Annual Emission Rate (tpy) = Flare Emission Factor (lb/MMBtu) x Annual Gas Stream Heat Input (MMBtu/yr) x (1 ton / 2,000 lb)

$$\text{Example } NO_x \text{ Annual Emission Rate (tpy)} = \frac{0.138\ \text{lb}}{\text{MMBtu}} \Big| \frac{41{,}535\ \text{MMBtu}}{\text{yr}} \Big| \frac{1\ \text{ton}}{2{,}000\ \text{lb}} = \frac{2.87\ \text{ton}}{\text{yr}}$$

Crestwood New Mexico Pipeline LLC
Willow Lake Gas Processing Plant

Unit(s): **WL2-FL Blowdown**
Description: **Flare - Compressor Downtime Flaring**

Flare Emissions - Residue Compressor Emergency Blowdowns - VOC, SO_2, and H_2S

Input Data

Total Number of Events =	52	events/year
Estimated Event Duration [2] =	1	hr/event
Event Flowrate =	0.625	MMscf/event
Annual Event Hours =	52	hrs/yr
Gas Stream Heat Value =	1,278	Btu/scf
Hourly Flowrate [3] =	0.625	MMscf/hr
Annual Flowrate [4] =	32.50	MMscf/yr
Hourly Gas Stream Heat Input [5] =	799	MMBtu/hr
Annual Gas Stream Heat Input [6] =	41,535	MMBtu/yr

Compound	Composition [5] (Mole %)	MW (lb/lb-mole)	DRE [6] (%)	Gas Vented to Flare [7, 8] (lb/hr)	Gas Vented to Flare [7, 8] (tpy)	Controlled Emissions [9,10] (lb/hr)	Controlled Emissions [9,10] (tpy)
Propane	5.118	44	98%	3,708.70	96.43	74.17	1.93
i-Butane	0.731	58	98%	698.25	18.15	13.97	0.36
n-Butane	1.623	58	98%	1,550.30	40.31	31.01	0.81
i-Pentane	0.383	72	98%	454.15	11.81	9.08	0.24
n-Pentane	0.398	72	98%	471.94	12.27	9.44	0.25
Hexanes Plus	0.767	86	98%	1,086.33	28.24	21.73	0.56
H_2S	0.0004	34	98%	0.22	5.84E-03	4.49E-03	0.00012
VOC [11]	9.02			7969.66	207.21	159.39	4.14
SO_2		64				0.41	0.011

[1] Emergency blowdown of residue gas header is routed to flare.

[2] For events lasting less than 1 hour, it is assumed that no more than 1 event occurs per hour.

[3] Hourly Flowrate (MMscf/hr) = Event Flowrate (MMscf/event) / Event Duration (hrs/event)

$$\text{Hourly Flowrate (MMscf/hr)} = \frac{0.625 \text{ MMscf}}{\text{event}} \Big| \frac{\text{event}}{1 \text{ hr}} = \frac{0.625 \text{ MMscf}}{\text{hr}}$$

[4] Annual Flowrate (MMscf/yr) = Event Flowrate (MMscf/event) x Total Number of Event (events/yr)

$$\text{Annual Flowrate (MMscf/yr)} = \frac{0.625 \text{ MMscf}}{\text{event}} \Big| \frac{52 \text{ events}}{\text{yr}} = \frac{32.5 \text{ MMscf}}{\text{yr}}$$

[5] Composition of the gas stream is obtained from the Dehy Upstream Gas Analysis (05/28/2020). H_2S is conservatively assumed to be 4 ppm.

[6] Per TCEQ "Air Permit Guidance For Chemical Sources, Flare And Vapor Oxidizers" (Draft Oct. 2000), 98% of the H_2S is assumed to be oxidized to SO_2 while the remaining 2% is emitted as H_2S.

[7] Gas Vented to Flare (lb/hr) = Hourly Flowrate (MMscf/hr) x Mole Percent (%) / 100 x MW (lb/lb-mole) / 379.5 (scf/lb-mole) x (10^6 scf/1 MMscf)

$$\text{Example Propane Hourly Vented Rate (lb/hr)} = \frac{0.625 \text{ MMscf}}{\text{hr}} \Big| \frac{5.12 \%}{100} \Big| \frac{44 \text{ lb}}{\text{lb-mole}} \Big| \frac{\text{lb-mole}}{379.5 \text{ scf}} \Big| \frac{10^6 \text{ scf}}{1 \text{ MMscf}} = \frac{3{,}708.70 \text{ lb}}{\text{hr}}$$

[8] Gas Vented to Flare (tpy) = Annual Flowrate (MMscf/yr) x Mole Percent (%) / 100 x MW (lb/lb-mole) / 379.5 (scf/lb-mole) x (10^6 scf/1MMscf) x (1ton/ 2,000 lb)

$$\text{Example Propane Annual Vented Rate (tpy)} = \frac{32.5 \text{ MMscf}}{\text{yr}} \Big| \frac{5.12 \%}{100} \Big| \frac{44 \text{ lb}}{\text{lb-mole}} \Big| \frac{\text{lb-mole}}{379.5 \text{ scf}} \Big| \frac{10^6 \text{ scf}}{1 \text{ MMscf}} \Big| \frac{1 \text{ ton}}{2{,}000 \text{ lb}} = \frac{96.43 \text{ ton}}{\text{yr}}$$

[9] Controlled Maximum Potential Hourly Emission Rate (lb/hr) = Gas Vented to Flare (lb/hr) x (1 - DRE)
Controlled Maximum Potential Annual Emission Rate (tpy) = Gas Vented to Flare (tpy) x (1 - DRE)

$$\text{Example Controlled Propane Hourly Emission Rate (lb/hr)} = \frac{3{,}708.70 \text{ lb}}{\text{hr}} \Big| (1 - 0.98) = \frac{74.17 \text{ lb}}{\text{hr}}$$

[10] Controlled flare SO_2 Emission Rate (lb/hr) = [H_2S Inlet (lb/hr) - H_2S Outlet (lb/hr)] x SO_2 MW (lb/lb-mol) / H_2S MW (lb/lb-mol)

$$\text{Controlled } SO_2 \text{ Hourly Emission Rate (lb/hr)} = \frac{[0.22 - 0.00] \text{ lb}}{\text{hr}} \Big| \frac{64.06 \text{ lb/lb-mol}}{34.08 \text{ lb/lb-mol}} = \frac{0.41 \text{ lb}}{\text{hr}}$$

[11] Total VOC taken as the sum of NMNEHC.

Crestwood New Mexico Pipeline LLC
Willow Lake Gas Processing Plant

Unit(s): **WL2-FL Blowdown**
Description: **Flare - Compressor Downtime Flaring**

Flare Emissions - Residue Compressor Emergency Blowdowns - Greenhouse Gas Calculations

CO_2	N_2O	CH_4	CO_2e	
53.1	0.0001	0.001	-	kg/MMBtu [1]
1	298	25	-	GWP [2]
2,431	0.005	0.05	2,434	tpy [3]

[1] Greenhouse gas emission factors are from 40 CFR 98 Subpart C.

[2] 40 CFR 98 Subpart A, Table A-1.

[3] GHG Emissions (tpy) = Emission Factor (kg/MMBtu) x Fuel Consumption (MMBtu/yr) x 2.20426 (lb/kg) / 2,000 (lb/ton)
CO_2e (tpy) = CO_2 tpy + (CH_4 tpy x CH_4 GWP) + (N_2O tpy x N_2O GWP)

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Unit(s): WL1-FL

Description: WL1 Process Flare

Fuel and Gas Stream Data

Flare Pilot + Purge	213.0	scf/hr	Design
Flare Pilot + Purge	1020	Btu/scf	Fuel Gas
Flare Pilot + Purge	0.217	MMBtu/hr	Calculated
Condensate Tank Flash (Max)	0.491	MMSCFD	ProMax
Condensate Tank Flash	20,466.5	scf/hr	Calculated
Condensate Tank Flash	9.0	MMscf/yr	Calculated (Annual based on 5% VRU downtime)
Condensate Tank Flash	2,785.6	Btu/scf	ProMax
Truck Loading (Max)	*0.0120*	MMSCFD	ProMax
Truck Loading (Max)	500.8	scf/hr	Calculated
Truck Loading (Annual)	0.0040	MMSCFD	ProMax
Truck Loading (Annual)	1.5	MMscf/yr	Calculated
Truck Loading	*2833.30*	btu/scf	ProMax
DEHY-803 Flash Tank	3,090.0	scf/hr	GLYCalc
DEHY-804 Flash Tank	297.0	scf/hr	GLYCalc
DEHY-805 Flash Tank	6,640.0	scf/hr	GLYCalc
DEHY-1505 Flash Tank	6,610.0	scf/hr	GLYCalc
*Total Dehy Flash Tank **	16,637.0	scf/hr	Calculated
*Total Dehy Flash Tank **	5.1	MMscf/yr	Calculated
Dehy Flash Tank	1215.02	btu/scf	GLYCalc/Calculated

** Total hourly dehy flash tank flowrate assumes all dehydration unit flash tank emissions are routed to flare. Total annual dehy flash tank flowrate is calculated based on 5% annual VRU downtime. During VRU downtime, flash tank flow from DEHY-803, DEHY-804, and DEHY-805 are assumed to route flash tank gases to reboiler fuel line for approximately half of the VRU downtime, and to flare for half of the VRU downtime: therefore. an additional 50% reduction in flash tank aases to flare is accounted for.*

Total Flare Flowrate (Max Hourly)	37,316.5	scf/hr	Calculated
Total Flare Flowrate (Max Hourly)	0.037	MMscf/hr	Calculated
Total Flare Flowrate (Annual)	15.92	MMscf/yr	
Total Flare Heat Content (Max)	2785.57	Btu/scf[1]	
Total Flare Heat Flow (Max)	103.948	MMBtu/hr	

Emission Rates

Pilot Gas + Tanks Vapors

NOx	CO	VOC[3]	H_2S[3]	SO_2[4]	HAPs	Units	
0.138	0.2755					lb/MMBtu[2]	TNRCC RG-109
			0.25	5		gr/100 scf	Assumed for Fuel Gas
		2115.07	0.0679		90.30	lb/hr	Uncontrolled Tank Vapors
		2080.57	0.054		81.93	tpy	Uncontrolled Tank Vapors
		54.96	0.001886		2.29		Uncontrolled Truck Loading (WL1+WLCS)
		82.42	0.00234		3.41		Uncontrolled Truck Loading (WL1+WLCS)
		281.07	0.032		14.38	lb/hr	Uncontrolled Dehy Flash Tank Vapors
		42.77	0.0048		2.16	tpy	Uncontrolled Dehy Flash Tank Vapors [9]
0.0300	0.060	-	7.61E-05	3.04E-03	-	lb/hr	Pilot Emissions
0.131	0.262	-	3.33E-04	1.33E-02	-	tpy	
7.87	15.71	42.30	1.36E-03	0.1253	1.81	lb/hr	Post-Control Tank Emissions
1.72	3.44	2.08	5.44E-05	0.0050	0.082	tpy[5]	
0.20	0.39	1.10	3.77E-05	3.48E-03	0.046	lb/hr	Post-Control Truck Loading
0.28	0.57	1.65	4.69E-05	4.33E-03	0.0034	tpy[5]	Emissions (WL1+WLCS)
2.79	5.57	5.62	0.00064	0.059	0.29	lb/hr	Post-Control Flash Tank
0.43	0.85	0.86	9.55E-05	8.81E-03	0.043	tpy[9]	Emissions

	NOx	CO	VOC[3]	H_2S[3]	SO_2[4]	HAPs	Units	
Pilot Gas + Tank Vapors + Loading	**10.88**	**21.73**	**49.02**	**2.11E-03**	**0.191**	**2.14**	**lb/hr**	Controlled Emission Rate
+ Dehy Flash Gas	**2.57**	**5.12**	**4.58**	**5.30E-04**	**0.031**	**0.13**	**tpy**	

Greenhouse Gas Calculations[6]

CO_2	N_2O	CH_4	CO_2e	
53.1	0.0001	0.001		kg/MMBtu
1	298	25		GWP[7]
12159.5	0.0229	0.229	12172.0	lb/hr[8]
2662.9	0.0050	0.050	2665.7	tpy[5]

[1] Based on maximum heating value from ProMax simulation for WL1 or WLCS.

[2] To be conservative the TNRCC RG-109 emission factors for high-Btu flares were used.

[3] Assumed 98% combustion for H_2S, HAP and VOC. 98% DRE

[4] Assumed 100% conversion H_2S to SO_2. SO_2=(64/34)*uncontrolled H_2S.

[5] ton/yr emissions based on assumed 5% annual VRU downtime. MMScf/yr * 5% = Annual Flowrate

[6] Greenhouse gas emission factors are from 40 CFR 98 Subpart C

[7] 40 CFR 98 Subpart A, Table A-1

[8] CO_2, N_2O and CH_4 lb/hr = EF (kg/MMBtu) * 2.20462lb/kg * Fuel consumption (MMBtu/hr)
CO_2e lb/hr = CO_2 lb/hr + (CH_4 lb/hr * GWP) + (N_2O lb/hr * GWP)

[9] Uncontrolled Annual Dehy Flash Tank Vapors routed to flare are based on 5% of the annual uncontrolled emissions rates. Emissions from DEHY-803, DEHY-804, and DEHY-805 are further reduced by routing flash tank emissions to reboiler fuel line at least 50% of the time.

Crestwood New Mexico Pipeline LLC
Willow Lake Gas Processing Plant

Unit(s): **WL1-FL**
Description: **Flare - Compressor Blowdowns**

Flare Emissions - Residue Compressor Blowdowns - NO_x and CO [1]

Input Data

Total Number of Events =	416	blowdowns/year
Total Number of Compressors =	8	compressors
Blowdown Volume per Compressor=	6,500	scf/blowdown
Estimated Event Duration [2]=	1	hr/event
Maximum Flowrate =	0.052	MMscf/event
Annual Event Hours =	416	hrs/yr
Gas Stream Heat Value =	1,278	Btu/scf
Maximum Hourly Flowrate [3] =	0.052	MMscf/hr
Annual Flowrate [4] =	2.704	MMscf/yr
Hourly Gas Stream Heat Input [5] =	66	MMBtu/hr
Annual Gas Stream Heat Input [6] =	3,456	MMBtu/yr

Compound	Flare Emission Factors [7] (lb/MMBtu)	Flare Emissions [8, 9] (lb/hr)	(tpy)
NO_x	0.138	9.17	0.24
CO	0.2755	18.31	0.48

[1] Blowdown of compressors is routed to WL1- FL. Maximum of five blowdowns per event @ 6,500 scf/blowdown

[2] For events lasting less than 1 hour, it is assumed that no more than 1 event occurs per hour.

[3] Maximum hourly flowrate is not steady-state, but represents the maximum hourly flowrate at the time that a blowdown is routed to the flare.

Hourly Flowrate (MMscf/hr) = Event Flowrate (MMscf/event) / Event Duration (hrs/event)

$$\text{Hourly Flowrate (MMscf/hr)} = \frac{0.052 \text{ MMscf}}{\text{event}} \Big| \frac{\text{event}}{1 \text{ hr}} = \frac{0.052 \text{ MMscf}}{\text{hr}}$$

[4] Annual Flowrate (MMscf/yr) = Event Flowrate (MMscf/event) x Total Number of Event (events/yr)

$$\text{Annual Flowrate (MMscf/yr)} = \frac{0.052 \text{ MMscf}}{\text{event}} \Big| \frac{416 \text{ events}}{\text{yr}} = \frac{2.7 \text{ MMscf}}{\text{yr}}$$

[5] Hourly Gas Stream Heat Input (MMBtu/hr) = Hourly Flowrate (MMscf/hr) x Gas Stream Heat Value (Btu/scf)

$$\text{Hourly Gas Stream Heat Input (MMBtu/hr)} = \frac{0.052 \text{ MMscf}}{\text{hr}} \Big| \frac{1{,}278 \text{ Btu}}{\text{scf}} = \frac{66 \text{ MMBtu}}{\text{hr}}$$

[6] Annual Gas Stream Heat Input (MMBtu/yr) = Annual Flowrate (MMscf/yr) x Gas Stream Heat Value (Btu/scf)

$$\text{Annual Gas Stream Heat Input (MMBtu/yr)} = \frac{2.7 \text{ MMscf}}{\text{yr}} \Big| \frac{1{,}278 \text{ Btu}}{\text{scf}} = \frac{3{,}456 \text{ MMBtu}}{\text{yr}}$$

[7] From TCEQ "Air Permit Guidance For Chemical Sources, Flare And Vapor Oxidizers" (Draft Oct. 2000) Table 4, emission factors for industrial flares combusting high-Btu vapors.

[8] Maximum Potential Hourly Emission Rate (lb/hr) = Flare Emission Factor (lb/MMBtu) x Hourly Gas Stream Heat Input (MMBtu/hr)

$$\text{Example } NO_x \text{ Hourly Emission Rate (lb/hr)} = \frac{0.138 \text{ lb}}{\text{MMBtu}} \Big| \frac{66 \text{ MMBtu}}{\text{hr}} = \frac{9.17 \text{ lb}}{\text{hr}}$$

[9] Maximum Potential Annual Emission Rate (tpy) = Flare Emission Factor (lb/MMBtu) x Annual Gas Stream Heat Input (MMBtu/yr) x (1 ton / 2,000 lb)

$$\text{Example } NO_x \text{ Annual Emission Rate (tpy)} = \frac{0.138 \text{ lb}}{\text{MMBtu}} \Big| \frac{3{,}456 \text{ MMBtu}}{\text{yr}} \Big| \frac{1 \text{ ton}}{2{,}000 \text{ lb}} = \frac{0.24 \text{ ton}}{\text{yr}}$$

Flare Emissions - Residue Compressor Emergency Blowdowns - VOC, SO_2, and H_2S

Input Data

Total Number of Events =	416	blowdowns/year
Estimated Event Duration [2]=	1	hr/event
Maximum Flowrate =	0.052	MMscf/event
Annual Event Hours =	416	hrs/yr
Gas Stream Heat Value =	1,278	Btu/scf
Hourly Flowrate [3] =	0.052	MMscf/hr
Annual Flowrate [4] =	2.70	MMscf/yr
Hourly Gas Stream Heat Input [5] =	66	MMBtu/hr
Annual Gas Stream Heat Input [6] =	3,456	MMBtu/yr

Compound	Composition [5] (Mole %)	MW (lb/lb-mole)	DRE [6] (%)	Gas Vented to Flare [7, 8] (lb/hr)	Gas Vented to Flare [7, 8] (tpy)	Controlled Emissions [9,10] (lb/hr)	Controlled Emissions [9,10] (tpy)
Propane	5.118	44	98%	308.56	8.02	6.17	0.16
i-Butane	0.731	58	98%	58.09	1.51	1.16	0.03
n-Butane	1.623	58	98%	128.98	3.35	2.58	0.07
i-Pentane	0.383	72	98%	37.79	0.98	0.76	0.020
n-Pentane	0.398	72	98%	39.27	1.02	0.79	0.020
Hexanes Plus	0.767	86	98%	90.38	2.35	1.81	0.047
H_2S	0.0004	34	98%	1.87E-02	4.86E-04	3.74E-04	9.71E-06
VOC [11]	9.02			663.08	17.24	13.26	0.34
SO_2		64				0.034	8.95E-04

[1] Blowdown of compressor station engines are routed to flare.

[2] For events lasting less than 1 hour, it is assumed that no more than 1 event occurs per hour.

[3] Hourly Flowrate (MMscf/hr) = Event Flowrate (MMscf/event) / Event Duration (hrs/event)

$$\text{Hourly Flowrate (MMscf/hr)} = \frac{0.052 \text{ MMscf}}{\text{event}} \Big| \frac{\text{event}}{1 \text{ hr}} = \frac{0.052 \text{ MMscf}}{\text{hr}}$$

[4] Annual Flowrate (MMscf/yr) = Event Flowrate (MMscf/event) x Total Number of Event (events/yr)

$$\text{Annual Flowrate (MMscf/yr)} = \frac{0.052 \text{ MMscf}}{\text{event}} \Big| \frac{416 \text{ events}}{\text{yr}} = \frac{2.7 \text{ MMscf}}{\text{yr}}$$

[5] Composition of the gas stream is obtained from the Dehy Upstream Gas Analysis (05/28/2020). H_2S is conservatively assumed to be 4 ppm.

[6] Per TCEQ "Air Permit Guidance For Chemical Sources, Flare And Vapor Oxidizers" (Draft Oct. 2000), 98% of the H_2S is assumed to be oxidized to SO_2 while the remaining 2% is emitted as H_2S.

[7] Gas Vented to Flare (lb/hr) = Hourly Flowrate (MMscf/hr) x Mole Percent (%) / 100 x MW (lb/lb-mole) / 379.5 (scf/lb-mole) x (10^6 scf/1 MMscf)

$$\text{Example Propane Hourly Vented Rate (lb/hr)} = \frac{0.052 \text{ MMscf}}{\text{hr}} \Big| \frac{5.12 \%}{100} \Big| \frac{44 \text{ lb}}{\text{lb-mole}} \Big| \frac{\text{lb-mole}}{379.5 \text{ scf}} \Big| \frac{10^6 \text{ scf}}{1 \text{ MMscf}} = \frac{0{,}308.56 \text{ lb}}{\text{hr}}$$

[8] Gas Vented to Flare (tpy) = Annual Flowrate (MMscf/yr) x Mole Percent (%) / 100 x MW (lb/lb-mole) / 379.5 (scf/lb-mole) x (10^6 scf/1MMscf) x (1ton/ 2,000 lb)

$$\text{Example Propane Annual Vented Rate (tpy)} = \frac{2.7 \text{ MMscf}}{\text{yr}} \Big| \frac{5.12 \%}{100} \Big| \frac{44 \text{ lb}}{\text{lb-mole}} \Big| \frac{\text{lb-mole}}{379.5 \text{ scf}} \Big| \frac{10^6 \text{ scf}}{1 \text{ MMscf}} \Big| \frac{1 \text{ ton}}{2{,}000 \text{ lb}} = \frac{8.02 \text{ ton}}{\text{yr}}$$

[9] Controlled Maximum Potential Hourly Emission Rate (lb/hr) = Gas Vented to Flare (lb/hr) x (1 - DRE)

Controlled Maximum Potential Annual Emission Rate (tpy) = Gas Vented to Flare (tpy) x (1 - DRE)

$$\text{Example Controlled Propane Hourly Emission Rate (lb/hr)} = \frac{0{,}308.56 \text{ lb}}{\text{hr}} \Big| (1 - 0.98) = \frac{6.17 \text{ lb}}{\text{hr}}$$

[10] Controlled flare SO_2 Emission Rate (lb/hr) = [H_2S Inlet (lb/hr) - H_2S Outlet (lb/hr)] x SO_2 MW (lb/lb-mol) / H_2S MW (lb/lb-mol)

$$\text{Controlled } SO_2 \text{ Hourly Emission Rate (lb/hr)} = \frac{[0.02 - 0.00] \text{ lb}}{\text{hr}} \Big| \frac{64.06 \text{ lb/lb-mol}}{34.08 \text{ lb/lb-mol}} = \frac{0.03 \text{ lb}}{\text{hr}}$$

[11] Total VOC taken as the sum of NMNEHC.

Flare Emissions - Residue Compressor Emergency Blowdowns - Greenhouse Gas Calculations

CO_2	N_2O	CH_4	CO_2e	
53.1	0.0001	0.001	-	kg/MMBtu [1]
1	298	25	-	GWP [2]
202	0.000	0.00	202	tpy [3]

[1] Greenhouse gas emission factors are from 40 CFR 98 Subpart C.

[2] 40 CFR 98 Subpart A, Table A-1.

[3] GHG Emissions (tpy) = Emission Factor (kg/MMBtu) x Fuel Consumption (MMBtu/yr) x 2.20426 (lb/kg) / 2,000 (lb/ton)
CO_2e (tpy) = CO_2 tpy + (CH_4 tpy x CH_4 GWP) + (N_2O tpy x N_2O GWP)

Crestwood New Mexico Pipeline LLC

Willow Lake

Emission Unit: DEHY-803
Source Description: Glycol Dehydrator

Annual Operating Hours: 8760 hr
Dry Gas Flow Rate: 25 MMscf/day

Criteria Pollutant Emissions

Compound	DRE (%)	Uncontrolled Flash Tank Emissions[1]		Uncontrolled Regenerator Emissions[2]		Total Uncontrolled Emissions[3]		Controlled Regenerator Emissions[4]		Total Controlled Emissions[5]	
		lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
Carbon Dioxide[5]	0%	1.2900	5.6502	0.1090	0.4774	1.3990	6.1276	0.1070	0.4687	1.6764	7.3426
Hydrogen Sulfide	98%	0.0062	0.0272	0.0034	0.0149	0.0096	0.0420	0.0032	0.0140	0.0002	0.0010
Methane	98%	97.3095	426.2156	0.6597	2.8895	97.9692	429.1051	0.6569	2.8772	2.3512	10.2982
Ethane	98%	30.7329	134.6101	0.7663	3.3564	31.4992	137.9665	0.7490	3.2806	0.7556	3.3094
Propane	98%	22.1606	97.0634	1.1983	5.2486	23.3589	102.3120	1.0738	4.7032	0.5576	2.4424
Isobutane	98%	4.4301	19.4038	0.3713	1.6263	4.8014	21.0301	0.3021	1.3232	0.1136	0.4974
n-Butane	98%	10.6813	46.7841	1.1845	5.1881	11.8658	51.9722	0.9037	3.9582	0.2780	1.2178
Isopentane	98%	2.9814	13.0585	0.3866	1.6933	3.3680	14.7518	0.2046	0.8961	0.0765	0.3349
n-Pentane	98%	3.3602	14.7177	0.5454	2.3889	3.9056	17.1065	0.2752	1.2054	0.0872	0.3822
n-Hexane	98%	1.9850	8.6943	0.6025	2.6390	2.5875	11.3333	0.1865	0.8169	0.0521	0.2283
Other Hexanes	98%	2.2096	9.6780	0.5015	2.1966	2.7111	11.8746	0.1843	0.8072	0.0575	0.2516
Heptanes	98%	3.3209	14.5455	2.1406	9.3758	5.4615	23.9214	0.3014	1.3201	0.0869	0.3808
Benzene	98%	0.0151	0.0661	0.1349	0.5909	0.1500	0.6570	0.0280	0.1226	0.0010	0.0045
Toluene	98%	0.5918	2.5921	8.4893	37.1831	9.0811	39.7752	0.6903	3.0235	0.0308	0.1348
Ethylbenzene	98%	0.0461	0.2019	1.1841	5.1864	1.2302	5.3883	0.0317	0.1388	0.0019	0.0082
Xylenes	98%	0.1272	0.5571	4.7399	20.7608	4.8671	21.3179	0.1186	0.5195	0.0059	0.0258
C8+ Heavies	98%	0.9895	4.3340	7.7595	33.9866	8.7490	38.3206	0.0038	0.0166	0.0238	0.1044
VOC	98%	52.90	231.70	29.24	128.06	82.14	359.76	4.30	18.85	1.37	6.01
HAP	98%	2.77	12.11	15.15	66.360	17.92	78.47	1.06	4.62	0.092	0.40

Greenhouse Gas Emissions

CO_2	CH_4	CO_2e	
7.34	10.30		tons/yr[6]
1	25		GWP[7]
7.34	257.46	264.80	tons/yr CO_2e[8]

[1] From "Flash Tank Off Gas" stream in GLYCalc Report.

[2] From "Uncontrolled Regenerator Emissions" stream in GLYCalc Report.

[3] Summation of the Uncontrolled Flash Tank and Regenerator Emissions.

[4] From "Controlled Regenerator Emissions" stream in GLYCalc Report. The control provided in the GLYCalc report is by a condenser.

[5] Controlled maximum potential hourly emission rate = (Uncontrolled Flash Tank Emissions + Condenser Controlled Regenerator Emissions) * (1-DRE). A Safety Factor has been added. 20%

Flash tank emissions are routed into the reboiler fuel line for reboiler firing and continuous pilot fuel, vapors may be routed to the VRU in the event of low fuel demand.

Flash tank emissions are routed to the flare in the event the VRU is not in service with an assumed 98% DRE.

The post-condenser regenerator emissions are routed to the firebox when the reboiler is firing and glow plug when the reboiler is not firing (assumed 98% DRE).

[6] Carbon Dioxide emissions from "Condenser Vent Gas Stream" and "Flash Tank Off Gas Stream" in the GLYCalc report. A DRE of 0% is assumed for CO_2.

[7] 40 CFR 98 Subpart A, Table A-1

[8] CO_2e tons/yr = tons/yr * GWP

Crestwood New Mexico Pipeline LLC

Willow Lake

Emission Unit: DEHY-804
Source Description: Glycol Dehydrator

Annual Operating Hours: 8760 hr
Dry Gas Flow Rate: 3.5 MMscf/day

Criteria Pollutant Emissions

Compound	DRE (%)	Uncontrolled Flash Tank Emissions[1]		Uncontrolled Regenerator Emissions[2]		Total Uncontrolled Emissions[3]		Controlled Regenerator Emissions[4]		Total Controlled Emissions[5]	
		lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
Carbon Dioxide[5]	0%	0.1240	0.5431	0.0103	0.0451	0.1343	0.5882	0.0101	0.0442	0.1609	0.7048
Hydrogen Sulfide	98%	0.0006	0.0026	0.0003	0.0013	0.0009	0.0039	0.0003	0.0013	0.0000	0.0001
Methane	98%	9.3595	40.9946	0.0622	0.2724	9.4217	41.2670	0.0619	0.2711	0.2261	0.9904
Ethane	98%	2.9459	12.9030	0.0709	0.3105	3.0168	13.2136	0.0692	0.3031	0.0724	0.3169
Propane	98%	2.1282	9.3215	0.1139	0.4989	2.2421	9.8204	0.1017	0.4454	0.0535	0.2344
Isobutane	98%	0.4250	1.8615	0.0351	0.1537	0.4601	2.0152	0.0284	0.1244	0.0109	0.0477
n-Butane	98%	1.0243	4.4864	0.1118	0.4897	1.1361	4.9761	0.0847	0.3710	0.0266	0.1166
Isopentane	98%	0.2859	1.2522	0.0363	0.1590	0.3222	1.4112	0.0190	0.0832	0.0073	0.0321
n-Pentane	98%	0.3221	1.4108	0.0512	0.2243	0.3733	1.6351	0.0254	0.1113	0.0083	0.0365
n-Hexane	98%	0.1903	0.8335	0.0562	0.2462	0.2465	1.0797	0.0170	0.0745	0.0050	0.0218
Other Hexanes	98%	0.2118	0.9277	0.0468	0.2050	0.2586	1.1327	0.0169	0.0740	0.0055	0.0240
Heptanes	98%	0.3192	1.3981	0.1983	0.8686	0.5175	2.2667	0.0271	0.1187	0.0083	0.0364
Benzene	98%	0.0015	0.0066	0.0132	0.0578	0.0147	0.0644	0.0026	0.0114	0.0001	0.0004
Toluene	98%	0.0599	0.2624	0.8363	3.6630	0.8962	3.9254	0.0654	0.2865	0.0030	0.0132
Ethylbenzene	98%	0.0047	0.0206	0.1176	0.5151	0.1223	0.5357	0.0030	0.0131	0.0002	0.0008
Xylenes	98%	0.0133	0.0583	0.4827	2.1142	0.4960	2.1725	0.0116	0.0508	0.0006	0.0026
C8+ Heavies	98%	0.0978	0.4284	0.7238	3.1702	0.8216	3.5986	0.0003	0.0013	0.0024	0.0103
VOC	98%	5.08	22.27	2.82	12.37	7.91	34.63	0.40	1.77	0.13	0.58
HAP	98%	0.27	1.18	1.51	6.60	1.78	7.78	0.10	0.44	0.0089	0.039

Greenhouse Gas Emissions

CO_2	CH_4	CO_2e	
0.70	0.99		tons/yr[5]
1	25		GWP[6]
0.705	24.7594	25.464	tons/yr CO_2e[7]

[1] From "Flash Tank Off Gas" stream in GLYCalc Report.

[2] From "Uncontrolled Regenerator Emissions" stream in GLYCalc Report.

[3] Summation of the Uncontrolled Flash Tank and Regenerator Emissions.

[4] From "Controlled Regenerator Emissions" stream in GLYCalc Report. The control provided in the GLYCalc report is by a condenser.

[5] Controlled maximum potential hourly emission rate = (Uncontrolled Flash Tank Emissions + Condenser Controlled Regenerator Emissions) * (1-DRE). A Safety Factor has been added. 20%
Flash tank emissions are routed into the reboiler fuel line for reboiler firing and continuous pilot fuel, vapors may be routed to the VRU in the event of low fuel demand.
Flash tank emissions are routed to the flare in the event the VRU is not in service with an assumed 98% DRE.
The post-condenser regenerator emissions are routed to the firebox when the reboiler is firing and glow plug when the reboiler is not firing (assumed 98% DRE).

[6] Carbon Dioxide emissions from "Condenser Vent Gas Stream" and "Flash Tank Off Gas Stream" in the GLYCalc report. A DRE of 0% is assumed for CO_2.

[7] 40 CFR 98 Subpart A, Table A-1

[8] CO_2e tons/yr = tons/yr * GWP

Crestwood New Mexico Pipeline LLC

Willow Lake

Emission Unit: DEHY-EG
Source Description: Ethylene Glycol Dehydrator

Annual Operating Hours: 8760 hr
Dry Gas Flow Rate: 35 MMscf/day

Criteria Pollutant Emissions

Compound	Uncontrolled Flash Tank Emissions[1]		Uncontrolled Regenerator Emissions[2]		Total Uncontrolled Emissions[3]		Total Controlled Emissions[4]	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
Carbon Dioxide[5]	0.5270	2.3083	0.6820	2.9872	1.2090	5.2954	-	-
Hydrogen Sulfide	0.0014	0.0061	0.0080	0.0350	0.0094	0.0412	-	-
Methane	1.2202	5.3445	0.1630	0.7139	1.3832	6.0584	-	-
Ethane	3.0956	13.5587	0.4700	2.0586	3.5656	15.6173	-	-
Propane	0.8371	3.6665	0.3432	1.5032	1.1803	5.1697	-	-
Isobutane	0.1032	0.4520	0.0392	0.1717	0.1424	0.6237	-	-
n-Butane	0.2334	1.0223	0.1110	0.4862	0.3444	1.5085	-	-
Isopentane	0.0382	0.1673	0.0215	0.0942	0.0597	0.2615	-	-
n-Pentane	0.0167	0.0731	0.0111	0.0486	0.0278	0.1218	-	-
n-Hexane	0.0079	0.0346	0.0069	0.0302	0.0148	0.0648	-	-
Other Hexanes	0.0123	0.0539	0.0085	0.0372	0.0208	0.0911	-	-
Heptanes	0.0022	0.0096	0.0026	0.0114	0.0048	0.0210	-	-
Benzene	0.0003	0.0013	0.0031	0.0136	0.0034	0.0149	-	-
Toluene	0.0003	0.0013	0.0044	0.0193	0.0047	0.0206	-	-
Ethylbenzene	0.0003	0.0013	0.0034	0.0149	0.0037	0.0162	-	-
Xylenes	0.0006	0.0026	0.0119	0.0521	0.0125	0.0548	-	-
C8+ Heavies	0.0001	0.0004	0.0001	0.0004	0.0002	0.0009	-	-
VOC	1.25	5.49	0.57	2.48	1.82	7.97	-	-
HAP	0.0094	0.041	0.030	0.13	0.039	0.17	-	-

Greenhouse Gas Emissions

CO_2	CH_4	CO_2e	
5.30	6.06		tons/yr[6]
1	25		GWP[7]
5.30	151.46	156.76	tons/yr CO_2e[8]

[1] From "Flash Tank Off Gas" Stream in GlyCalc Report.

[2] From "Uncontrolled Regenerator" Stream in GlyCalc Report.

[3] Summation of the Uncontrolled Flash Tank Emissions and Uncontrolled Regenerator Emissions

[4] Flash tank emissions and regenerator emissions are routed to the flare. Controlled emissions are represented under that unit (WL2-FL)

[5] Carbon Dioxide emissions from "Flash Tank off Gas" and "Regenerator Overheads" streams in the GLYCalc report.

[6] From "Uncontrolled Emissions", calculated above

[7] 40 CFR 98 Subpart A, Table A-1

[8] CO_2e tons/yr = tons/yr * GWP

Crestwood New Mexico Pipeline LLC

Willow Lake

Emission Unit: DEHY-805
Source Description: Triethylene Glycol Dehydrator

Annual Operating Hours: 8760 hr
Dry Gas Flow Rate: 65 MMscf/day

Criteria Pollutant Emissions

Compound	DRE (%)	Uncontrolled Flash Tank Emissions[1]		Uncontrolled Regenerator Emissions[2]		Total Uncontrolled Emissions[3]		Controlled Regenerator Emissions[4]		Total Controlled Emissions[5]	
		lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
Carbon Dioxide[5]	0%	2.7700	12.1326	0.2320	1.0162	3.0020	13.1488	0.2280	0.9986	3.5976	15.7575
Hydrogen Sulfide	98%	0.0132	0.0578	0.0073	0.0320	0.0205	0.0898	0.0068	0.0298	0.0005	0.0021
Methane	98%	208.9957	915.4012	1.4039	6.1491	210.3996	921.5502	1.3979	6.1228	5.0494	22.1166
Ethane	98%	65.9011	288.6468	1.6159	7.0776	67.5170	295.7245	1.5788	6.9151	1.6195	7.0935
Propane	98%	47.5613	208.3185	2.5594	11.2102	50.1207	219.5287	2.2892	10.0267	1.1964	5.2403
Isobutane	98%	9.5035	41.6253	0.7913	3.4659	10.2948	45.0912	0.6413	2.8089	0.2435	1.0664
n-Butane	98%	22.9093	100.3427	2.5220	11.0464	25.4313	111.3891	1.9162	8.3930	0.5958	2.6097
Isopentane	98%	6.3946	28.0083	0.8215	3.5982	7.2161	31.6065	0.4313	1.8891	0.1638	0.7175
n-Pentane	98%	7.2055	31.5601	1.1584	5.0738	8.3639	36.6339	0.5788	2.5351	0.1868	0.8183
n-Hexane	98%	4.2568	18.6448	1.2758	5.5880	5.5326	24.2328	0.3897	1.7069	0.1115	0.4884
Other Hexanes	98%	4.7382	20.7533	1.0618	4.6507	5.8000	25.4040	0.3860	1.6907	0.1230	0.5387
Heptanes	98%	7.1305	31.2316	4.5189	19.7928	11.6494	51.0244	0.6258	2.7410	0.1862	0.8153
Benzene	98%	0.0331	0.1450	0.2927	1.2820	0.3258	1.4270	0.0595	0.2606	0.0022	0.0097
Toluene	98%	1.3065	5.7225	18.5091	81.0699	19.8156	86.7923	1.4731	6.4522	0.0667	0.2922
Ethylbenzene	98%	0.1025	0.4490	2.5935	11.3595	2.6960	11.8085	0.0678	0.2970	0.0041	0.0179
Xylenes	98%	0.2857	1.2514	10.5216	46.0846	10.8073	47.3360	0.2574	1.1274	0.0130	0.0571
C8+ Heavies	98%	2.1529	9.4297	16.4331	71.9770	18.5860	81.4067	0.0078	0.0342	0.0519	0.2271
VOC	98%	113.58	497.48	63.06	276.20	176.64	773.68	9.12	39.96	2.94	12.90
HAP	98%	5.98	26.21	33.19	145.38	39.18	171.60	2.25	9.84	0.20	0.87

Greenhouse Gas Emissions

CO_2	CH_4	CO_2e	
15.76	22.12		tons/yr[5]
1	25		GWP[6]
15.76	552.91	568.67	tons/yr CO_2e[7]

[1] From "Flash Tank Off Gas" stream in GLYCalc Report.

[2] From "Uncontrolled Regenerator Emissions" stream in GLYCalc Report.

[3] Summation of the Uncontrolled Flash Tank and Regenerator Emissions.

[4] From "Controlled Regenerator Emissions" stream in GLYCalc Report. The control provided in the GLYCalc report is by a condenser.

[5] Controlled maximum potential hourly emission rate = (Uncontrolled Flash Tank Emissions + Condenser Controlled Regenerator Emissions) * (1-DRE). A Safety Factor has been added. 20%

Flash tank emissions are routed into the reboiler fuel line for reboiler firing and continuous pilot fuel, vapors may be routed to the VRU in the event of low fuel demand.

Flash tank emissions are routed to the flare in the event the VRU is not in service with an assumed 98% DRE.

The post-condenser regenerator emissions are routed to the firebox when the reboiler is firing and glow plug when the reboiler is not firing (assumed 98% DRE).

[6] Carbon Dioxide emissions from "Condenser Vent Gas Stream" and "Flash Tank Off Gas Stream" in the GLYCalc report. A DRE of 0% is assumed for CO_2.

[7] 40 CFR 98 Subpart A, Table A-1

[8] CO_2e tons/yr = tons/yr * GWP

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Emission Unit: DEHY-1505
Source Description: Triethylene Glycol Dehydrator

Annual Operating Hours: 8760 hr
Dry Gas Flow Rate: 80 MMscf/day

Criteria Pollutant Emissions

Compound	DRE (%)	Uncontrolled Flash Tank Emissions[1]		Uncontrolled Regenerator Emissions[2]		Total Uncontrolled Emissions[3]		Controlled Regenerator Emissions[4]		Total Controlled Emissions[5]	
		lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
Carbon Dioxide[5]	0%	2.7000	11.8260	0.2960	1.2965	2.9960	13.1225	0.2960	1.2965	0.5172	2.2653
Hydrogen Sulfide	98%	0.0118	0.0517	0.0086	0.0377	0.0204	0.0894	0.0081	0.0355	0.0002	0.0009
Methane	98%	209.1286	915.9833	1.8701	8.1910	210.9987	924.1743	1.8638	8.1634	0.2957	1.2951
Ethane	98%	65.4390	286.6228	2.1037	9.2142	67.5427	295.8370	2.0662	9.0500	0.1281	0.5611
Propane	98%	46.8732	205.3046	3.3304	14.5872	50.2036	219.8918	3.0541	13.3770	0.1295	0.5674
Isobutane	98%	9.2882	40.6823	1.0133	4.4383	10.3015	45.1206	0.8593	3.7637	0.0318	0.1391
n-Butane	98%	22.2317	97.3748	3.2040	14.0335	25.4357	111.4084	2.5787	11.2947	0.0886	0.3879
Isopentane	98%	6.1784	27.0614	1.0360	4.5377	7.2144	31.5991	0.6127	2.6836	0.0221	0.0969
n-Pentane	98%	6.9083	30.2584	1.4482	6.3431	8.3565	36.6015	0.8160	3.5741	0.0279	0.1221
n-Hexane	98%	3.9783	17.4250	1.5384	6.7382	5.5167	24.1631	0.5606	2.4554	0.0182	0.0798
Other Hexanes	98%	4.4851	19.6447	1.3023	5.7041	5.7874	25.3488	0.5560	2.4353	0.0187	0.0820
Heptanes	98%	6.4042	28.0504	5.1747	22.6652	11.5789	50.7156	0.8949	3.9197	0.0292	0.1277
Benzene	98%	0.0264	0.1156	0.3026	1.3254	0.3290	1.4410	0.0757	0.3316	0.0018	0.0081
Toluene	98%	1.0450	4.5771	19.0405	83.3974	20.0855	87.9745	1.9355	8.4775	0.0477	0.2090
Ethylbenzene	98%	0.0827	0.3622	2.6596	11.6490	2.7423	12.0113	0.0908	0.3977	0.0023	0.0100
Xylenes	98%	0.2318	1.0153	10.9008	47.7455	11.1326	48.7608	0.3473	1.5212	0.0086	0.0377
C8+ Heavies	98%	1.7714	7.7587	16.6000	72.7080	18.3714	80.4667	0.0102	0.0447	0.0024	0.0104
VOC	98%	109.50	479.63	67.55	295.87	177.06	775.50	12.39	54.28	0.43	1.88
HAP	98%	5.36	23.50	34.44	150.86	39.81	174.35	3.01	13.18	0.08	0.34

Greenhouse Gas Emissions

CO_2	CH_4	CO_2e	
2.27	1.30		tons/yr[5]
1	25		GWP[6]
2.27	32.38	34.64	tons/yr CO_2e[7]

[1] From "Flash Tank Off Gas" stream in GLYCalc Report.

[2] From "Uncontrolled Regenerator Emissions" stream in GLYCalc Report.

[3] Summation of the Uncontrolled Flash Tank and Regenerator Emissions.

[4] From "Controlled Regenerator Emissions" stream in GLYCalc Report. The control provided in the GLYCalc report is by a condenser.

[5] Controlled maximum potential hourly emission rate = (Condenser Controlled Regenerator Emissions) * (1-DRE). A Safety Factor has been added. 20%

Flash tank emissions are recycled and directed back into the suction side of the compressor station. Flash tank emissions may also be routed to VRU, and to flare during VRU downtime. Worst-case emissions assume flash tank emissions are routed to flare with 98% DRE during VRU downtime (VRU downtime estimated at 5% annually).
The post-condenser regenerator emissions are routed to the firebox when the reboiler is firing and glow plug when the reboiler is not firing (assumed 98% DRE).

[6] Carbon Dioxide emissions from "Condenser Vent Gas Stream" and "Flash Tank Off Gas Stream" in the GLYCalc report. A DRE of 0% is assumed for CO_2.

[7] 40 CFR 98 Subpart A, Table A-1

[8] CO_2e tons/yr = tons/yr * GWP

Crestwood New Mexico Pipeline LLC

Willow Lake

Emission Unit: HTR-803

Source Description: DEHY 803 Reboiler

Fuel Consumption

Input heat rate	0.500	MMBtu/hr	
Fuel heat value	1020	Btu/scf	Fuel Gas Analysis
Fuel rate	490.20	scf/hr	Input heat rate / fuel heat value
Fuel rate	0.00049	MMscf/hr	Converted to MMscf
Annual operating hours:	8760		
Annual fuel usage	4.29	MMscf/yr	

Emission Rates

NO_x[1]	CO[1]	VOC[1]	SO_2[2]	PM[1,3]	H_2S[4]	HCHO[5]	Toluene[5]	Benzene[5]	n-Hexane[5]	HAPs[5]	Units
100	84	5.5		7.6		0.075	0.0034	0.0021	1.80		lb/MMscf
100.0	84.0	5.5		7.6		0.075	0.0034	0.0021	1.80		lb/MMscf
0.049	0.041	0.0027	0.0073	0.0037	3.50E-06	3.68E-05	1.67E-06	1.03E-06	8.82E-04	9.22E-04	lb/hr[6]
0.21	0.18	0.012	0.032	0.016	1.53E-05	1.61E-04	7.30E-06	4.51E-06	3.86E-03	4.04E-03	tons/yr[7]

[1] Emission factors from AP-42 Tables 1.4-1 and 1.4-2 (7/98)
Emission factors have been adjusted according to AP-42: EF (at fuel heating value) = Fuel Heat Value / EF Heat Value (1020 Btu/scf) * EF (at 1020 Btu/scf)

[2] SO_2 emissions based on fuel content of 5 grains of sulfur per 100 scf
SO_2 lb/hr = 5gr S/100 scf * Fuel usage (scf/hr) * 1 lb/7000 gr * 64lb SO2/ 32lb S
Assume 100% conversion of combusted H_2S into SO_2 and 98% Combustion Efficiency. Additional SO_2 emissions from the combustion of H_2S:
SO_2 (lb/hr) from H_2S = 98%*[(0.25 gr H_2S/100 scf * 1 lb/7000 gr * 64 lb/lbmol SO_2/34 lb/lbmol H_2S*scf/hr)]

[3] Assumes PM (Total) = PM-10 = PM-2.5

[4] H_2S emissions fuel content of 0.25 grains of hydrogen sulfide per 100 scf and combustion efficiency of 98%
H_2S lb/hr = (1-0.98) * 0.25 gr H_2S/100 scf * Fuel usage (scf/hr) * 1 lb/7000 gr

[5] HAP emission factors from AP-42 Table 1.4-3
Emission factors have been adjusted according to AP-42: EF (at fuel heating value) = Fuel Heat Value / EF Heat Value (1020 Btu/scf) * EF (at 1020 Btu/scf)

[6] Hourly emission rates calculated as follows:
NOx, CO, VOC, PM, HAP lb/hr = EF (lb/MMscf) * Fuel usage (MMscf/hr)

[7] Annual emissions calculated as follows:
tons/yr = Hourly emissions (lb/hr) * Hours of operation * 1 ton/2000 lb

Greenhouse Gas Calculations

CO_2	N_2O	CH_4	CO_2e	
53.06	0.00010	0.0010		kg/MMBtu[8]
1	298	25		GWP[9]
58.5	0.000110	0.00110		lb/hr[10]
256.2	0.00048	0.0048	256.4	tpy[11]

[8] Greenhouse gas emission factors are from 40 CFR 98 Subpart C

[9] 40 CFR 98 Subpart A, Table A-1

[10] GHG lb/hr = EF (kg/MMBtu) * Heat input (MMBtu/hr) * 2.20462lb/kg

[11] CO_2, N_2O, CH_4 tpy = Hourly emission rate (lb/hr) * Hours of operation * 1ton/2000lb
CO_2e tpy = CO_2 Emission Rate + (N_2O Emission Rate * GWP) + (CH_4 Emission Rate * GWP)

Crestwood New Mexico Pipeline LLC

Willow Lake

Emission Unit:	HTR-804		
Source Description:	DEHY 804 Reboiler		

Fuel Consumption

Input heat rate	0.125	MMBtu/hr	
Fuel heat value	1020	Btu/scf	Fuel Gas Analysis
Fuel rate	122.55	scf/hr	Input heat rate / fuel heat value
Fuel rate	0.00012	MMscf/hr	Converted to MMscf
Annual operating hours:	8760		
Annual fuel usage	1.07	MMscf/yr	

Emission Rates

NO_x[1]	CO[1]	VOC[1]	SO_2[2]	PM[1,3]	H_2S[4]	HCHO[5]	Toluene[5]	Benzene[5]	n-Hexane[5]	HAPs[5]	Units
100	84	5.5		7.6		0.075	0.0034	0.0021	1.80		lb/MMscf
100.0	84.0	5.5		7.6		0.075	0.0034	0.0021	1.80		lb/MMscf
0.012	0.010	0.00067	0.0018	0.00093	8.75E-07	9.19E-06	4.17E-07	2.57E-07	2.21E-04	2.30E-04	lb/hr[6]
0.054	0.045	0.0030	0.0080	0.0041	3.83E-06	4.03E-05	1.83E-06	1.13E-06	9.66E-04	1.01E-03	tons/yr[7]

[1] Emission factors from AP-42 Tables 1.4-1 and 1.4-2 (7/98)
Emission factors have been adjusted according to AP-42: EF (at fuel heating value) = Fuel Heat Value / EF Heat Value (1020 Btu/scf) * EF (at 1020 Btu/scf)

[2] SO_2 emissions based on fuel content of 5 grains of sulfur per 100 scf
SO_2 lb/hr = 5gr S/100 scf * Fuel usage (scf/hr) * 1 lb/7000 gr * 64lb SO2/ 32lb S
Assume 100% conversion of combusted H_2S into SO_2 and 98% Combustion Efficiency. Additional SO_2 emissions from the combustion of H_2S:
SO_2 (lb/hr) from H_2S = 98%*[(0.25 gr H_2S/100 scf * 1 lb/7000 gr * 64 lb/lbmol SO_2/34 lb/lbmol H_2S*scf/hr)]

[3] Assumes PM (Total) = PM-10 = PM-2.5

[4] H_2S emissions fuel content of 0.25 grains of hydrogen sulfide per 100 scf and combustion efficiency of 98%
H_2S lb/hr = (1-0.98) * 0.25 gr H_2S/100 scf * Fuel usage (scf/hr) * 1 lb/7000 gr

[5] HAP emission factors from AP-42 Table 1.4-3
Emission factors have been adjusted according to AP-42: EF (at fuel heating value) = Fuel Heat Value / EF Heat Value (1020 Btu/scf) * EF (at 1020 Btu/scf)

[6] Hourly emission rates calculated as follows:
NOx, CO, VOC, PM, HAP lb/hr = EF (lb/MMscf) * Fuel usage (MMscf/hr)

[7] Annual emissions calculated as follows:
tons/yr = Hourly emissions (lb/hr) * Hours of operation * 1 ton/2000 lb

Greenhouse Gas Calculations

CO_2	N_2O	CH_4	CO_2e	
53.06	0.00010	0.0010		kg/MMBtu[8]
1	298	25		GWP[9]
14.6	0.000028	0.00028		lb/hr[10]
64.0	0.00012	0.0012	64.1	tpy[11]

[8] Greenhouse gas emission factors are from 40 CFR 98 Subpart C

[9] 40 CFR 98 Subpart A, Table A-1

[10] GHG lb/hr = EF (kg/MMBtu) * Heat input (MMBtu/hr) * 2.20462lb/kg

[11] CO_2, N_2O, CH_4 tpy = Hourly emission rate (lb/hr) * Hours of operation * 1ton/2000lb
CO_2e tpy = CO_2 Emission Rate + (N_2O Emission Rate * GWP) + (CH_4 Emission Rate * GWP)

Crestwood New Mexico Pipeline LLC

Willow Lake

Emission Unit:	HTR-802	
Source Description:	Regen Gas Heater	

Fuel Consumption

Input heat rate	2.00	MMBtu/hr	
Fuel heat value	1020	Btu/scf	Fuel Gas Analysis
Fuel rate	1960.78	scf/hr	Input heat rate / fuel heat value
Fuel rate	0.00196	MMscf/hr	Converted to MMscf
Annual operating hours:	8760		
Annual fuel usage	17.18	MMscf/yr	

Emission Rates

NO_x[1]	CO[1]	VOC[1]	SO_2[2]	PM[1,3]	H_2S[4]	HCHO[5]	Toluene[5]	Benzene[5]	n-Hexane[5]	HAPs[5]	Units
100	84	5.5		7.6		0.075	0.0034	0.0021	1.80		lb/MMscf
100.0	84.0	5.5		7.6		0.075	0.0034	0.0021	1.80		lb/MMscf
0.20	0.16	0.011	0.029	0.015	1.40E-05	1.47E-04	6.67E-06	4.12E-06	0.0035	0.0037	lb/hr[6]
0.86	0.72	0.047	0.13	0.065	6.13E-05	6.44E-04	2.92E-05	1.80E-05	0.015	0.016	tons/yr[7]

[1] Emission factors from AP-42 Tables 1.4-1 and 1.4-2 (7/98)
Emission factors have been adjusted according to AP-42: EF (at fuel heating value) = Fuel Heat Value / EF Heat Value (1020 Btu/scf) * EF (at 1020 Btu/scf)

[2] SO_2 emissions based on fuel content of 5 grains of sulfur per 100 scf
SO_2 lb/hr = 5gr S/100 scf * Fuel usage (scf/hr) * 1 lb/7000 gr * 64lb SO2/ 32lb S
Assume 100% conversion of combusted H_2S into SO_2 and 98% Combustion Efficiency. Additional SO_2 emissions from the combustion of H_2S:
SO_2 (lb/hr) from H_2S = 98%*[(0.25 gr H_2S/100 scf * 1 lb/7000 gr * 64 lb/lbmol SO_2/34 lb/lbmol H_2S*scf/hr)]

[3] Assumes PM (Total) = PM-10 = PM-2.5

[4] H_2S emissions fuel content of 0.25 grains of hydrogen sulfide per 100 scf and combustion efficiency of 98%
H_2S lb/hr = (1-0.98) * 0.25 gr H_2S/100 scf * Fuel usage (scf/hr) * 1 lb/7000 gr

[5] HAP emission factors from AP-42 Table 1.4-3
Emission factors have been adjusted according to AP-42: EF (at fuel heating value) = Fuel Heat Value / EF Heat Value (1020 Btu/scf) * EF (at 1020 Btu/scf)

[6] Hourly emission rates calculated as follows:
NOx, CO, VOC, PM, HAP lb/hr = EF (lb/MMscf) * Fuel usage (MMscf/hr)

[7] Annual emissions calculated as follows:
tons/yr = Hourly emissions (lb/hr) * Hours of operation * 1 ton/2000 lb

Greenhouse Gas Calculations

CO_2	N_2O	CH_4	CO_2e	
53.06	0.00010	0.0010		kg/MMBtu[8]
1	298	25		GWP[9]
234.0	0.000441	0.00441		lb/hr[10]
1024.7	0.00193	0.0193	1025.8	tpy[11]

[8] Greenhouse gas emission factors are from 40 CFR 98 Subpart C

[9] 40 CFR 98 Subpart A, Table A-1

[10] GHG lb/hr = EF (kg/MMBtu) * Heat input (MMBtu/hr) * 2.20462lb/kg

[11] CO_2, N_2O, CH_4 tpy = Hourly emission rate (lb/hr) * Hours of operation * 1ton/2000lb
CO_2e tpy = CO_2 Emission Rate + (N_2O Emission Rate * GWP) + (CH_4 Emission Rate * GWP)

Crestwood New Mexico Pipeline LLC

Willow Lake

Emission Unit: HTR-730

Source Description: Hot Oil Heater

Fuel Consumption

Input heat rate	6.83	MMBtu/hr	
Fuel heat value	1020	Btu/scf	Fuel Gas Analysis
Fuel rate	6696.71	scf/hr	Input heat rate / fuel heat value
Fuel rate	0.00670	MMscf/hr	Converted to MMscf
Annual operating hours:	8760		
Annual fuel usage	58.66	MMscf/yr	

Emission Rates

NO_x[1]	CO[1]	VOC[1]	SO_2[2]	PM[1,3]	H_2S[4]	HCHO[5]	Toluene[5]	Benzene[5]	n-Hexane[5]	HAPs[5]	Units
100	84	5.5		7.6		0.075	0.0034	0.0021	1.80		lb/MMscf
100.0	84.0	5.5		7.6		0.075	0.0034	0.0021	1.80		lb/MMscf
0.67	0.56	0.037	0.10	0.051	4.78E-05	5.02E-04	2.28E-05	1.41E-05	0.012	0.013	lb/hr[6]
2.93	2.46	0.16	0.44	0.22	2.10E-04	2.20E-03	9.97E-05	6.16E-05	0.053	0.055	tons/yr[7]

[1] Emission factors from AP-42 Tables 1.4-1 and 1.4-2 (7/98)
Emission factors have been adjusted according to AP-42: EF (at fuel heating value) = Fuel Heat Value / EF Heat Value (1020 Btu/scf) * EF (at 1020 Btu/scf)

[2] SO_2 emissions based on fuel content of 5 grains of sulfur per 100 scf
SO_2 lb/hr = 5gr S/100 scf * Fuel usage (scf/hr) * 1 lb/7000 gr * 64lb SO2/ 32lb S
Assume 100% conversion of combusted H_2S into SO_2 and 98% Combustion Efficiency. Additional SO_2 emissions from the combustion of H_2S:
SO_2 (lb/hr) from H_2S = 98%*[(0.25 gr H_2S/100 scf * 1 lb/7000 gr * 64 lb/lbmol SO_2/34 lb/lbmol H_2S*scf/hr)]

[3] Assumes PM (Total) = PM-10 = PM-2.5

[4] H_2S emissions fuel content of 0.25 grains of hydrogen sulfide per 100 scf and combustion efficiency of 98%
H_2S lb/hr = (1-0.98) * 0.25 gr H_2S/100 scf * Fuel usage (scf/hr) * 1 lb/7000 gr

[5] HAP emission factors from AP-42 Table 1.4-3
Emission factors have been adjusted according to AP-42: EF (at fuel heating value) = Fuel Heat Value / EF Heat Value (1020 Btu/scf) * EF (at 1020 Btu/scf)

[6] Hourly emission rates calculated as follows:
NOx, CO, VOC, PM, HAP lb/hr = EF (lb/MMscf) * Fuel usage (MMscf/hr)

[7] Annual emissions calculated as follows:
tons/yr = Hourly emissions (lb/hr) * Hours of operation * 1 ton/2000 lb

Greenhouse Gas Calculations

CO_2	N_2O	CH_4	CO_2e	
53.06	0.00010	0.0010		kg/MMBtu[8]
1	298	25		GWP[9]
799.0	0.001506	0.01506		lb/hr[10]
3499.7	0.00660	0.0660	3503.4	tpy[11]

[8] Greenhouse gas emission factors are from 40 CFR 98 Subpart C

[9] 40 CFR 98 Subpart A, Table A-1

[10] GHG lb/hr = EF (kg/MMBtu) * Heat input (MMBtu/hr) * 2.20462lb/kg

[11] CO_2, N_2O, CH_4 tpy = Hourly emission rate (lb/hr) * Hours of operation * 1ton/2000lb
CO_2e tpy = CO_2 Emission Rate + (N_2O Emission Rate * GWP) + (CH_4 Emission Rate * GWP)

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Emission Unit:	HTR-805 and HTR-1505	
Source Description:	DEHY 805 Reboiler and DEHY 1505 Reboiler	

Fuel Consumption

Input heat rate	1.50	MMBtu/hr	
Fuel heat value	1020	Btu/scf	Fuel Gas Analysis
Fuel rate	1470.59	scf/hr	Input heat rate / fuel heat value
Fuel rate	0.00147	MMscf/hr	Converted to MMscf
Annual operating hours:	8760		
Annual fuel usage	12.88	MMscf/yr	

Emission Rates

NO_x[1]	CO[1]	VOC[1]	SO_2[2]	PM[1,3]	H_2S[4]	HCHO[5]	Toluene[5]	Benzene[5]	n-Hexane[5]	HAPs[5]	Units
100	84	5.5		7.6		0.075	0.0034	0.0021	1.80		lb/MMscf
100.0	84.0	5.5		7.6		0.075	0.0034	0.0021	1.80		lb/MMscf
0.15	0.12	0.0081	0.022	0.011	1.05E-05	1.10E-04	5.00E-06	3.09E-06	0.0026	0.0028	lb/hr[6]
0.64	0.54	0.035	0.096	0.049	4.60E-05	4.83E-04	2.19E-05	1.35E-05	0.012	0.012	tons/yr[7]

[1] Emission factors from AP-42 Tables 1.4-1 and 1.4-2 (7/98)
Emission factors have been adjusted according to AP-42: EF (at fuel heating value) = Fuel Heat Value / EF Heat Value (1020 Btu/scf) * EF (at 1020 Btu/scf)

[2] SO_2 emissions based on fuel content of 5 grains of sulfur per 100 scf
SO_2 lb/hr = 5gr S/100 scf * Fuel usage (scf/hr) * 1 lb/7000 gr * 64lb SO2/ 32lb S
Assume 100% conversion of combusted H_2S into SO_2 and 98% Combustion Efficiency. Additional SO_2 emissions from the combustion of H_2S:
SO_2 (lb/hr) from H_2S = 98%*[(0.25 gr H_2S/100 scf * 1 lb/7000 gr * 64 lb/lbmol SO_2/34 lb/lbmol H_2S*scf/hr)]

[3] Assumes PM (Total) = PM-10 = PM-2.5

[4] H_2S emissions fuel content of 0.25 grains of hydrogen sulfide per 100 scf and combustion efficiency of 98%
H_2S lb/hr = (1-0.98) * 0.25 gr H_2S/100 scf * Fuel usage (scf/hr) * 1 lb/7000 gr

[5] HAP emission factors from AP-42 Table 1.4-3
Emission factors have been adjusted according to AP-42: EF (at fuel heating value) = Fuel Heat Value / EF Heat Value (1020 Btu/scf) * EF (at 1020 Btu/scf)

[6] Hourly emission rates calculated as follows:
NOx, CO, VOC, PM, HAP lb/hr = EF (lb/MMscf) * Fuel usage (MMscf/hr)

[7] Annual emissions calculated as follows:
tons/yr = Hourly emissions (lb/hr) * Hours of operation * 1 ton/2000 lb

Greenhouse Gas Calculations

CO_2	N_2O	CH_4	CO_2e	
53.06	0.00010	0.0010		kg/MMBtu[8]
1	298	25		GWP[9]
175.5	0.000331	0.00331		lb/hr[10]
768.5	0.00145	0.0145	769.3	tpy[11]

[8] Greenhouse gas emission factors are from 40 CFR 98 Subpart C

[9] 40 CFR 98 Subpart A, Table A-1

[10] GHG lb/hr = EF (kg/MMBtu) * Heat input (MMBtu/hr) * 2.20462lb/kg

[11] CO_2, N_2O, CH_4 tpy = Hourly emission rate (lb/hr) * Hours of operation * 1ton/2000lb
CO_2e tpy = CO_2 Emission Rate + (N_2O Emission Rate * GWP) + (CH_4 Emission Rate * GWP)

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Unit: WL1-TK601 through WL1-TK603

Description: WL1 210 bbl Condensate Tanks

Number of Tanks 3

Tank Emissions [1,2]

VOC	Benzene	Toluene	Ethylbenzene	Xylenes	n-Hexane	Total HAPs	H_2S			
159.85	0.17	0.30	0.019	0.12	2.45	3.06	0.0041	lb/hr	ProMax Report	
594.66	0.79	1.50	0.10	0.645	11.85	14.89	0.011	tpy	ProMax Report	
53.28	0.056	0.099	0.0064	0.040	0.82	1.02	0.0014	lb/hr	Per Tank	Uncontrolled
198.22	0.26	0.50	0.034	0.21	3.95	4.96	0.0038	tpy	Per Tank	Uncontrolled
1.07	0.0011	0.0020	0.00013	0.00080	0.016	0.020	2.74E-05	lb/hr	Per Tank	Controlled[3]
0.20	0.00026	0.00050	0.000034	0.00021	0.0039	0.0050	3.82E-06	tpy	Per Tank	Controlled[3]

CO_2	Methane		
0.40	24.83	lb/hr	ProMax Report
1.10	66.64	tpy	ProMax Report

CO_2e[4]		
1667.06	tpy	
555.69	tpy	Per Tank

Notes

[1] ProMax simulation utilized the following conservative throughputs:
14 bbl/hr of condensate for lb/hr calculations and 65,700 bbl/yr of condensate for tpy calculations.
65,700 bbl/yr of produced water for tpy calculations.

[2] Emissions include working, breathing and flash and are per tank.

[3] Emissions from the tanks are controlled by a VRU with an assumed annual 5% downtime. VRU control only applied to annual emissions. 5%
During VRU downtime, the emissions will be routed to a flare (WL1-FL) with an assumed additional 98% DRE 98%

[4] CO_2e tpy Emission Rate = CO_2 Emission Rate + CH_4 Emission Rate *GWP Factor

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Unit: WL2-TK8101 and WL2-TK8102
Description: WL 2 400 bbl Condensate Tanks
Number of Tanks 2

Tank Emissions [1,2]

VOC	Benzene	Toluene	Ethylbenzene	Xylenes	n-Hexane	Total HAPs	H_2S			
188.67	0.21	0.36	0.024	0.15	3.01	3.75	0.0046	lb/hr	ProMax Report	
93.93	0.13	0.24	0.016	0.10	1.88	2.36	0.0018	tpy	ProMax Report	
94.33	0.10	0.18	0.012	0.074	1.51	1.88	0.0023	lb/hr	Per Tank	Uncontrolled
46.96	0.063	0.12	0.0082	0.051	0.94	1.18	0.00090	tpy	Per Tank	Uncontrolled
94.33	0.10	0.18	0.012	0.074	1.51	1.88	0.0023	lb/hr	Per Tank	Controlled[3]
2.35	0.0032	0.0060	0.00041	0.0026	0.047	0.059	0.000045	tpy	Per Tank	Controlled[3]

CO_2	Methane		
0.45	27.72	lb/hr	ProMax Report
0.17	10.17	tpy	ProMax Report

CO_2e[3]		
254.44	tpy	
127.22	tpy	Per Tank

Notes

[1] ProMax simulation utilized the following conservative throughputs:

14 bbl/hr of condensate for lb/hr calculations and 10,000 bbl/yr of condensate for tpy calculations.

1 bbl/hr of produced water for lb/hr calculations and 10,000 bbl/yr of produced water for tpy calculations.

[2] Emissions include working, breathing and flash and are per tank.

[3] Emissions from the tanks are controlled by a VRU with an assumed annual 5% downtime. VRU control only applied to annual emissions. 5%

[4] CO_2e tpy Emission Rate = CO_2 Emission Rate + CH_4 Emission Rate *GWP Factor

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Unit: WLCS-TK2301 through WLCS-TK2304
Description: WLCS 400 bbl Condensate Tanks
Number of Tanks 4

Tank Emissions [1,2]

VOC	Benzene	Toluene	Ethylbenzene	Xylenes	n-Hexane	Total HAPs	H_2S			
1955.23	4.31	4.05	0.16	0.60	78.13	87.25	6.38E-02	lb/hr	ProMax Report	
1485.90	3.29	3.11	0.124	0.46	60.06	67.04	4.29E-02	tpy	ProMax Report	
488.81	1.08	1.01	0.040	0.15	19.53	21.81	1.60E-02	lb/hr	Per Tank	Uncontrolled
371.48	0.82	0.78	0.031	0.114	15.02	16.76	1.07E-02	tpy	Per Tank	Uncontrolled
9.78	0.022	0.020	0.00081	0.0030	0.39	0.44	3.19E-04	lb/hr	Per Tank	Controlled[3]
0.37	0.00082	0.00078	0.000031	0.00011	0.015	0.017	1.07E-05	tpy	Per Tank	Controlled[3]

CO_2	Methane		
4.22	120.80	lb/hr	ProMax Report
2.93	81.49	tpy	ProMax Report

CO_2e[3]		
2040.23	tpy	
510.06	tpy	Per Tank

Notes

[1] ProMax simulation utilized the following conservative throughputs:
250 bbl/hr of condensate for lb/hr calculations and 320,000 bbl/yr of condensate for tpy calculations.
320,000 bbl/yr of produced water for tpy calculations.

[2] Emissions include working, breathing and flash and are per tank.

[3] Emissions from the tanks are controlled by a VRU with an assumed annual 5% downtime. VRU control only applied to lb/hr and tpy emissions. 5%
During VRU downtime, the emissions will be routed to a flare (WL1-FL) with an assumed additional 98% DRE 98%

[4] CO_2e tpy Emission Rate = CO_2 Emission Rate + CH_4 Emission Rate *GWP Factor

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Unit: ATM LOAD

Description: Atmospheric Tank Loadout from All Tanks

Number of Tanks 9

Loading Emissions[1]

VOC	Benzene	Toluene	Ethylbenzene	Xylenes	n-Hexane	Total HAPs	H_2S		
93.95	0.18	0.24	0.014	0.075	3.03	3.53	1.93E-03	lb/hr	ProMax Report (WL1+WL2+WLCS)
84.33	0.17	0.19	0.0088	0.042	3.06	3.47	2.37E-03	tpy	ProMax Report (WL1+WL2+WLCS)
38.99	0.065	0.13	0.0091	0.057	0.98	1.24	4.46E-05	lb/hr	WL2 Uncontrolled Loading
1.91	0.0032	0.0063	0.00045	0.0028	0.048	0.061	2.99E-05	tpy	WL2 Uncontrolled Loading
54.96	0.11	0.11	0.0044	0.018	2.05	2.29	1.89E-03	lb/hr	WL1+WLCS Uncontrolled Loading
82.42	0.17	0.18	0.0084	0.039	3.01	3.41	2.34E-03	tpy	WL1+WLCS Uncontrolled Loading
1.10	0.0023	0.0022	0.000089	0.00036	0.041	0.046	3.77E-05	lb/hr	WL1+WLCS Controlled Loading [2]
1.65	0.0034	0.0036	0.00017	0.00079	0.060	0.068	4.69E-05	tpy	WL1+WLCS Controlled Loading [2]
39.54	0.07	0.13	0.01	0.06	1.00	1.26	6.35E-05	lb/hr	Total Loading [3]
2.73	0.00	0.01	0.00	0.00	0.08	0.09	5.34E-05	tpy	Total Loading [3]

CO_2	Methane		
0.1324	2.612	lb/hr	ProMax Report
0.1690	1.803	tpy	ProMax Report

CO_2e[2]	
45.26	tpy

Notes

[1] Loading emissions from tanks at WL1, WL2 and WLCS portions of the facility.

lb/hr emissions based on maximum bbl/hr flowrate; tpy emissions based on annual bbl/yr throughput.

[2] WL1 and WLCS condensate tank truck loading vapors will be routed to a flare (WL1-FL) with 98% DRE 98%

[3] Total loading includes uncontrolled WL2 condensate and produced water loading emissions and produced water loading from WL1 and WLCS (assumed 1% of uncontrolled emission rate). Controlled loading of condensate at WL1 and WLCS is not included in ATM LOAD, these emissions are included at the emission point WL-FL1.

[4] CO_2e tpy Emission Rate = CO_2 Emission Rate + CH_4 Emission Rate *GWP Factor

Crestwood New Mexico Pipeline LLC

Willow Lake

Unit: NGL LOAD

Hose Parameters

Vapor Hose Diameter	2	inches
Vapor Hose Length	1	foot
Hose Volume	0.022	ft^3
Number of Hoses	2	
Total Hose Volume	0.044	ft^3

NGL Data[1]

NGL Tank Pressure	321.27	psia
NGL Throughput	3571.43	bbl/day
NGL Throughput	4500000	gal/month
Capacity of Tank	9000	gal/load
NGL Throughput	500.00	loads/month

[1] Values obtained from a similar Crestwood facility.

Physical Data

Loadout Temperature (T)	591.67	R
Molecular Weight	46.315	lb/lbmol
Moles in the vapor phase (n)	2.21E-03	$lbmol/ft^3$
Vapor Density[2]	1.02E-01	lb/ft^3

[2] Calculated using PV = nRT, where R = Universal Gas Constant 10.73 cubic feet *psi/lbmole * deg R

VOC Emissions from Pressurized NGL Loadout

Source	Density (lb/ft^3)	Hose Volume (ft^3/load)	Loads per month	Monthly Emissions (lb/month)[3]	Annual Emissions (tpy)[4]
Vapor Hoses	0.102	0.044	500.00	2.23	0.013
Total				2.23	0.013

[3] Monthly Emissions (lb/month) = Density (lb/ft^3) x Hose Volume (ft^3/load) x Loads per month (load/month)

$$\text{Monthly Emission Rate (lb/month)} = \frac{0.10\ \text{lb}}{ft^3} \times \frac{0.043633231}{\text{load}} \times \frac{500}{\text{month}} = \frac{2.23\ \text{lb}}{\text{month}}$$

[4] Annual Emission Rate (tpy) = Uncontrolled emission rate (lb/hr) x (8,760 hr/yr) / (2,000 lb/ton).

$$\text{Annual Emission Rate (tpy)} = \frac{2.23}{\text{month}} \times \frac{12\ \text{months}}{\text{yr}} \times \frac{1\ \text{ton}}{2{,}000\ \text{lb}} = \frac{1.34\text{E-}02\ \text{lb}}{\text{yr}}$$

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Unit: FUG-1

Description: Willow Lake Plant 1 - Fugitive emissions

Facility-wide Fugitive Emissions Per Piece of Equipment

Subcomponent		Emission Factor[1] (kg/hr/comp)	Emission Factor[1] (lb/hr/comp)	Component Counts[3]	VOC Content[2] (wt%)	VOC[4] (lb/hr)	HAP Content[2] (wt%)	HAP[4] (lb/hr)	H_2S Content[2] (wt%)	H_2S[4] (lb/hr)	CO_2 Content[2] (wt%)	CO_2[4] (lb/hr)	CH_4 Content[2] (wt%)	CH_4[4] (lb/hr)	CO_2e[7] (lb/hr)
Valves	Gas	4.50E-03	9.92E-03	1155	23.15%	2.65E+00	0.85%	9.78E-02	0.0004%	4.58E-05	1.00%	1.15E-01	79.00%	9.05	226.34
	Heavy Oil	8.40E-06	1.85E-05	0	100.00%	0.00E+00	100.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - MeOH	2.50E-03	5.51E-03	0	100.00%	0.00E+00	100.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil- Propane	2.50E-03	5.51E-03	107	100.00%	5.89E-01	0.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - Cond/PW	2.50E-03	5.51E-03	239	100.00%	1.32E+00	11.69%	1.54E-01	0.0004%	5.27E-06	0.074%	9.80E-04	0.78%	0.01	0.26
Flanges	Gas	3.90E-04	8.60E-04	323	23.15%	6.43E-02	0.85%	2.37E-03	0.0004%	1.11E-06	1.00%	2.78E-03	79.00%	0.22	5.49
	Heavy Oil	3.90E-07	8.60E-07	0	100.00%	0.00E+00	100.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - MeOH	1.10E-04	2.43E-04	0	100.00%	0.00E+00	100.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil- Propane	1.10E-04	2.43E-04	22	100.00%	5.30E-03	0.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - Cond/PW	1.10E-04	2.43E-04	107	100.00%	2.59E-02	11.69%	3.03E-03	0.0004%	1.04E-07	0.074%	1.93E-05	0.78%	0.00	0.01
Connectors	Gas	2.00E-04	4.41E-04	4080	23.15%	4.16E-01	0.85%	1.54E-02	0.0004%	7.20E-06	1.00%	1.80E-02	79.00%	1.42	35.55
	Heavy Oil	7.50E-06	1.65E-05	0	100.00%	0.00E+00	100.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - MeOH	2.10E-04	4.63E-04	0	100.00%	0.00E+00	100.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil- Propane	2.10E-04	4.63E-04	245	100.00%	1.13E-01	0.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - Cond/PW	2.10E-04	4.63E-04	726	100.00%	3.36E-01	11.69%	3.93E-02	0.0004%	1.34E-06	0.074%	2.50E-04	0.78%	0.00	0.07
Other	Gas	8.80E-03	1.94E-02	10	23.15%	4.65E-02	0.85%	1.71E-03	0.0004%	8.03E-07	1.00%	2.01E-03	79.00%	0.16	3.97
	Heavy Oil	3.20E-05	7.05E-05	0	100.00%	0.00E+00	100.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - MeOH	7.50E-03	1.65E-02	0	100.00%	0.00E+00	100.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil- Propane	7.50E-03	1.65E-02	0	100.00%	0.00E+00	0.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - Cond/PW	7.50E-03	1.65E-02	0	100.00%	0.00E+00	11.69%	0.00E+00	0.0004%	0.00E+00	0.074%	0.00E+00	0.78%	0.00	0.00
Pump Seals	Gas	2.40E-03	5.29E-03	0	23.15%	0.00E+00	0.85%	0.00E+00	0.0004%	0.00E+00	1.00%	0.00E+00	79.00%	0.00	0.00
	Light Oil - MeOH	1.30E-02	2.87E-02	1	100.00%	3.30E-02	100.00%	3.30E-02	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil- Propane	1.30E-02	2.87E-02	0	100.00%	0.00E+00	0.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - Cond/PW	1.30E-02	2.87E-02	0	100.00%	0.00E+00	11.69%	0.00E+00	0.0004%	0.00E+00	0.07%	0.00E+00	0.78%	0.00	0.00
Open Ended-Lines	Gas	2.03E-03	4.48E-03	39	23.15%	4.05E-02	0.85%	1.49E-03	0.0004%	7.00E-07	1.00%	1.75E-03	79.00%	0.14	3.46
	Heavy Oil	1.40E-04	3.09E-04	0	100.00%	0.00E+00	100.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - MeOH	1.40E-03	3.09E-03	0	100.00%	0.00E+00	100.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil- Propane	1.40E-03	3.09E-03	3	100.00%	1.06E-02	0.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - Cond/PW	1.40E-03	3.09E-03	1	100.00%	3.55E-03	11.69%	4.15E-04	0.0004%	1.42E-08	0.074%	2.64E-06	0.78%	0.00	0.00
Hourly Emission Rate (lb/hr)[4]						**5.66**		**0.35**		**0.000062**		**0.14**		**11.00**	**275.13**
Annual Emission Rate (tpy)[5]						**24.77**		**1.53**		**0.00027**		**0.61**		**48.18**	**1205.08**

[1] Emission factors from Table 2-4 of EPA Protocol for Equipment Leak Emission Estimates, 1995.

[2] Weight percent of gas and light liquid - Cond/PW components from facility gas analysis and liquid stream from ProMax report. H_2S is conservatively assumed to be 4 ppm.
Weight percent of heavy liquids and light liquids assumed to be 100% VOC. Propane assumed to have 0% HAP. Heavy liquid (glycol) and methanol assumed to be 100% HAP.

[3] Component counts are based on actual facility counts plus estimated counts for new modification. A safety factor is included for non-methanol service components.
The safety factor provides a conservative estimate of fugitive components, and conservatively estimates emissions to account for variation in gas quality.
Safety Factor 15%

[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] * Operating Hours [hr/yr] * 1/2000 [ton/lb].

[6] Annual GHG Emissions [tpy] = Emissions Factor [lb/hr/component] * Weight Content of Chemical Component [%] * Subcomponent Count * Operating Hours [hr/yr] * 1/2000 [ton/lb]

[7] CO_2e tpy Emission Rate = CO_2 Emission Rate + CH_4 Emission Rate *GWP Factor

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Unit: FUG-2

Description: Willow Lake Plant 2 and Willow Lake Compressor Station - Fugitive emissions

Facility-wide Fugitive Emissions Per Piece of Equipment

Subcomponent		Emission Factor[1] (kg/hr/comp)	Emission Factor[1] (lb/hr/comp)	Component Counts[3]	VOC Content[2] (wt%)	VOC[4] (lb/hr)	HAP Content[2] (wt%)	HAP[4] (lb/hr)	H_2S Content[2] (wt%)	H_2S[4] (lb/hr)	CO_2 Content[2] (wt%)	CO_2[4] (lb/hr)	CH_4 Content[2] (wt%)	CH_4[4] (lb/hr)	CO_2e[7] (lb/hr)
Valves	Gas	4.50E-03	9.92E-03	968	23.15%	2.22E+00	0.85%	8.20E-02	0.0004%	3.84E-05	1.00%	9.61E-02	79.00%	7.59	189.82
	Heavy Oil	8.40E-06	1.85E-05	123	100.00%	2.28E-03	100.00%	2.28E-03	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - MeOH	2.50E-03	5.51E-03	41	100.00%	2.26E-01	100.00%	2.26E-01	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil- Propane	2.50E-03	5.51E-03	317	100.00%	1.75E+00	0.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - Cond/PW	2.50E-03	5.51E-03	482	100.00%	2.66E+00	11.69%	3.10E-01	0.0004%	1.06E-05	0.074%	1.97E-03	0.78%	0.02	0.52
Flanges	Gas	3.90E-04	8.60E-04	486	23.15%	9.68E-02	0.85%	3.57E-03	0.0004%	1.67E-06	1.00%	4.18E-03	79.00%	0.33	8.26
	Heavy Oil	3.90E-07	8.60E-07	51	100.00%	4.35E-05	100.00%	4.35E-05	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - MeOH	1.10E-04	2.43E-04	9	100.00%	2.18E-03	100.00%	2.18E-03	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil- Propane	1.10E-04	2.43E-04	227	100.00%	5.49E-02	0.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - Cond/PW	1.10E-04	2.43E-04	291	100.00%	7.06E-02	11.69%	8.25E-03	0.0004%	2.82E-07	0.074%	5.24E-05	0.78%	0.00	0.01
Connectors	Gas	2.00E-04	4.41E-04	2252	23.15%	2.30E-01	0.85%	8.48E-03	0.0004%	3.97E-06	1.00%	9.93E-03	79.00%	0.78	19.62
	Heavy Oil	7.50E-06	1.65E-05	486	100.00%	8.04E-03	100.00%	8.04E-03	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - MeOH	2.10E-04	4.63E-04	143	100.00%	6.62E-02	100.00%	6.62E-02	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil- Propane	2.10E-04	4.63E-04	697	100.00%	3.23E-01	0.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - Cond/PW	2.10E-04	4.63E-04	1270	100.00%	5.88E-01	11.69%	6.87E-02	0.0004%	2.35E-06	0.074%	4.37E-04	0.78%	0.00	0.11
Other	Gas	8.80E-03	1.94E-02	12	23.15%	5.16E-02	0.85%	1.91E-03	0.0004%	8.92E-07	1.00%	2.23E-03	79.00%	0.18	4.41
	Heavy Oil	3.20E-05	7.05E-05	0	100.00%	0.00E+00	100.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - MeOH	7.50E-03	1.65E-02	0	100.00%	0.00E+00	100.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil- Propane	7.50E-03	1.65E-02	3	100.00%	5.70E-02	0.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - Cond/PW	7.50E-03	1.65E-02	0	100.00%	0.00E+00	11.69%	0.00E+00	0.0004%	0.00E+00	0.074%	0.00E+00	0.78%	0.00	0.00
Pump Seals	Gas	2.40E-03	5.29E-03	0	23.15%	0.00E+00	0.85%	0.00E+00	0.0004%	0.00E+00	1.00%	0.00E+00	79.00%	0.00	0.00
	Light Oil - MeOH	1.30E-02	2.87E-02	2	100.00%	5.73E-02	100.00%	5.73E-02	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil- Propane	1.30E-02	2.87E-02	3	100.00%	9.89E-02	0.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - Cond/PW	1.30E-02	2.87E-02	9	100.00%	2.58E-01	11.69%	3.02E-02	0.0004%	1.03E-06	0.07%	1.92E-04	0.78%	0.00	0.05
Open Ended-Lines	Gas	2.03E-03	4.48E-03	2	23.15%	2.38E-03	0.85%	8.79E-05	0.0004%	4.12E-08	1.00%	1.03E-04	79.00%	0.01	0.20
	Heavy Oil	1.40E-04	3.09E-04	0	100.00%	0.00E+00	100.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - MeOH	1.40E-03	3.09E-03	1	100.00%	3.09E-03	100.00%	3.09E-03	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil- Propane	1.40E-03	3.09E-03	0	100.00%	0.00E+00	0.00%	0.00E+00	0.0000%	0.00E+00	0.00%	0.00E+00	0.00%	0.00	0.00
	Light Oil - Cond/PW	1.40E-03	3.09E-03	0	100.00%	0.00E+00	11.69%	0.00E+00	0.0004%	0.00E+00	0.074%	0.00E+00	0.78%	0.00	0.00
Hourly Emission Rate (lb/hr)[4]						**8.82**		**0.88**		**0.000059**		**0.12**		**8.92**	**223.01**
Annual Emission Rate (tpy)[5]						**38.65**		**3.85**		**0.00026**		**0.50**		**39.05**	**976.78**

[1] Emission factors from Table 2-4 of EPA Protocol for Equipment Leak Emission Estimates, 1995.

[2] Weight percent of gas and light liquid - Cond/PW components from facility gas analysis and liquid stream from ProMax report. H_2S is conservatively assumed to be 4 ppm.
Weight percent of heavy liquids and light liquids assumed to be 100% VOC. Propane assumed to have 0% HAP. Heavy liquid (glycol) and methanol assumed to be 100% HAP.

[3] Component counts are based on actual facility counts plus estimated counts for new modification. A safety factor is included for non-methanol service components.
The safety factor provides a conservative estimate of fugitive components, and conservatively estimates emissions to account for variation in gas quality.
Safety Factor 15%

[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] * Operating Hours [hr/yr] * 1/2000 [ton/lb].

[6] Annual GHG Emissions [tpy] = Emissions Factor [lb/hr/component] * Weight Content of Chemical Component [%] * Subcomponent Count * Operating Hours [hr/yr] * 1/2000 [ton/lb]

[7] CO_2e tpy Emission Rate = CO_2 Emission Rate + CH_4 Emission Rate *GWP Factor

Crestwood New Mexico Pipeline LLC

Willow Lake

Emission Unit: PIGGING

Source Description: Pig Receiver and Launcher Emissions - WL1, WL2, WLCS

Area	Type	Qty	Blowdowns (per year)	Actual cubic ft.	Pressure (psig)	Temperature (F)	scf/event per pig trap
WL CS	Receiver	2	312	21.4	50	80	92.10
WL1	Auto-Launcher	1	26	88.5	1000	80	5973.15
WL1	Receiver	1	26	11.8	150	80	129.27
WL2	Receiver	1	26	11.8	150	80	129.27

Inlet Gas [1]

Molecular Weight	21.74	lb/lb-mol
Methane	55.99%	wt%
CO2	0.19%	wt%
VOC	24%	wt%
HAPs	1%	wt%
H_2S	0.0004%	wt%

[1] Weight percent of gas from facility inlet gas analysis. HAPs are based of inlet to dehy gas analysis. H_2S is conservatively assumed to be 4 ppm.

Total Emissions	VOC Emissions (lb/hr)	VOC Emissions (tpy)	HAP Emissions (lb/hr)	HAP Emissions (tpy)	H_2S Emissions (lb/hr)	H_2S Emissions (tpy)	CO2 Emissions (tpy)	Methane Emissions (tpy)
WL CS	0.05	0.20	0.0019	0.008	7.52E-07	3.29E-06	0.0016	0.032
WL1	0.24	1.07	0.010	0.044	4.06E-06	1.78E-05	0.0085	8.48
WL1	0.0053	0.023	0.00022	0.00096	8.79E-08	3.85E-07	0.00018	0.024
WL2	0.0053	0.023	0.00022	0.00096	8.79E-08	3.85E-07	0.00018	0.024
Total	**0.30**	**1.31**	**0.012**	**0.055**	**4.99E-06**	**2.19E-05**	**0.010**	**8.56**

Notes

$$\text{Emissions (tpy)} = \frac{\text{Number of events per year} * \text{Gas Volume (scf/event)} * \text{Molecular Weight of Gas (lb/lb-mol)} * \text{Weight Fraction of Pollutant}}{\text{Density of Natural Gas (379 scf/lb-mol)} * \text{2000 (lb/ton)}}$$

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Unit: HAUL
Description: Truck Loadout of Condensate, PW and NGL

Haul Road Inputs

Max Facility Throughput:

		bbl/week	bbl/yr	Truck Capacity (bbl)	Vehicles Per Day (VPD)[5]	Vehicles Per Year (VPY)[6]
Haul-1	Condensate + PW	3121.15	162300	139	3.19	1165.00
Haul-2	NGL	25000	1300000	200	17.81	6500.00
	Total	28121.15	1462300	170	21.00	7665.00

	Weight (tons)					
Vehicle Type	Empty Vehicle[1]	Load Size[2]	Loaded Vehicle[3]	Mean Vehicle[4]	Segments per trip	Trips per hour[7]
Haul-1	16	22.0	38.0	27.0	1	1.000
Haul-2	16	21.0	37.0	26.5	1	1.000

	Haul-1	Haul-2
Hours of Operation per Day	24	24
Total Vehicles Per Day	4.00	18.00
Mean Vehicle Weight (tons)	27.0	26.5
Total Trips per Hour	1.00	1.00

Footnotes

[1] Empty vehicle weight includes driver and occupants and full fuel load.

[2] Cargo, transported materials, etc. (Water Density*SG*8400 gal truck/ 2000lb/ton)

[3] Loaded vehicle weight = Empty + Load Size

[4] Mean Vehicle weight = (Loaded Weight + Empty Weight) / 2

[5] Vehicles per day =Maximum Facility Throughput per year*(1/Truck Capacity)*(1 year/365 days)

[6] Vehicles per year =Maximum Facility Throughput per year (bbl/yr)*(1/Truck Capacity (bbl))

[7] Trips per hour = Vehicles per day * Segments per trip ÷ Hours of Operation per Day

Crestwood New Mexico Pipeline LLC

Willow Lake Gas Processing Plant

Unit: HAUL
Description: Truck Loadout of Condensate, PW and NGL

Haul Road Emission Factor Calculation

Emission Factor Calculation (AP-42 Sec. 13.2.2.3 November, 2006, Equation 2)

Unit	Operating Hours	s, silt content[1] %	W, Avg. Veh. Wt. tons	k, PM-10 lb/VMT	k, PM-2.5 lb/VMT	a, PM-10 lb/VMT	a, PM-2.5 lb/VMT	b, PM-10 lb/VMT	b, PM-2.5 lb/VMT
HAUL-1	8760	4.8	27.0	1.5	0.15	0.9	0.9	0.45	0.45
HAUL-2	8760	4.8	26.5	1.5	0.15	0.9	0.9	0.45	0.45

	Hourly Emission Factor[2]		Wet Day, Adjusted Emission Factor[3]		
	E, PM-10 lb/VMT	E, PM-2.5 lb/VMT	Wet Days	E, PM-10 lb/VMT	E, PM-2.5 lb/VMT
HAUL-1	1.77	0.18	70	1.43	0.14
HAUL-2	1.75	0.18	70	1.42	0.14

Haul Road Emission Calculations

Unit	Avg. Trips per Hour	Avg. Trips per Day	Trips per Year	Segment Length	Average VMT/hr[4]	Average VMT/yr[5]	PM-10[6]		PM-2.5[6]	
	T	T	T	mi	mi/hr	mi/yr	lb/hr	tpy	lb/hr	tpy
Haul-1	1.00	4.00	1165.00	0.096	0.0964	112.31	0.17	0.080	0.017	0.0080
Haul-2	1.00	18.00	6500.00	0.085	0.0850	552.75	0.15	0.39	0.015	0.039
Total							**0.32**	**0.47**	**0.032**	**0.047**

Footnotes

[1] Surface silt = % of 75 micron diameter and smaller particles (NMED Default)

[2] E = k x (s/12)^a x (W/3)^b (AP-42 page 13.2.2-4 Equation 1a, November 2006)
E= Size Specific Emission Factor (lb/VMT)
s = surface material silt content (%)
k, a, b = constants from AP-42 Table 13.2.2-2
W = Weighted Mean Vehicle Weight from Haul Road Inputs (tons)

[3] Wet Day Emission Factor = E * (365 - Wet Days)/365. Wet days value is the NM default allowed by NMED without additional justification.

[4] VMT/hr = Vehicle Miles Travelled per hour= Trips per hour * Segment Length

[5] VMT/yr = Vehicle Miles Travelled per year = Trips per day * 365 days per year * Segment Length

[6] lb/hr PM = lb/VMT * VMT/hr
tpy PM = lb/VMT * VMT/yr * 1 ton/2000 lb

Section 7

Information Used To Determine Emissions

Information Used to Determine Emissions shall include the following:

- ☑ If manufacturer data are used, include specifications for emissions units and 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.

Compressor Engines (Units C-1100, C-1200, C-2300, C-2400, and C-1110 to C-1180)
- Manufacturer and catalyst data
- AP-42 Tables 3.2-1 and 3.2-2
- 40 CFR 98 Subparts A and C

Glycol Dehydrators (Units DEHY-803, DEHY-804, DEHY-EG, DEHY-805, DEHY-1505)
- GRI GlyCalc 4.0
- Dehy Upstream Gas Analysis (5/28/2020)
- 40 CFR 98 Subpart A

Heaters and Reboilers (Units HTR-802, HTR-803, HTR-804, HTR-805, HTR-730, HTR-1505)
- AP-42 Tables 1.4-1, 1.4-2, and 1.4-3
- 40 CFR 98 Subparts A and C

Fugitive Components (Units FUG-1 and FUG-2)
- Table 2-4 of EPA Protocol for Equipment Leak Emission Estimates (1995)
- Dehy Upstream Gas Analysis (5/28/2020)
- BR&E ProMax Report

Storage Tanks (Units WL1-TK601 through WL1-TK603, WL2-TK8101 and WL2-TK8102, WLCS-TK2301 to WLCS-TK2304)
- BR&E ProMax
- Condensate Liquid Analysis (5/28/2020)
- Condensate Liquid Analysis (8/19/2021)

Condensate Loading (Unit ATM LOAD)
- BR&E ProMax
- Condensate Liquid Analysis (5/28/2020)
- Condensate Liquid Analysis (8/19/2021)

Natural Gas Liquid Loading (Unit NGL LOAD)
- Loading hose dimensions, volumes, and throughputs
- Estimated physical properties of NGL

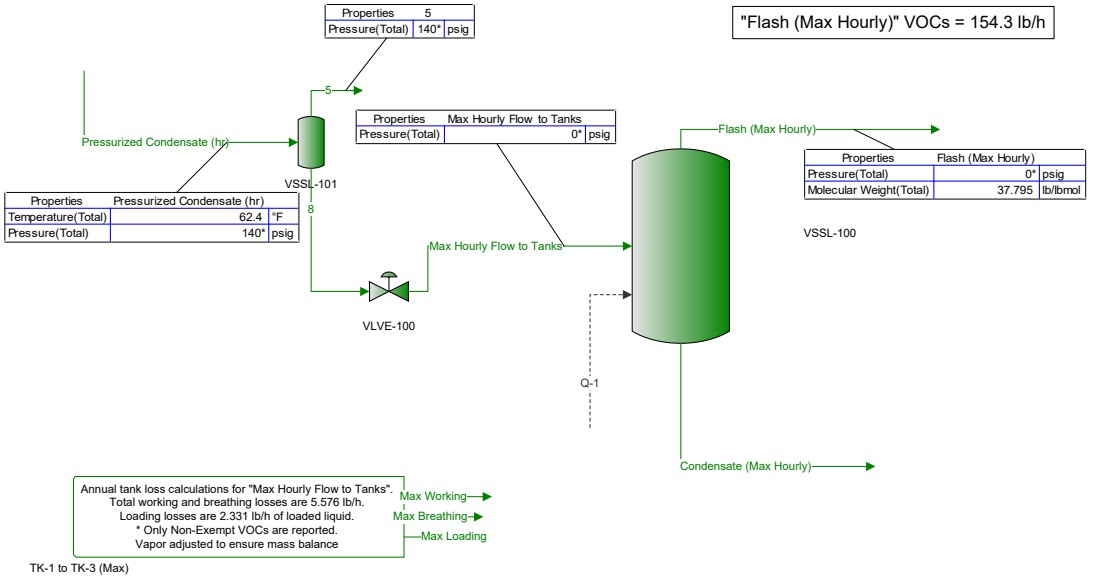
Unpaved Haul Road (Unit HAUL)
- AP-42 13.2.2
- Facility throughputs and truck capacities

Process Flares (Units WL1-FL and WL2-FL)
- Tank, loading, and dehydrator streams from BR&E ProMax
- TNRCC RG-109 emission factors

Miscellaneous Equipment (Units WL1-FL Blowdown, WL2-FL Blowdown, PIGGING)
- Engineer estimates for blowdown volumes and frequency
- Dehy Upstream Gas Analysis (05/28/2020)
- Inlet Gas Analysis (02/17/2020)
- TNRCC RG-109 emission factors

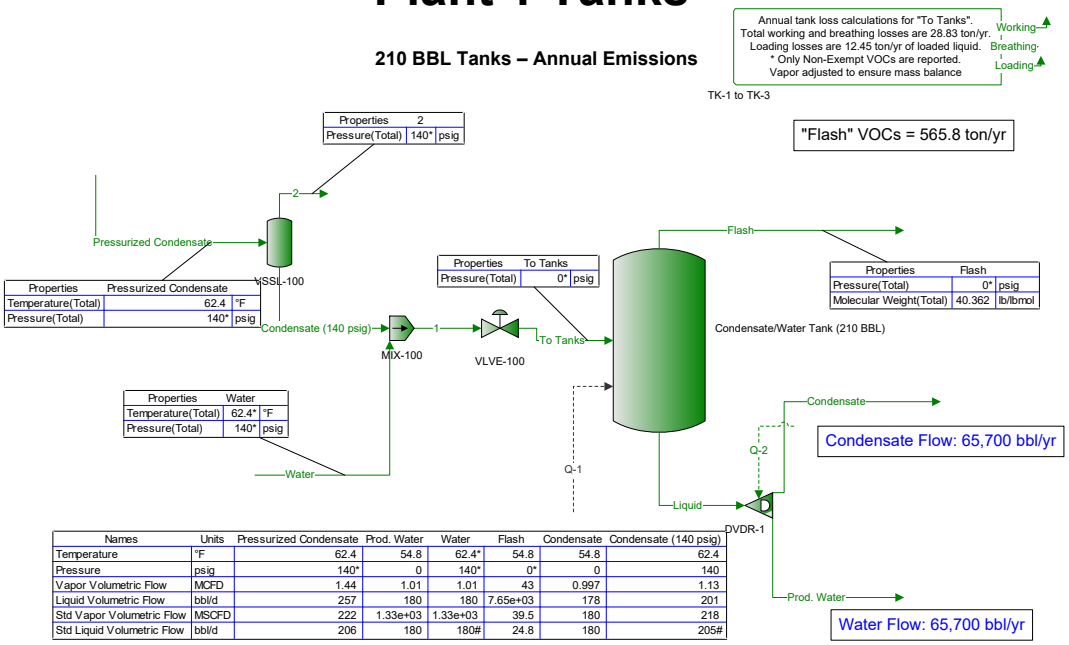
Willow Lake Gas Plant
Plant 1 Tanks

210 BBL Tanks – Max Hourly Emissions



Willow Lake Gas Plant
Plant 1 Tanks

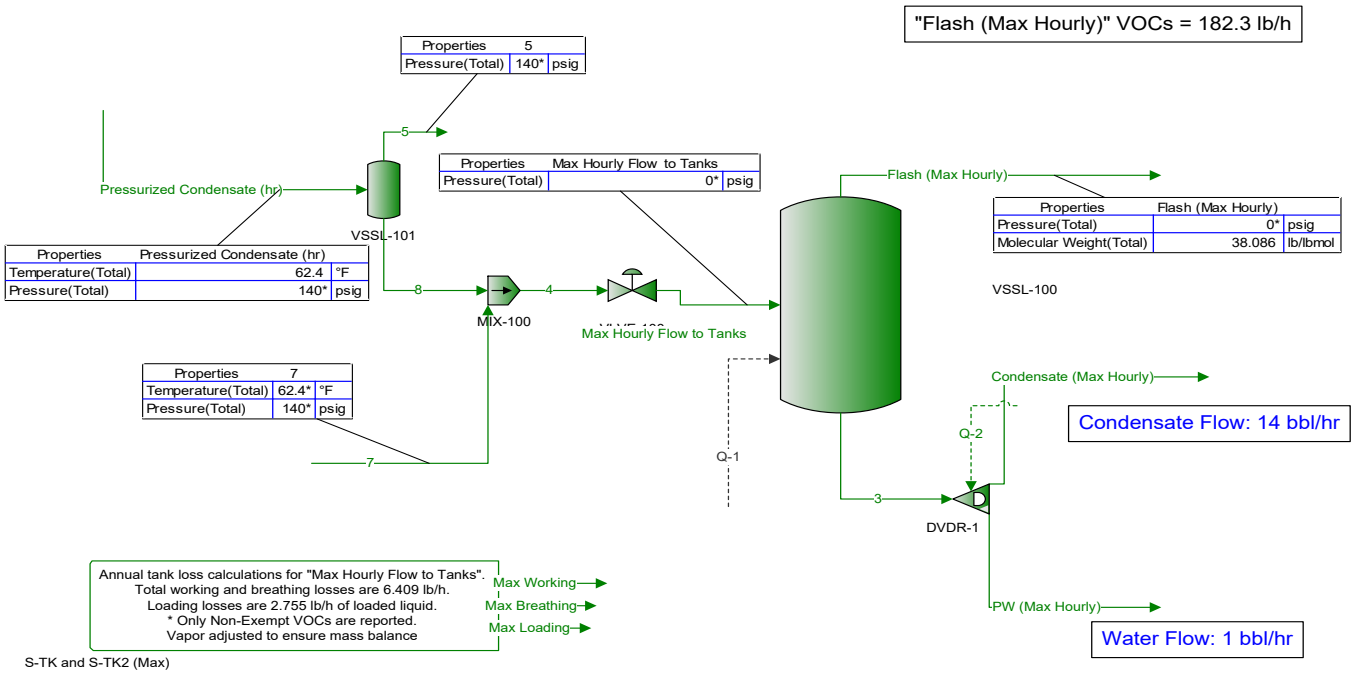
210 BBL Tanks – Annual Emissions



Names	Units	Pressurized Condensate	Prod. Water	Water	Flash	Condensate	Condensate (140 psig)
Temperature	°F	62.4	54.8	62.4*	54.8	54.8	62.4
Pressure	psig	140*	0	140*	0*	0	140
Vapor Volumetric Flow	MCFD	1.44	1.01	1.01	43	0.997	1.13
Liquid Volumetric Flow	bbl/d	257	180	180	7.65e+03	178	201
Std Vapor Volumetric Flow	MSCFD	222	1.33e+03	1.33e+03	39.5	180	218
Std Liquid Volumetric Flow	bbl/d	206	180	180#	24.8	180	205#

Willow Lake Gas Plant
Plant 2 Tanks

400 BBL Tanks – Max Hourly Emissions



Willow Lake Gas Plant
Plant 2 Tanks

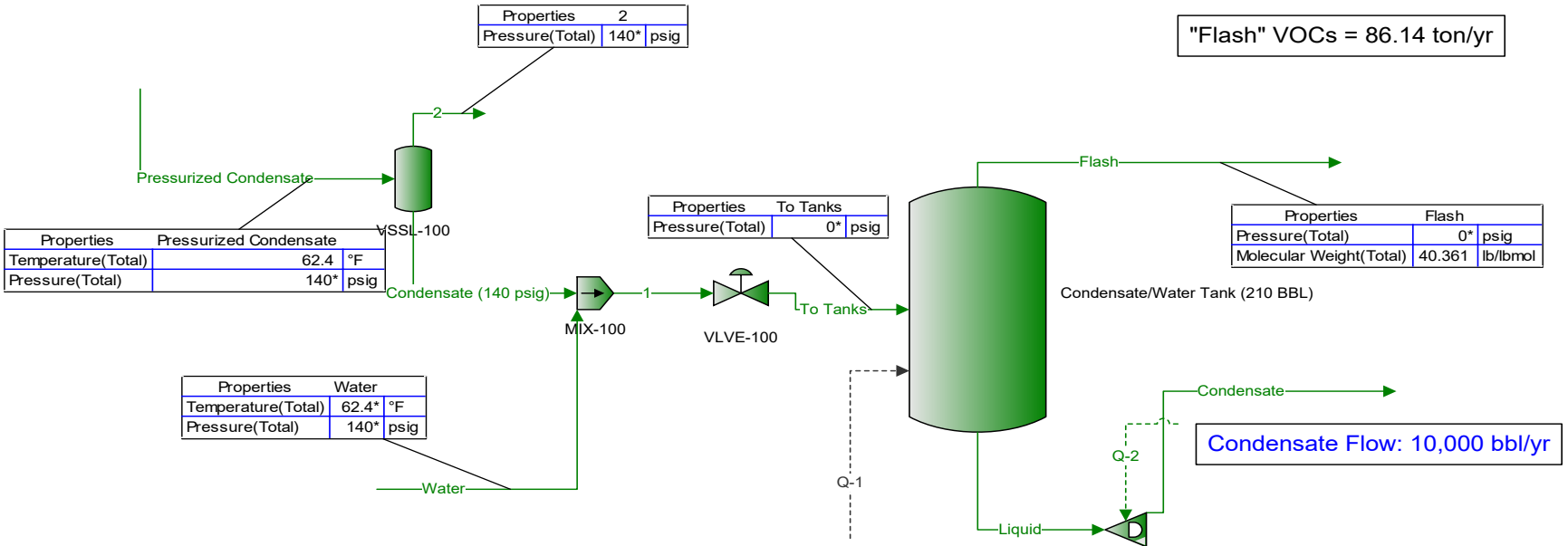
400 BBL Tanks – Annual Emissions

Annual tank loss calculations for "To Tanks".
Total working and breathing losses are 7.792 ton/yr.
Loading losses are 1.909 ton/yr of loaded liquid.
* Only Non-Exempt VOCs are reported.
Vapor adjusted to ensure mass balance

Working
Breathing
Loading

S-TK and S-TK2

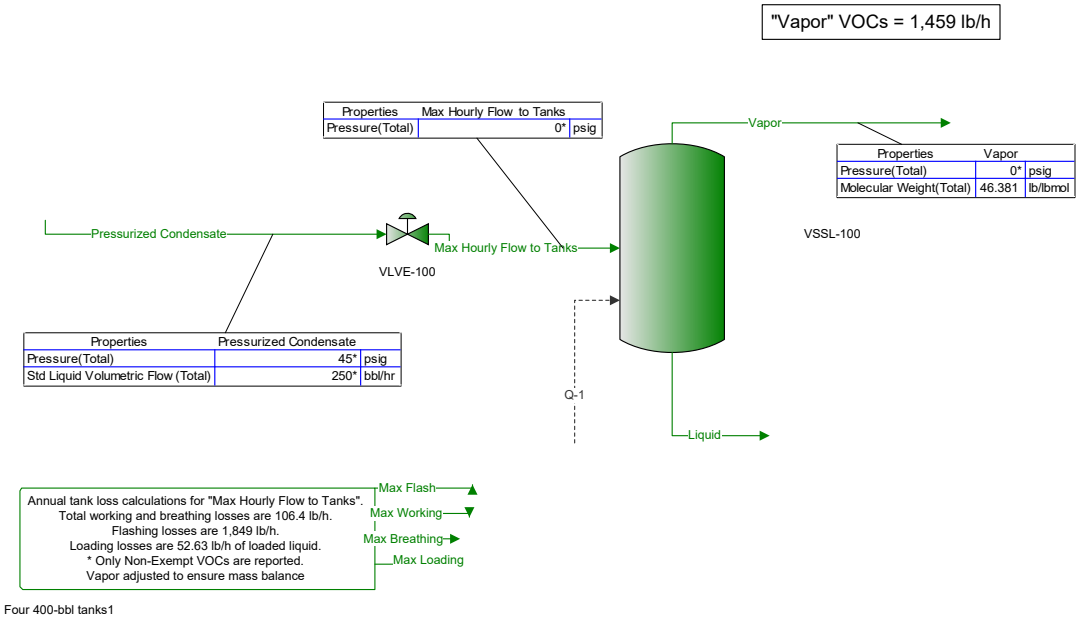
"Flash" VOCs = 86.14 ton/yr



Names	Units	Pressurized Condensate	Prod. Water	Water	Flash	Condensate	Condensate (140 psig)
Temperature	°F	62.4	54.8	62.4*	54.8	54.8	62.4
Pressure	psig	140*	0	140*	0*	0	140
Vapor Volumetric Flow	MCFD	0.219	0.154	0.154	6.54	0.152	0.171
Liquid Volumetric Flow	bbl/d	39	27.4	27.4	1.16e+03	27	30.5
Std Vapor Volumetric Flow	MSCFD	33.8	202	202	6.02	27.3	33.3
Std Liquid Volumetric Flow	bbl/d	31.4	27.4	27.4#	3.78	27.4	31.2#

Willow Lake Gas Plant
Compressor Station Tanks

400 BBL Tanks – Max Hourly Emissions



Four 400-bbl tanks1

Willow Lake Gas Plant
Compressor Station Tanks

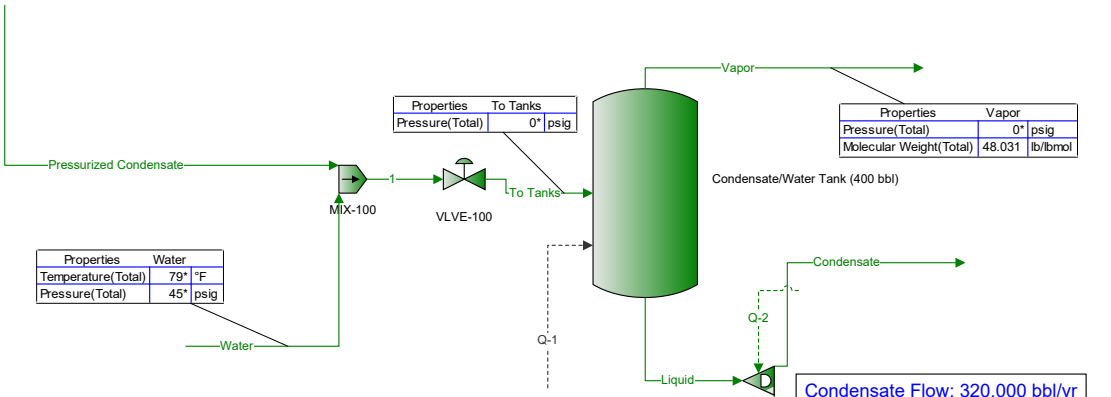
400 BBL Tanks – Annual Emissions

Annual tank loss calculations for "To Tanks".
Total working and breathing losses are 148.6 ton/yr.
Flashing losses are 1,337 ton/yr.
Loading losses are 69.97 ton/yr of loaded liquid.
* Only Non-Exempt VOCs are reported.
Vapor adjusted to ensure mass balance

Flash
Working
Breathing
Loading

Four 400-bbl tanks

"Vapor" VOCs = 1,318 ton/yr



Condensate Flow: 320,000 bbl/yr

Produced Water Flow: 320,000 bbl/yr

Names	Units	Pressurized Condensate	Prod. Water	Water	Vapor	Condensate
Temperature	°F	79*	75.7	79*	75.7	75.7
Pressure	psig	45*	0	45*	0*	0
Vapor Volumetric Flow	MCFD	5.2	4.93	4.94	76.9	4.94
Liquid Volumetric Flow	bbl/d	926	879	879	1.37e+04	880
Std Vapor Volumetric Flow	MSCFD	925	6.47e+03	6.47e+03	68.2	859
Std Liquid Volumetric Flow	bbl/d	923#	877	877#	46.3	877

Cypress Engine Accessories

MIRATECH

Equipment Specification

Proposal Information

Proposal Number:	CEA-20-005080	Date:	**8/17/2020**
Project Reference:	Crestwood		

Engine Information

Engine Make:	Caterpillar	Speed:	Rated
Engine Model:	G 3608 LE TA	Power Output:	2,370 bhp
Rated Speed:	1000 RPM	Exhaust Flow Rate:	16,144 acfm (cfm)
Fuel Description:	Natural Gas	Exhaust Temperature:	857 F
Hours Of Operation:	8760 Hours per year	Fuel Consumption:	6,629 btu/bhp-hr
Load:	100%	O_2:	12.3%
		H_2O:	17%

Emission Data (100% Load)

Emission	Raw Engine Emissions						Target Outlet Emissions						Calculated Reduction
	g/bhp-hr	*tons/yr*	*ppmvd @ 15% O_2*	*ppmvd*	*g/kW-hr*	*lb/MW-hr*	*g/bhp-hr*	*tons/yr*	*ppmvd @ 15% O_2*	*ppmvd*	*g/kW-hr*	*lb/MW-hr*	
NO_x*	*0.5*	11.44	47	68	0.671	1.48							
CO	*2.75*	62.93	421	613	3.688	8.13	*1*	22.89	153	223	1.341	2.96	63.6%
THC**	*6.29*	143.95	1,680	2,448	8.435	18.6							
NMNEHC***	*0.63*	14.42	168	245	0.845	1.86	0.16	3.66	43	62	0.215	0.47	74.6%
CH_2O	*0.26*	5.95	37	54	0.349	0.77	*0.04*	0.92	6	8	0.054	0.12	84.6%

System Specifications

Catalyst (Replacement Catalyst)

Design Exhaust Flow Rate:	16,144 acfm (cfm)
Design Exhaust Temperature:	857°F
Element Model Number:	MECB-OX-SQ-1500-2400-350
Number of Catalyst Layers:	1
Number of Catalyst Per Layer:	3
Catalyst Back Pressure:	4.0 inches of WC (Clean) (10.0 mBar)
Dimensions:	15 x 24
Exhaust Temperature Limits†:	550 – 1250°F (catalyst inlet); 1350°F (catalyst outlet) 288 – 677°C (catalyst inlet); 732°C (catalyst outlet)

* MW referenced as NO_2

** MW referenced as CH_4

*** MW referenced as CH_4. Propane in the exhaust shall not exceed 15% by volume of the NMNEHC compounds in the exhaust, excluding aldehydes. The 15% (vol.) shall be established on a wet basis, reported on a methane molecular weight basis. The measurement of exhaust NMNEHC composition shall be based upon EPA method 320 (FTIR), and shall exclude formaldehyde.

† General catalyst temperature operating range. Performance is based on the Design Exhaust Temperature.

Cypress Engine Accessories

MIRATECH

Equipment Specification

Proposal Information

Proposal Number:	CEA-20-005082 Rev(2)	Date:	**9/14/2020**
Project Reference:	Crestwood		

Engine Information

Engine Make:	Waukesha	Speed:	Rated
Engine Model:	P 9390 GSI	Power Output:	1,980 bhp
Rated Speed:	1200 RPM	Exhaust Flow Rate:	9,774 acfm (cfm)
Fuel Description:	Natural Gas	Exhaust Temperature:	1,250 F
Hours Of Operation:	8760 Hours per year	Fuel Consumption:	8,278 btu/bhp-hr
Load:	100%	O_2:	0.3%
		H_2O:	18.5%

Emission Data (100% Load)

Emission	Raw Engine Emissions						Target Outlet Emissions						Calculated Reduction
	g/bhp-hr	*tons/yr*	*ppmvd @ 15% O_2*	*ppmvd*	*g/kW-hr*	*lb/MW-hr*	*g/bhp-hr*	*tons/yr*	*ppmvd @ 15% O_2*	*ppmvd*	*g/kW-hr*	*lb/MW-hr*	
NO_x*	*13*	248.55	922	3,220	17.433	38.43	*2*	38.24	142	495	2.682	5.91	84.6%
CO	*9*	172.07	1,049	3,661	12.069	26.61	*1.35*	25.81	157	549	1.81	3.99	85%
THC**	*2*	38.24	407	1,420	2.682	5.91							
NMNEHC***	*0.3*	5.74	61	213	0.402	0.89	0.12	2.29	24	85	0.161	0.35	60%
CH_2O	*0.05*	0.96	5	19	0.067	0.15	*0.04*	0.73	4	14	0.051	0.11	24%

System Specifications

Catalyst (Replacement Catalyst)

Design Exhaust Flow Rate:	9,774 acfm (cfm)
Design Exhaust Temperature:	1,250°F
Element Model Number:	MECB-TW-RO-3350-0000-350
Number of Catalyst Layers:	2
Number of Catalyst Per Layer:	1
Catalyst Back Pressure:	6.0 inches of WC (Clean) (14.9 mBar)
Dimensions:	Ø 33.5
Exhaust Temperature Limits†:	750 – 1250°F (catalyst inlet); 1350°F (catalyst outlet) 399 – 677°C (catalyst inlet); 732°C (catalyst outlet)

* MW referenced as NO_2

** MW referenced as CH_4

*** MW referenced as CH_4. Propane in the exhaust shall not exceed 15% by volume of the NMNEHC compounds in the exhaust, excluding aldehydes. The 15% (vol.) shall be established on a wet basis, reported on a methane molecular weight basis. The measurement of exhaust NMNEHC composition shall be based upon EPA method 320 (FTIR), and shall exclude formaldehyde.

† General catalyst temperature operating range. Performance is based on the Design Exhaust Temperature.

POWERTHERM
MAXIM SILENCERS

ICE Catalyst Sizing Program

ENGINE INPUT (Manufacturer, Model, Type) - Waukesha L7044GSI L7044GSI-1680BHP-1200RPM - EXPERT MODE

Input Mass Flow Rate

	lbs/hr	scfm	scfh	"acfm"	"acfh"	Estimated Exhaust Gas Composition		
	10750	2,422	145,332	7,395.1	443,706	N2	79.7	vol%
Brake Horse Power:	1680					O2	0.3	vol%
			Maximum Pressure Drop (in)		20	H2O	10	vol%
Molecular weight:	28.50		Exhaust Density (lbs/ft3)		0.025	CO2	10	vol%
			mol% propane in fuel gas:		<5			

Inlet Temperature

Process Temperature (F)
1152

Permitted Emissions (g/bhp-hr)

NOx**	CO**	VOC(NMNE)**	H2CO**
1.0	1.0	0.06	.012

Catalyst Type

Three-way Catalyst

Catalyst Module Details

Module Shape		Modules/Layer	3	Layers	1
Square				cpsi	300
Guard Bed - No	X&Y (inch)	15	24	Depth	3.5
	Part Number:		ERT-1524-2	Part Weight (lbs)	43.4
				Total Weight (lbs)	130.3

Space Velocity

Open area for gas flow (ft2):	6.71				
Linear Velocity (ft/min):	1,102	Calculated Space Velocity:	74,278	Safety Value	2
Foil thickness (inches):	0.002				

Pressure Drop

300 cpsi — Pressure Drop (in wc): 1.83

Inlet Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	13.3	49.26	215.76	2,792.64	888.70
CO	11.5	42.59	186.56	3,966.98	1,262.42
VOC	0.16	0.59	2.60	35.04	11.15
H2CO	0.05	0.19	0.81	16.10	5.12

Target Conversions

NOx	92.5%
CO	91.3%
VOC(NMNE)	62.5%
H2CO	76.0%

Required Output Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	<1.0	3.70	16.22	209.97	66.82
CO	<1.0	3.70	16.22	344.95	109.78
VOC	<0.06	0.22	0.98	13.14	4.18
H2CO	<.012	0.05	0.19	3.86	1.23

Conversions Catalyst Design

NOx	92.5%
CO	91.3%
VOC(NMNE)	62.5%
H2CO	76.0%

Output Pollutants with Catalyst Sizing

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	1.0	3.70	16.22	209.97	66.82
CO	1.0	3.70	16.22	344.95	109.78
VOC	0.06	0.22	0.98	13.14	4.18
H2CO	.012	0.05	0.19	3.86	1.23

Notes:

Customer:	Crestwood Midstream			Project:	L7044GSI
Sales Person:	Bryan King	Date:	11/17/20	Contact:	Moe Wolfe
Housing:		Element:	ERT-1524-2	Description:	Element, Catalyst, 3-Way, 15 x 24

* Calculated ppm at 15% Oxygen. Estimated with O2 value provided in "Estimated Exhaust Gas Composition". For accurate value insert actual engine O2.

** Insert required conversion rates.

POWERTHERM
MAXIM SILENCERS

ICE Catalyst Sizing Program

ENGINE INPUT (Manufacturer, Model, Type) - Caterpillar G3606 1875 BHP @ 1000 RPM Caterpillar G3606 - EXPERT MODE

Input Mass Flow Rate

	lbs/hr	scfm	scfh	"acfm"	"acfh"	Estimated Exhaust Gas Composition		
	22100	4,980	298,776	12,213.2	732,792	N2	74	vol%
Brake Horse Power:	1875					O2	10	vol%
			Maximum Pressure Drop (in)		0	H2O	10	vol%
Molecular weight:	28.50		Exhaust Density (lbs/ft3)		0.031	CO2	6	vol%
			mol% propane in fuel gas:		<5			

Inlet Temperature

Process Temperature (F)
835

Permitted Emissions (g/bhp-hr)

NOx**	CO**	VOC(NMNE)**	H2CO**
0.5	0.22	0.145	0.03

Catalyst Type

CO/DOC Catalyst

Catalyst Module Details

Module Shape		Modules/Layer	2	Layers	1
Square				cpsi	300
Guard Bed - No	X&Y (inch)	15	36	Depth	3.5
	Part Number:		ERH-1536-2	Part Weight (lbs)	63.6
				Total Weight (lbs)	127.3

Space Velocity

Open area for gas flow (ft2):	6.81				
Linear Velocity (ft/min):	1,795	Calculated Space Velocity:	150,521	Safety Value	2
Foil thickness (inches):	0.002				

Pressure Drop

300 cpsi — Pressure Drop (in wc): 2.98

Inlet Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.50	2.07	9.05	57.00	34.28
CO	2.20	9.09	39.83	412.00	247.79
VOC	0.29	1.20	5.25	34.48	20.74
H2CO	0.20	0.83	3.62	34.96	21.03

Target Conversions

Required Output Pollutants

			g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.0%	NOx	<0.5	2.07	9.05	57.00	34.28
CO	90.0%	CO	<0.22	0.91	3.98	41.20	24.78
VOC(NMNE)	50.0%	VOC	<0.145	0.60	2.63	17.24	10.37
H2CO	85.0%	H2CO	<0.03	0.12	0.54	5.24	3.15

Conversions Catalyst Design

Output Pollutants with Catalyst Sizing

			g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.0%	NOx	0.5	2.07	9.05	57.00	34.28
CO	90.0%	CO	0.22	0.91	3.98	41.20	24.78
VOC(NMNE)	50.0%	VOC	0.145	0.60	2.63	17.24	10.37
H2CO	85.0%	H2CO	0.03	0.12	0.54	5.24	3.15

Notes:

Customer:	Crestwood Midstream			Project:	G3606A4
Sales Person:	KW	Date:	1/27/2021	Contact:	Moe Wolfe
Housing:		Element:	ERH-1536-2	Description:	Element, Catalyst, Oxidation, 15 x 36

* Calculated ppm at 15% Oxygen. Estimated with O2 value provided in "Estimated Exhaust Gas Composition". For accurate value insert actual engine O2.

** Insert required conversion rates.

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:

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

[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 ≤ 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.

Table 3.2-3. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE RICH-BURN ENGINES (Concluded)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Chlorobenzene[l]	<1.29 E-05	E
Chloroform[l]	<1.37 E-05	E
Ethane[n]	7.04 E-02	C
Ethylbenzene[l]	<2.48 E-05	E
Ethylene Dibromide[l]	<2.13 E-05	E
Formaldehyde[l,m]	2.05 E-02	A
Methanol[l]	3.06 E-03	D
Methylene Chloride[l]	4.12 E-05	C
Naphthalene[l]	<9.71 E-05	E
PAH[l]	1.41 E-04	D
Styrene[l]	<1.19 E-05	E
Toluene[l]	5.58 E-04	A
Vinyl Chloride[l]	<7.18 E-06	E
Xylene[l]	1.95 E-04	A

[a] Reference 7. Factors represent uncontrolled levels. For NO_x, CO, and PM-10, "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. PM10 = 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,

Table 3.2-3. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE RICH-BURN ENGINES[a]
(SCC 2-02-002-53)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Criteria Pollutants and Greenhouse Gases		
NO_x[c] 90 - 105% Load	2.21 E+00	A
NO_x[c] <90% Load	2.27 E+00	C
CO[c] 90 - 105% Load	3.72 E+00	A
CO[c] <90% Load	3.51 E+00	C
CO_2[d]	1.10 E+02	A
SO_2[e]	5.88 E-04	A
TOC[f]	3.58 E-01	C
Methane[g]	2.30 E-01	C
VOC[h]	2.96 E-02	C
PM10 (filterable)[i,j]	9.50 E-03	E
PM2.5 (filterable)[j]	9.50 E-03	E
PM Condensable[k]	9.91 E-03	E
Trace Organic Compounds		
1,1,2,2-Tetrachloroethane[l]	2.53 E-05	C
1,1,2-Trichloroethane[l]	<1.53 E-05	E
1,1-Dichloroethane	<1.13 E-05	E
1,2-Dichloroethane	<1.13 E-05	E
1,2-Dichloropropane	<1.30 E-05	E
1,3-Butadiene[l]	6.63 E-04	D
1,3-Dichloropropene[l]	<1.27 E-05	E
Acetaldehyde[l,m]	2.79 E-03	C
Acrolein[l,m]	2.63 E-03	C
Benzene[l]	1.58 E-03	B
Butyr/isobutyraldehyde	4.86 E-05	D
Carbon Tetrachloride[l]	<1.77 E-05	E

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 6 source tests.

[g] Emission factor for methane is determined by subtracting the VOC and ethane emission factors from the TOC emission factor.

[h] VOC emission factor is based on the sum of the emission factors for all speciated organic compounds. Methane and ethane emissions were not measured for this engine category.

[i] No data were available for uncontrolled engines. PM10 emissions are for engines equipped with a PCC.

[j] Considered ≤ 1 μm in aerodynamic diameter. Therefore, for filterable PM emissions, PM10(filterable) = PM2.5(filterable).

[k] No data were available for condensable emissions. The presented emission factor reflects emissions from 4SLB engines.

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

[m] For rich-burn engines, no interference is suspected in quantifying aldehyde emissions. The presented emission factors are based on FTIR and CARB 430 emissions data measurements.

[n] Ethane emission factor is determined by subtracting the VOC emission factor from the NMHC emission factor.

References For Section 3.2

1. *Engines, Turbines, And Compressors Directory*, American Gas Association, Catalog #XF0488.

2. *Standards Support And Environmental Impact Statement, Volume I: Stationary Internal Combustion Engines*, EPA-450/2-78-125a, U. S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, July 1979.

3. *Alternative Control Techniques Document - NO_x Emissions From Stationary Reciprocating Engines*, EPA-453/R-93-032, July 1993.

4. *Handbook - Control Technologies For Hazardous Air Pollutants*, EPA-625/6-91-014, June 1991.

5. *Limiting Net Greenhouse Gas Emissions In The United States, Volume II: Energy Responses,* Report for the Office of Environmental Analysis, Office of Policy, Planning and Analysis, Department of Energy (DOE), DOE/PE-0101 Volume II, September 1991.

6. C. Castaldini, *NO_x Reduction Technologies For Natural Gas Industry Prime Movers*, GRI-90/0215, Gas Research Institute, Chicago, IL, August 1990.

7. *Emission Factor Documentation for AP-42 Section 3.2, Natural Gas-Fired Reciprocating Engines*, EPA Contract No. 68-D2-0160, Alpha-Gamma Technologies, Inc., Raleigh, North Carolina, July 2000.

Federal Environment and Safety Codified Regulations
TITLE 40—Protection of Environment
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	$C\text{-}C_3F_6$	17,340
PFC-3-1-10 (Perfluorobutane)	355-25-9	C_4F_{10}	[a] 8,860
PFC-318 (Perfluorocyclobutane)	115-25-3	$C\text{-}C_4F_8$	[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
PFC-7-1-18	307-34-6	C_8F_{18}; $CF_3(CF_2)_6CF_3$	[b] 7,620
PFC-9-1-18	306-94-5	$C_{10}F_{18}$	7,500
PFPMIE (HT-70)	NA	$CF_3OCF(CF_3)CF_2OCF_2OCF_3$	10,300
Perfluorodecalin (cis)	60433-11-6	$Z\text{-}C_{10}F_{18}$	[b] 7,236
Perfluorodecalin (trans)	60433-12-7	$E\text{-}C_{10}F_{18}$	[b] 6,288
Saturated Hydrofluorocarbons (HFCs) With Two or Fewer Carbon-Hydrogen Bonds			
HFC-23	75-46-7	CHF_3	[a] 14,800
HFC-32	75-10-5	CH_2F_2	[a] 675
HFC-125	354-33-6	C_2HF_5	[a] 3,500
HFC-134	359-35-3	$C_2H_2F_4$	[a] 1,100
HFC-134a	811-97-2	CH_2FCF_3	[a] 1,430
HFC-227ca	2252-84-8	$CF_3CF_2CHF_2$	[b] 2640

Federal Environment and Safety Codified Regulations
TITLE 40—Protection of Environment
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

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
Propane [1]	0.091	62.87
Propylene [2]	0.091	67.77
Ethane [1]	0.068	59.60
Ethanol	0.084	68.44
Ethylene [2]	0.058	65.96
Isobutane [1]	0.099	64.94
Isobutylene [1]	0.103	68.86
Butane [1]	0.103	64.77
Butylene [1]	0.105	68.72
Naphtha (<401 deg F)	0.125	68.02
Natural Gasoline	0.110	66.88
Other Oil (>401 deg F)	0.139	76.22

Pentanes Plus	0.110	70.02
Petrochemical Feedstocks	0.125	71.02
Special Naphtha	0.125	72.34
Unfinished Oils	0.139	74.54
Heavy Gas Oils	0.148	74.92
Lubricants	0.144	74.27
Motor Gasoline	0.125	70.22
Aviation Gasoline	0.120	69.25
Kerosene-Type Jet Fuel	0.135	72.22
Asphalt and Road Oil	0.158	75.36
Crude Oil	0.138	74.54
Petroleum products—solid	mmBtu/short ton	kg CO_2/mmBtu
Petroleum Coke	30.00	102.41
Petroleum products—gaseous	mmBtu/scf	kg CO_2/mmBtu
Propane Gas	2.516×10^{-3}	61.46
Other fuels—solid	mmBtu/short ton	kg CO_2 /mmBtu
Municipal Solid Waste	9.95 [3]	90.7
Tires	28.00	85.97
Plastics	38.00	75.00
Other fuels—gaseous	mmBtu/scf	kg CO_2 /mmBtu
Blast Furnace Gas	0.092×10^{-3}	274.32
Coke Oven Gas	0.599×10^{-3}	46.85
Fuel Gas [4]	1.388×10^{-3}	59.00
Biomass fuels—solid	mmBtu/short ton	kg CO_2 /mmBtu
Wood and Wood Residuals (dry basis) [5]	17.48	93.80
Agricultural Byproducts	8.25	118.17
Peat	8.00	111.84
Solid Byproducts	10.39	105.51
Biomass fuels—gaseous	mmBtu/scf	kg CO_2 /mmBtu
Landfill Gas	0.485×10^{-3}	52.07
Other Biomass Gases	0.655×10^{-3}	52.07
Biomass Fuels—Liquid	mmBtu/gallon	kg CO_2 /mmBtu
Ethanol	0.084	68.44
Biodiesel (100%)	0.128	73.84
Rendered Animal Fat	0.125	71.06
Vegetable Oil	0.120	81.55

[1] The HHV for components of LPG determined at 60 °F and saturation pressure with the exception of ethylene.

[2] Ethylene HHV determined at 41 °F (5 °C) and saturation pressure.

[3] Use of this default HHV is allowed only for: (a) Units that combust MSW, do not generate steam, and are allowed to use Tier 1; (b) units that derive no more than 10 percent of their annual heat input from MSW and/or tires; and (c) small batch incinerators that combust no more than 1,000 tons of MSW per year.

[4] Reporters subject to subpart X of this part that are complying with § 98.243(d) or subpart Y of this part may only use the default HHV and the default CO_2 emission factor for fuel gas combustion under the conditions prescribed in § 98.243(d)(2)(i) and (d)(2)(ii) and § 98.252(a)(1) and (a)(2), respectively. Otherwise, reporters subject to subpart X or subpart Y shall use either Tier 3 (Equation C-5) or Tier 4.

[5] Use the following formula to calculate a wet basis HHV for use in Equation C-1: $HHV_w = ((100 - M)/100)*HHV_d$ where HHV_w = wet basis HHV, M = moisture content (percent) and HHV_d = dry basis HHV from Table C-1.

[78 FR page 71950, Nov. 29, 2013; 81 FR page 89252, Dec. 9, 2016; corrected at 82 FR 41343, Aug. 31, 2017]

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Federal Environment and Safety Codified Regulations
TITLE 40—Protection of Environment
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.

[75 FR page 79154, Dec. 17, 2010; 78 FR page 71952, Nov. 29, 2013; 81 FR page 89252, Dec. 9, 2016]

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GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: 2020_Willow Lake_Dehy 1
File Name: P:\1. CLIENTS\Crestwood\Willow Lake NSR\ProMax and GlyCalc\GlyCalc Runs\2020_Dehy1_WillowLake 2020 0817.ddf
Date: August 17, 2020

DESCRIPTION: **DEHY-803**

Description: 2020 PTE Calculations

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0032	0.077	0.0140
Methane	0.6569	15.766	2.8774
Ethane	0.7490	17.976	3.2807
Propane	1.0738	25.771	4.7032
Isobutane	0.3021	7.252	1.3234
n-Butane	0.9037	21.688	3.9581
Isopentane	0.2046	4.910	0.8960
n-Pentane	0.2752	6.604	1.2053
n-Hexane	0.1865	4.476	0.8168
Other Hexanes	0.1843	4.423	0.8072
Heptanes	0.3014	7.233	1.3199
Benzene	0.0280	0.672	0.1227
Toluene	0.6903	16.566	3.0233
Ethylbenzene	0.0317	0.760	0.1388
Xylenes	0.1186	2.847	0.5196
C8+ Heavies	0.0038	0.090	0.0164
Total Emissions	5.7130	137.112	25.0229
Total Hydrocarbon Emissions	5.7098	137.035	25.0089
Total VOC Emissions	4.3038	103.292	18.8508
Total HAP Emissions	1.0551	25.322	4.6212
Total BTEX Emissions	0.8686	20.846	3.8044

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0034	0.082	0.0150
Methane	0.6597	15.832	2.8893
Ethane	0.7663	18.391	3.3564
Propane	1.1983	28.760	5.2487
Isobutane	0.3716	8.919	1.6277
n-Butane	1.1845	28.429	5.1883
Isopentane	0.3866	9.278	1.6932
n-Pentane	0.5454	13.091	2.3890
n-Hexane	0.6025	14.460	2.6390
Other Hexanes	0.5015	12.036	2.1965
Heptanes	2.1406	51.376	9.3760

Benzene	0.1349	3.239	0.5911
Toluene	8.4893	203.744	37.1833
Ethylbenzene	1.1841	28.418	5.1863
Xylenes	4.7399	113.757	20.7606
C8+ Heavies	7.7595	186.227	33.9865
Total Emissions	30.6682	736.038	134.3269
Total Hydrocarbon Emissions	30.6648	735.956	134.3119
Total VOC Emissions	29.2389	701.732	128.0662
Total HAP Emissions	15.1507	363.618	66.3603
Total BTEX Emissions	14.5482	349.158	63.7213

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0062	0.148	0.0270
Methane	97.3095	2335.427	426.2154
Ethane	30.7329	737.591	134.6103
Propane	22.1606	531.854	97.0634
Isobutane	4.4301	106.322	19.4037
n-Butane	10.6813	256.352	46.7843
Isopentane	2.9814	71.553	13.0585
n-Pentane	3.3602	80.645	14.7178
n-Hexane	1.9850	47.640	8.6943
Other Hexanes	2.2096	53.030	9.6781
Heptanes	3.3209	79.702	14.5455
Benzene	0.0151	0.363	0.0663
Toluene	0.5918	14.203	2.5920
Ethylbenzene	0.0461	1.107	0.2020
Xylenes	0.1272	3.054	0.5573
C8+ Heavies	0.9895	23.747	4.3339
Total Emissions	180.9474	4342.738	792.5498
Total Hydrocarbon Emissions	180.9413	4342.591	792.5228
Total VOC Emissions	52.8989	1269.573	231.6971
Total HAP Emissions	2.7653	66.366	12.1119
Total BTEX Emissions	0.7803	18.727	3.4176

EQUIPMENT REPORTS:

CONDENSER

Condenser Outlet Temperature:	120.00 deg. F
Condenser Pressure:	13.50 psia
Condenser Duty:	5.14e-002 MM BTU/hr
Hydrocarbon Recovery:	2.01 bbls/day
Produced Water:	4.05 bbls/day
VOC Control Efficiency:	85.28 %
HAP Control Efficiency:	93.04 %
BTEX Control Efficiency:	94.03 %
Dissolved Hydrocarbons in Water:	380.15 mg/L

Component	Emitted	Condensed
Water	0.60%	99.40%

Carbon Dioxide	98.16%	1.84%
Hydrogen Sulfide	93.58%	6.42%
Nitrogen	99.59%	0.41%
Methane	99.59%	0.41%
Ethane	97.74%	2.26%
Propane	89.61%	10.39%
Isobutane	81.31%	18.69%
n-Butane	76.29%	23.71%
Isopentane	52.92%	47.08%
n-Pentane	50.45%	49.55%
n-Hexane	30.95%	69.05%
Other Hexanes	36.75%	63.25%
Heptanes	14.08%	85.92%
Benzene	20.76%	79.24%
Toluene	8.13%	91.87%
Ethylbenzene	2.68%	97.32%
Xylenes	2.50%	97.50%
C8+ Heavies	0.05%	99.95%

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages:	1.25
Calculated Dry Gas Dew Point:	2.81 lbs. H2O/MMSCF
Temperature:	100.0 deg. F
Pressure:	975.0 psig
Dry Gas Flow Rate:	25.0000 MMSCF/day
Glycol Losses with Dry Gas:	0.6630 lb/hr
Wet Gas Water Content:	Saturated
Calculated Wet Gas Water Content:	59.85 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	7.06 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	4.69%	95.31%
Carbon Dioxide	99.61%	0.39%
Hydrogen Sulfide	97.69%	2.31%
Nitrogen	99.96%	0.04%
Methane	99.97%	0.03%
Ethane	99.91%	0.09%
Propane	99.87%	0.13%
Isobutane	99.84%	0.16%
n-Butane	99.79%	0.21%
Isopentane	99.81%	0.19%
n-Pentane	99.76%	0.24%
n-Hexane	99.64%	0.36%
Other Hexanes	99.72%	0.28%
Heptanes	99.40%	0.60%
Benzene	86.26%	13.74%
Toluene	82.31%	17.69%
Ethylbenzene	79.16%	20.84%
Xylenes	72.43%	27.57%
C8+ Heavies	98.58%	1.42%

FLASH TANK

Flash Control: Vented to atmosphere
Flash Temperature: 120.0 deg. F
Flash Pressure: 45.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.75%	0.25%
Carbon Dioxide	7.78%	92.22%
Hydrogen Sulfide	35.68%	64.32%
Nitrogen	0.65%	99.35%
Methane	0.67%	99.33%
Ethane	2.43%	97.57%
Propane	5.13%	94.87%
Isobutane	7.74%	92.26%
n-Butane	9.98%	90.02%
Isopentane	11.67%	88.33%
n-Pentane	14.18%	85.82%
n-Hexane	23.51%	76.49%
Other Hexanes	18.93%	81.07%
Heptanes	39.41%	60.59%
Benzene	90.41%	9.59%
Toluene	93.99%	6.01%
Ethylbenzene	96.64%	3.36%
Xylenes	97.72%	2.28%
C8+ Heavies	89.87%	10.13%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	49.86%	50.14%
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	1.87%	98.13%
n-Pentane	1.75%	98.25%
n-Hexane	1.26%	98.74%
Other Hexanes	2.81%	97.19%
Heptanes	0.90%	99.10%
Benzene	5.44%	94.56%
Toluene	8.30%	91.70%
Ethylbenzene	10.65%	89.35%
Xylenes	13.12%	86.88%
C8+ Heavies	11.57%	88.43%

STREAM REPORTS:

WET GAS STREAM

Temperature: 100.00 deg. F
Pressure: 989.70 psia
Flow Rate: 1.04e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.26e-001	6.25e+001
Carbon Dioxide	1.81e-001	2.19e+002
Hydrogen Sulfide	4.00e-004	3.74e-001
Nitrogen	7.90e-001	6.09e+002
Methane	7.87e+001	3.47e+004
Ethane	1.12e+001	9.27e+003
Propane	5.11e+000	6.20e+003
Isobutane	7.30e-001	1.17e+003
n-Butane	1.62e+000	2.59e+003
Isopentane	3.83e-001	7.59e+002
n-Pentane	3.98e-001	7.89e+002
n-Hexane	1.79e-001	4.24e+002
Other Hexanes	2.15e-001	5.09e+002
Heptanes	2.33e-001	6.41e+002
Benzene	4.99e-004	1.07e+000
Toluene	2.00e-002	5.06e+001
Ethylbenzene	2.00e-003	5.83e+000
Xylenes	5.99e-003	1.75e+001
C8+ Heavies	1.12e-001	5.24e+002
Total Components	100.00	5.86e+004

DRY GAS STREAM

Temperature: 100.00 deg. F
Pressure: 989.70 psia
Flow Rate: 1.04e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	5.93e-003	2.93e+000
Carbon Dioxide	1.80e-001	2.18e+002
Hydrogen Sulfide	3.91e-004	3.66e-001
Nitrogen	7.91e-001	6.08e+002
Methane	7.88e+001	3.47e+004
Ethane	1.12e+001	9.26e+003
Propane	5.11e+000	6.19e+003
Isobutane	7.30e-001	1.17e+003
n-Butane	1.62e+000	2.59e+003
Isopentane	3.82e-001	7.58e+002
n-Pentane	3.97e-001	7.87e+002
n-Hexane	1.78e-001	4.22e+002
Other Hexanes	2.15e-001	5.08e+002
Heptanes	2.32e-001	6.38e+002
Benzene	4.32e-004	9.25e-001
Toluene	1.65e-002	4.17e+001
Ethylbenzene	1.58e-003	4.62e+000

Component	Conc. (wt%)	Loading (lb/hr)
Xylenes	4.35e-003	1.27e+001
C8+ Heavies	1.10e-001	5.17e+002
Total Components	100.00	5.84e+004

LEAN GLYCOL STREAM

Temperature: 100.00 deg. F
Flow Rate: 6.99e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.84e+001	3.88e+003
Water	1.50e+000	5.91e+001
Carbon Dioxide	2.16e-012	8.52e-011
Hydrogen Sulfide	2.19e-014	8.64e-013
Nitrogen	5.78e-013	2.28e-011
Methane	9.44e-018	3.72e-016
Ethane	9.93e-008	3.91e-006
Propane	8.10e-009	3.19e-007
Isobutane	1.43e-009	5.64e-008
n-Butane	3.39e-009	1.33e-007
Isopentane	1.87e-004	7.37e-003
n-Pentane	2.46e-004	9.70e-003
n-Hexane	1.95e-004	7.67e-003
Other Hexanes	3.69e-004	1.45e-002
Heptanes	4.92e-004	1.94e-002
Benzene	1.97e-004	7.76e-003
Toluene	1.95e-002	7.68e-001
Ethylbenzene	3.59e-003	1.41e-001
Xylenes	1.82e-002	7.15e-001
C8+ Heavies	2.58e-002	1.02e+000
Total Components	100.00	3.94e+003

RICH GLYCOL AND PUMP GAS STREAM

Temperature: 100.00 deg. F
Pressure: 989.70 psia
Flow Rate: 7.59e+000 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.20e+001	3.87e+003
Water	2.82e+000	1.19e+002
Carbon Dioxide	3.33e-002	1.40e+000
Hydrogen Sulfide	2.27e-004	9.57e-003
Nitrogen	4.16e-002	1.75e+000
Methane	2.33e+000	9.80e+001
Ethane	7.48e-001	3.15e+001
Propane	5.55e-001	2.34e+001
Isobutane	1.14e-001	4.80e+000
n-Butane	2.82e-001	1.19e+001
Isopentane	8.02e-002	3.38e+000
n-Pentane	9.30e-002	3.92e+000
n-Hexane	6.16e-002	2.60e+000
Other Hexanes	6.47e-002	2.73e+000
Heptanes	1.30e-001	5.48e+000

Benzene	3.75e-003	1.58e-001
Toluene	2.34e-001	9.85e+000
Ethylbenzene	3.26e-002	1.37e+000
Xylenes	1.33e-001	5.58e+000
C8+ Heavies	2.32e-001	9.76e+000
Total Components	100.00	4.21e+003

FLASH TANK OFF GAS STREAM

Temperature: 120.00 deg. F
Pressure: 59.70 psia
Flow Rate: 3.09e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.99e-001	2.91e-001
Carbon Dioxide	3.60e-001	1.29e+000
Hydrogen Sulfide	2.22e-003	6.16e-003
Nitrogen	7.63e-001	1.74e+000
Methane	7.45e+001	9.73e+001
Ethane	1.26e+001	3.07e+001
Propane	6.17e+000	2.22e+001
Isobutane	9.36e-001	4.43e+000
n-Butane	2.26e+000	1.07e+001
Isopentane	5.07e-001	2.98e+000
n-Pentane	5.72e-001	3.36e+000
n-Hexane	2.83e-001	1.98e+000
Other Hexanes	3.15e-001	2.21e+000
Heptanes	4.07e-001	3.32e+000
Benzene	2.38e-003	1.51e-002
Toluene	7.89e-002	5.92e-001
Ethylbenzene	5.33e-003	4.61e-002
Xylenes	1.47e-002	1.27e-001
C8+ Heavies	7.13e-002	9.89e-001
Total Components	100.00	1.84e+002

FLASH TANK GLYCOL STREAM

Temperature: 120.00 deg. F
Flow Rate: 7.18e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.62e+001	3.87e+003
Water	2.94e+000	1.18e+002
Carbon Dioxide	2.71e-003	1.09e-001
Hydrogen Sulfide	8.48e-005	3.42e-003
Nitrogen	2.84e-004	1.14e-002
Methane	1.64e-002	6.60e-001
Ethane	1.90e-002	7.66e-001
Propane	2.98e-002	1.20e+000
Isobutane	9.23e-003	3.72e-001
n-Butane	2.94e-002	1.18e+000
Isopentane	9.78e-003	3.94e-001
n-Pentane	1.38e-002	5.55e-001
n-Hexane	1.52e-002	6.10e-001

Other Hexanes	1.28e-002	5.16e-001
Heptanes	5.36e-002	2.16e+000
Benzene	3.54e-003	1.43e-001
Toluene	2.30e-001	9.26e+000
Ethylbenzene	3.29e-002	1.33e+000
Xylenes	1.35e-001	5.46e+000
C8+ Heavies	2.18e-001	8.77e+000
Total Components	100.00	4.03e+003

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 1.39e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.00e+001	5.94e+001
Carbon Dioxide	6.76e-002	1.09e-001
Hydrogen Sulfide	2.74e-003	3.42e-003
Nitrogen	1.12e-002	1.14e-002
Methane	1.12e+000	6.60e-001
Ethane	6.96e-001	7.66e-001
Propane	7.42e-001	1.20e+000
Isobutane	1.75e-001	3.72e-001
n-Butane	5.56e-001	1.18e+000
Isopentane	1.46e-001	3.87e-001
n-Pentane	2.06e-001	5.45e-001
n-Hexane	1.91e-001	6.03e-001
Other Hexanes	1.59e-001	5.01e-001
Heptanes	5.83e-001	2.14e+000
Benzene	4.72e-002	1.35e-001
Toluene	2.51e+000	8.49e+000
Ethylbenzene	3.04e-001	1.18e+000
Xylenes	1.22e+000	4.74e+000
C8+ Heavies	1.24e+000	7.76e+000
Total Components	100.00	9.02e+001

CONDENSER VENT GAS STREAM

Temperature: 120.00 deg. F
Pressure: 13.50 psia
Flow Rate: 5.96e+001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.26e+001	3.57e-001
Carbon Dioxide	1.55e+000	1.07e-001
Hydrogen Sulfide	5.98e-002	3.20e-003
Nitrogen	2.59e-001	1.14e-002
Methane	2.61e+001	6.57e-001
Ethane	1.59e+001	7.49e-001
Propane	1.55e+001	1.07e+000
Isobutane	3.31e+000	3.02e-001
n-Butane	9.91e+000	9.04e-001
Isopentane	1.81e+000	2.05e-001

n-Pentane	2.43e+000	2.75e-001
n-Hexane	1.38e+000	1.86e-001
Other Hexanes	1.36e+000	1.84e-001
Heptanes	1.92e+000	3.01e-001
Benzene	2.29e-001	2.80e-002
Toluene	4.77e+000	6.90e-001
Ethylbenzene	1.90e-001	3.17e-002
Xylenes	7.12e-001	1.19e-001
C8+ Heavies	1.40e-002	3.75e-003
Total Components	100.00	6.19e+000

CONDENSER PRODUCED WATER STREAM

Temperature: 120.00 deg. F
Flow Rate: 1.18e-001 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
Water	1.00e+002	5.90e+001	999606.
Carbon Dioxide	1.25e-003	7.36e-004	12.
Hydrogen Sulfide	1.22e-004	7.20e-005	1.
Nitrogen	3.46e-006	2.04e-006	0.
Methane	3.85e-004	2.27e-004	4.
Ethane	4.99e-004	2.95e-004	5.
Propane	7.36e-004	4.34e-004	7.
Isobutane	1.13e-004	6.66e-005	1.
n-Butane	4.47e-004	2.64e-004	4.
Isopentane	7.14e-005	4.22e-005	1.
n-Pentane	1.03e-004	6.09e-005	1.
n-Hexane	5.79e-005	3.42e-005	1.
Other Hexanes	4.61e-005	2.72e-005	0.
Heptanes	5.18e-005	3.06e-005	1.
Benzene	1.39e-003	8.19e-004	14.
Toluene	2.81e-002	1.66e-002	281.
Ethylbenzene	9.72e-004	5.74e-004	10.
Xylenes	5.05e-003	2.98e-003	50.
C8+ Heavies	4.07e-007	2.40e-007	0.
Total Components	100.00	5.91e+001	1000000.

CONDENSER RECOVERED OIL STREAM

Temperature: 120.00 deg. F
Flow Rate: 5.86e-002 gpm

Component	Conc. (wt%)	Loading (lb/hr)
Water	3.98e-002	9.92e-003
Carbon Dioxide	5.10e-003	1.27e-003
Hydrogen Sulfide	5.91e-004	1.47e-004
Nitrogen	1.81e-004	4.52e-005
Methane	1.01e-002	2.51e-003
Ethane	6.81e-002	1.70e-002
Propane	4.98e-001	1.24e-001
Isobutane	2.78e-001	6.94e-002
n-Butane	1.12e+000	2.81e-001
Isopentane	7.29e-001	1.82e-001

n-Pentane	1.08e+000	2.70e-001
n-Hexane	1.67e+000	4.16e-001
Other Hexanes	1.27e+000	3.17e-001
Heptanes	7.37e+000	1.84e+000
Benzene	4.25e-001	1.06e-001
Toluene	3.12e+001	7.78e+000
Ethylbenzene	4.62e+000	1.15e+000
Xylenes	1.85e+001	4.62e+000
C8+ Heavies	3.11e+001	7.76e+000
Total Components	100.00	2.49e+001

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: 2020_Willow Lake_Dehy 2
File Name: P:\1. CLIENTS\Crestwood\Willow Lake NSR\ProMax and GlyCalc\GlyCalc Runs\2020_Dehy2_WillowLake 2020 0817.ddf
Date: August 17, 2020

DESCRIPTION: **DEHY-804**

Description: 2020 PTE Calculations

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0003	0.007	0.0013
Methane	0.0619	1.487	0.2713
Ethane	0.0692	1.661	0.3032
Propane	0.1017	2.441	0.4454
Isobutane	0.0284	0.681	0.1242
n-Butane	0.0847	2.032	0.3708
Isopentane	0.0190	0.455	0.0830
n-Pentane	0.0254	0.609	0.1112
n-Hexane	0.0170	0.408	0.0744
Other Hexanes	0.0169	0.404	0.0738
Heptanes	0.0271	0.651	0.1188
Benzene	0.0026	0.063	0.0115
Toluene	0.0654	1.570	0.2865
Ethylbenzene	0.0030	0.072	0.0132
Xylenes	0.0116	0.278	0.0508
C8+ Heavies	0.0003	0.008	0.0015
Total Emissions	0.5345	12.827	2.3409
Total Hydrocarbon Emissions	0.5342	12.820	2.3396
Total VOC Emissions	0.4030	9.672	1.7652
Total HAP Emissions	0.0996	2.391	0.4364
Total BTEX Emissions	0.0827	1.984	0.3620

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0003	0.008	0.0014
Methane	0.0622	1.493	0.2725
Ethane	0.0709	1.701	0.3104
Propane	0.1139	2.733	0.4987
Isobutane	0.0351	0.842	0.1537
n-Butane	0.1118	2.683	0.4897
Isopentane	0.0363	0.872	0.1591
n-Pentane	0.0512	1.229	0.2243
n-Hexane	0.0562	1.349	0.2462
Other Hexanes	0.0468	1.122	0.2048
Heptanes	0.1983	4.760	0.8688

Benzene	0.0132	0.316	0.0577
Toluene	0.8363	20.071	3.6629
Ethylbenzene	0.1176	2.822	0.5150
Xylenes	0.4827	11.584	2.1142
C8+ Heavies	0.7238	17.371	3.1702
Total Emissions	2.9565	70.957	12.9496
Total Hydrocarbon Emissions	2.9562	70.949	12.9482
Total VOC Emissions	2.8231	67.755	12.3653
Total HAP Emissions	1.5059	36.142	6.5960
Total BTEX Emissions	1.4497	34.794	6.3498

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0006	0.014	0.0026
Methane	9.3595	224.628	40.9946
Ethane	2.9459	70.702	12.9031
Propane	2.1282	51.076	9.3214
Isobutane	0.4250	10.200	1.8616
n-Butane	1.0243	24.584	4.4865
Isopentane	0.2859	6.862	1.2523
n-Pentane	0.3221	7.730	1.4108
n-Hexane	0.1903	4.567	0.8335
Other Hexanes	0.2118	5.083	0.9277
Heptanes	0.3192	7.660	1.3980
Benzene	0.0015	0.036	0.0066
Toluene	0.0599	1.437	0.2623
Ethylbenzene	0.0047	0.114	0.0207
Xylenes	0.0133	0.319	0.0582
C8+ Heavies	0.0978	2.348	0.4285
Total Emissions	17.3900	417.361	76.1684
Total Hydrocarbon Emissions	17.3895	417.347	76.1658
Total VOC Emissions	5.0840	122.017	22.2681
Total HAP Emissions	0.2697	6.473	1.1813
Total BTEX Emissions	0.0794	1.906	0.3478

EQUIPMENT REPORTS:

CONDENSER

Condenser Outlet Temperature:	120.00 deg. F
Condenser Pressure:	13.50 psia
Condenser Duty:	1.21e-002 MM BTU/hr
Hydrocarbon Recovery:	0.20 bbls/day
Produced Water:	0.56 bbls/day
VOC Control Efficiency:	85.72 %
HAP Control Efficiency:	93.38 %
BTEX Control Efficiency:	94.30 %
Dissolved Hydrocarbons in Water:	385.68 mg/L

Component	Emitted	Condensed
Water	0.41%	99.59%

Carbon Dioxide	97.80%	2.20%
Hydrogen Sulfide	92.47%	7.53%
Nitrogen	99.55%	0.45%
Methane	99.56%	0.44%
Ethane	97.67%	2.33%
Propane	89.31%	10.69%
Isobutane	80.83%	19.17%
n-Butane	75.73%	24.27%
Isopentane	52.18%	47.82%
n-Pentane	49.59%	50.41%
n-Hexane	30.22%	69.78%
Other Hexanes	36.04%	63.96%
Heptanes	13.67%	86.33%
Benzene	20.00%	80.00%
Toluene	7.82%	92.18%
Ethylbenzene	2.57%	97.43%
Xylenes	2.40%	97.60%
C8+ Heavies	0.05%	99.95%

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages:	1.25
Calculated Dry Gas Dew Point:	3.31 lbs. H2O/MMSCF
Temperature:	100.0 deg. F
Pressure:	975.0 psig
Dry Gas Flow Rate:	3.5000 MMSCF/day
Glycol Losses with Dry Gas:	0.0929 lb/hr
Wet Gas Water Content:	Saturated
Calculated Wet Gas Water Content:	59.85 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	4.87 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	5.52%	94.48%
Carbon Dioxide	99.73%	0.27%
Hydrogen Sulfide	98.43%	1.57%
Nitrogen	99.97%	0.03%
Methane	99.98%	0.02%
Ethane	99.94%	0.06%
Propane	99.91%	0.09%
Isobutane	99.89%	0.11%
n-Butane	99.86%	0.14%
Isopentane	99.87%	0.13%
n-Pentane	99.83%	0.17%
n-Hexane	99.76%	0.24%
Other Hexanes	99.81%	0.19%
Heptanes	99.60%	0.40%
Benzene	90.39%	9.61%
Toluene	87.52%	12.48%
Ethylbenzene	85.19%	14.81%
Xylenes	79.92%	20.08%
C8+ Heavies	99.05%	0.95%

FLASH TANK

Flash Control: Vented to atmosphere
Flash Temperature: 120.0 deg. F
Flash Pressure: 45.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.75%	0.25%
Carbon Dioxide	7.69%	92.31%
Hydrogen Sulfide	35.16%	64.84%
Nitrogen	0.64%	99.36%
Methane	0.66%	99.34%
Ethane	2.35%	97.65%
Propane	5.08%	94.92%
Isobutane	7.63%	92.37%
n-Butane	9.84%	90.16%
Isopentane	11.47%	88.53%
n-Pentane	13.93%	86.07%
n-Hexane	23.03%	76.97%
Other Hexanes	18.52%	81.48%
Heptanes	38.54%	61.46%
Benzene	90.24%	9.76%
Toluene	93.84%	6.16%
Ethylbenzene	96.53%	3.47%
Xylenes	97.67%	2.33%
C8+ Heavies	89.33%	10.67%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	40.69%	59.31%
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	1.89%	98.11%
n-Pentane	1.76%	98.24%
n-Hexane	1.27%	98.73%
Other Hexanes	2.85%	97.15%
Heptanes	0.91%	99.09%
Benzene	5.45%	94.55%
Toluene	8.32%	91.68%
Ethylbenzene	10.67%	89.33%
Xylenes	13.14%	86.86%
C8+ Heavies	11.60%	88.40%

STREAM REPORTS:

WET GAS STREAM

Temperature: 100.00 deg. F
Pressure: 989.70 psia
Flow Rate: 1.46e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.26e-001	8.74e+000
Carbon Dioxide	1.81e-001	3.06e+001
Hydrogen Sulfide	4.00e-004	5.24e-002
Nitrogen	7.90e-001	8.52e+001
Methane	7.87e+001	4.86e+003
Ethane	1.12e+001	1.30e+003
Propane	5.11e+000	8.68e+002
Isobutane	7.30e-001	1.63e+002
n-Butane	1.62e+000	3.63e+002
Isopentane	3.83e-001	1.06e+002
n-Pentane	3.98e-001	1.10e+002
n-Hexane	1.79e-001	5.93e+001
Other Hexanes	2.15e-001	7.12e+001
Heptanes	2.33e-001	8.98e+001
Benzene	4.99e-004	1.50e-001
Toluene	2.00e-002	7.09e+000
Ethylbenzene	2.00e-003	8.16e-001
Xylenes	5.99e-003	2.45e+000
C8+ Heavies	1.12e-001	7.34e+001
Total Components	100.00	8.20e+003

DRY GAS STREAM

Temperature: 100.00 deg. F
Pressure: 989.70 psia
Flow Rate: 1.46e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.98e-003	4.83e-001
Carbon Dioxide	1.81e-001	3.05e+001
Hydrogen Sulfide	3.94e-004	5.16e-002
Nitrogen	7.91e-001	8.52e+001
Methane	7.88e+001	4.86e+003
Ethane	1.12e+001	1.30e+003
Propane	5.12e+000	8.67e+002
Isobutane	7.30e-001	1.63e+002
n-Butane	1.62e+000	3.62e+002
Isopentane	3.83e-001	1.06e+002
n-Pentane	3.97e-001	1.10e+002
n-Hexane	1.79e-001	5.92e+001
Other Hexanes	2.15e-001	7.11e+001
Heptanes	2.32e-001	8.94e+001
Benzene	4.52e-004	1.36e-001
Toluene	1.75e-002	6.20e+000
Ethylbenzene	1.70e-003	6.96e-001

Xylenes	4.80e-003	1.96e+000
C8+ Heavies	1.11e-001	7.27e+001
Total Components	100.00	8.18e+003

LEAN GLYCOL STREAM

Temperature: 100.00 deg. F
Flow Rate: 6.69e-001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.84e+001	3.71e+002
Water	1.50e+000	5.65e+000
Carbon Dioxide	2.15e-012	8.12e-012
Hydrogen Sulfide	2.18e-014	8.21e-014
Nitrogen	5.69e-013	2.14e-012
Methane	9.31e-018	3.51e-017
Ethane	9.76e-008	3.68e-007
Propane	8.05e-009	3.03e-008
Isobutane	1.42e-009	5.35e-009
n-Butane	3.36e-009	1.27e-008
Isopentane	1.85e-004	6.99e-004
n-Pentane	2.44e-004	9.19e-004
n-Hexane	1.92e-004	7.25e-004
Other Hexanes	3.64e-004	1.37e-003
Heptanes	4.84e-004	1.82e-003
Benzene	2.01e-004	7.59e-004
Toluene	2.01e-002	7.59e-002
Ethylbenzene	3.73e-003	1.40e-002
Xylenes	1.94e-002	7.30e-002
C8+ Heavies	2.52e-002	9.49e-002
Total Components	100.00	3.77e+002

RICH GLYCOL AND PUMP GAS STREAM

Temperature: 100.00 deg. F
Pressure: 989.70 psia
Flow Rate: 7.31e-001 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.14e+001	3.71e+002
Water	3.43e+000	1.39e+001
Carbon Dioxide	3.30e-002	1.34e-001
Hydrogen Sulfide	2.25e-004	9.12e-004
Nitrogen	4.15e-002	1.68e-001
Methane	2.32e+000	9.42e+000
Ethane	7.44e-001	3.02e+000
Propane	5.53e-001	2.24e+000
Isobutane	1.13e-001	4.60e-001
n-Butane	2.80e-001	1.14e+000
Isopentane	7.96e-002	3.23e-001
n-Pentane	9.22e-002	3.74e-001
n-Hexane	6.09e-002	2.47e-001
Other Hexanes	6.41e-002	2.60e-001
Heptanes	1.28e-001	5.19e-001

Benzene	3.81e-003	1.54e-002
Toluene	2.40e-001	9.72e-001
Ethylbenzene	3.36e-002	1.36e-001
Xylenes	1.40e-001	5.69e-001
C8+ Heavies	2.26e-001	9.17e-001
Total Components	100.00	4.06e+002

FLASH TANK OFF GAS STREAM

Temperature: 120.00 deg. F
Pressure: 59.70 psia
Flow Rate: 2.97e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.44e-001	3.44e-002
Carbon Dioxide	3.59e-001	1.24e-001
Hydrogen Sulfide	2.22e-003	5.91e-004
Nitrogen	7.63e-001	1.67e-001
Methane	7.45e+001	9.36e+000
Ethane	1.25e+001	2.95e+000
Propane	6.16e+000	2.13e+000
Isobutane	9.34e-001	4.25e-001
n-Butane	2.25e+000	1.02e+000
Isopentane	5.06e-001	2.86e-001
n-Pentane	5.70e-001	3.22e-001
n-Hexane	2.82e-001	1.90e-001
Other Hexanes	3.14e-001	2.12e-001
Heptanes	4.07e-001	3.19e-001
Benzene	2.46e-003	1.51e-003
Toluene	8.30e-002	5.99e-002
Ethylbenzene	5.69e-003	4.73e-003
Xylenes	1.60e-002	1.33e-002
C8+ Heavies	7.34e-002	9.78e-002
Total Components	100.00	1.77e+001

FLASH TANK GLYCOL STREAM

Temperature: 120.00 deg. F
Flow Rate: 6.92e-001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.56e+001	3.71e+002
Water	3.58e+000	1.39e+001
Carbon Dioxide	2.66e-003	1.03e-002
Hydrogen Sulfide	8.26e-005	3.21e-004
Nitrogen	2.76e-004	1.07e-003
Methane	1.60e-002	6.22e-002
Ethane	1.83e-002	7.09e-002
Propane	2.94e-002	1.14e-001
Isobutane	9.04e-003	3.51e-002
n-Butane	2.88e-002	1.12e-001
Isopentane	9.55e-003	3.70e-002
n-Pentane	1.34e-002	5.21e-002
n-Hexane	1.47e-002	5.69e-002

Other Hexanes	1.24e-002	4.81e-002
Heptanes	5.16e-002	2.00e-001
Benzene	3.59e-003	1.39e-002
Toluene	2.35e-001	9.12e-001
Ethylbenzene	3.39e-002	1.32e-001
Xylenes	1.43e-001	5.56e-001
C8+ Heavies	2.11e-001	8.19e-001
Total Components	100.00	3.88e+002

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 1.87e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.29e+001	8.24e+000
Carbon Dioxide	4.75e-002	1.03e-002
Hydrogen Sulfide	1.91e-003	3.21e-004
Nitrogen	7.76e-003	1.07e-003
Methane	7.87e-001	6.22e-002
Ethane	4.78e-001	7.09e-002
Propane	5.24e-001	1.14e-001
Isobutane	1.23e-001	3.51e-002
n-Butane	3.90e-001	1.12e-001
Isopentane	1.02e-001	3.63e-002
n-Pentane	1.44e-001	5.12e-002
n-Hexane	1.32e-001	5.62e-002
Other Hexanes	1.10e-001	4.68e-002
Heptanes	4.02e-001	1.98e-001
Benzene	3.42e-002	1.32e-002
Toluene	1.84e+000	8.36e-001
Ethylbenzene	2.25e-001	1.18e-001
Xylenes	9.23e-001	4.83e-001
C8+ Heavies	8.62e-001	7.24e-001
Total Components	100.00	1.12e+001

CONDENSER VENT GAS STREAM

Temperature: 120.00 deg. F
Pressure: 13.50 psia
Flow Rate: 5.58e+000 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.26e+001	3.34e-002
Carbon Dioxide	1.56e+000	1.01e-002
Hydrogen Sulfide	5.91e-002	2.96e-004
Nitrogen	2.59e-001	1.07e-003
Methane	2.63e+001	6.19e-002
Ethane	1.57e+001	6.92e-002
Propane	1.57e+001	1.02e-001
Isobutane	3.32e+000	2.84e-002
n-Butane	9.90e+000	8.47e-002
Isopentane	1.79e+000	1.90e-002

n-Pentane	2.39e+000	2.54e-002
n-Hexane	1.34e+000	1.70e-002
Other Hexanes	1.33e+000	1.69e-002
Heptanes	1.84e+000	2.71e-002
Benzene	2.29e-001	2.63e-003
Toluene	4.83e+000	6.54e-002
Ethylbenzene	1.93e-001	3.02e-003
Xylenes	7.42e-001	1.16e-002
C8+ Heavies	1.34e-002	3.36e-004
Total Components	100.00	5.79e-001

CONDENSER PRODUCED WATER STREAM

Temperature: 120.00 deg. F
Flow Rate: 1.64e-002 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
Water	1.00e+002	8.21e+000	999601.
Carbon Dioxide	1.25e-003	1.03e-004	13.
Hydrogen Sulfide	1.21e-004	9.91e-006	1.
Nitrogen	3.45e-006	2.83e-007	0.
Methane	3.87e-004	3.18e-005	4.
Ethane	4.92e-004	4.04e-005	5.
Propane	7.44e-004	6.10e-005	7.
Isobutane	1.13e-004	9.27e-006	1.
n-Butane	4.47e-004	3.67e-005	4.
Isopentane	7.07e-005	5.80e-006	1.
n-Pentane	1.01e-004	8.33e-006	1.
n-Hexane	5.63e-005	4.62e-006	1.
Other Hexanes	4.50e-005	3.70e-006	0.
Heptanes	4.98e-005	4.09e-006	0.
Benzene	1.39e-003	1.14e-004	14.
Toluene	2.84e-002	2.33e-003	284.
Ethylbenzene	9.88e-004	8.11e-005	10.
Xylenes	5.26e-003	4.32e-004	53.
C8+ Heavies	3.89e-007	3.19e-008	0.
Total Components	100.00	8.21e+000	1000000.

CONDENSER RECOVERED OIL STREAM

Temperature: 120.00 deg. F
Flow Rate: 5.69e-003 gpm

Component	Conc. (wt%)	Loading (lb/hr)
Water	4.03e-002	9.76e-004
Carbon Dioxide	5.13e-003	1.24e-004
Hydrogen Sulfide	5.88e-004	1.42e-005
Nitrogen	1.89e-004	4.57e-006
Methane	1.01e-002	2.43e-004
Ethane	6.67e-002	1.61e-003
Propane	5.01e-001	1.21e-002
Isobutane	2.78e-001	6.72e-003
n-Butane	1.12e+000	2.71e-002
Isopentane	7.18e-001	1.74e-002

n-Pentane	1.07e+000	2.58e-002
n-Hexane	1.62e+000	3.92e-002
Other Hexanes	1.24e+000	2.99e-002
Heptanes	7.08e+000	1.71e-001
Benzene	4.31e-001	1.04e-002
Toluene	3.18e+001	7.69e-001
Ethylbenzene	4.73e+000	1.14e-001
Xylenes	1.94e+001	4.71e-001
C8+ Heavies	2.99e+001	7.23e-001
Total Components	100.00	2.42e+000

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Willow Lake Dehy 3
File Name: P:\1. CLIENTS\Crestwood\Willow Lake NSR\ProMax and GlyCalc\GlyCalc Runs\2020_Dehy3_WillowLake 2020 0817.ddf
Date: August 17, 2020

DESCRIPTION: DEHY-EG

Description: 2020 PTE Calculations Dehy 3

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0080	0.191	0.0348
Methane	0.1630	3.911	0.7138
Ethane	0.4700	11.280	2.0586
Propane	0.3432	8.237	1.5032
Isobutane	0.0392	0.940	0.1716
n-Butane	0.1110	2.665	0.4864
Isopentane	0.0215	0.517	0.0943
n-Pentane	0.0111	0.266	0.0485
n-Hexane	0.0069	0.167	0.0304
Other Hexanes	0.0085	0.204	0.0373
Heptanes	0.0026	0.062	0.0112
Benzene	0.0031	0.075	0.0137
Toluene	0.0044	0.105	0.0191
Ethylbenzene	0.0034	0.081	0.0147
Xylenes	0.0119	0.285	0.0520
C8+ Heavies	<0.0001	<0.001	0.0001
Total Emissions	1.2077	28.984	5.2896
Total Hydrocarbon Emissions	1.1997	28.793	5.2548
Total VOC Emissions	0.5668	13.602	2.4824
Total HAP Emissions	0.0297	0.712	0.1299
Total BTEX Emissions	0.0227	0.545	0.0995

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0014	0.033	0.0060
Methane	1.2202	29.285	5.3445
Ethane	3.0956	74.295	13.5589
Propane	0.8371	20.091	3.6666
Isobutane	0.1032	2.476	0.4518
n-Butane	0.2334	5.600	1.0221
Isopentane	0.0382	0.916	0.1671
n-Pentane	0.0167	0.401	0.0732
n-Hexane	0.0079	0.189	0.0345
Other Hexanes	0.0123	0.294	0.0537
Heptanes	0.0022	0.052	0.0095

Benzene	0.0003	0.007	0.0013
Toluene	0.0003	0.008	0.0015
Ethylbenzene	0.0003	0.006	0.0011
Xylenes	0.0006	0.015	0.0026
C8+ Heavies	<0.0001	<0.001	0.0001
Total Emissions	5.5696	133.669	24.3947
Total Hydrocarbon Emissions	5.5682	133.636	24.3886
Total VOC Emissions	1.2524	30.057	5.4853
Total HAP Emissions	0.0094	0.225	0.0411
Total BTEX Emissions	0.0015	0.036	0.0066

EQUIPMENT REPORTS:

COLD SEPARATOR

Cold Separator Temperature:	-45.0 deg. F
Cold Separator Pressure:	250.0 psig
Dry Gas Flow Rate:	35.0000 MMSCF/day
Calculated Dry Gas Dew Point:	0.22 lbs. H2O/MMSCF
Glycol Losses with Dry Gas:	0.0163 lb/hr
Wet Gas Water Content:	Saturated
Calculated Wet Gas Water Content:	69.06 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	4.18 gal/lb H2O
Produced Liquid:	1.32e+003 bbls/day
Glycol Losses in Produced Liquids:	5.0528 lb/hr

Component	Remaining in Dry Gas	Absorbed or Condensed
Water	0.29%	99.71%
Carbon Dioxide	94.47%	5.53%
Hydrogen Sulfide	79.02%	20.98%
Nitrogen	99.58%	0.42%
Methane	98.34%	1.66%
Ethane	96.59%	3.41%
Propane	49.87%	50.13%
Isobutane	23.84%	76.16%
n-Butane	15.47%	84.53%
Isopentane	4.98%	95.02%
n-Pentane	1.44%	98.56%
n-Hexane	0.58%	99.42%
Other Hexanes	1.13%	98.87%
Heptanes	0.05%	99.95%
Benzene	0.46%	99.54%
Toluene	0.01%	99.99%
Ethylbenzene	0.03%	99.97%
Xylenes	0.01%	99.99%
C8+ Heavies	0.00%	100.00%

FLASH TANK

Flash Control:	Vented to atmosphere
Flash Temperature:	170.0 deg. F
Flash Pressure:	45.0 psig

Component	Left in Oil and Glycol	Removed in Flash Gas
Water	99.97%	0.03%
Carbon Dioxide	56.43%	43.57%
Hydrogen Sulfide	85.25%	14.75%
Nitrogen	9.49%	90.51%
Methane	11.79%	88.21%
Ethane	13.19%	86.81%
Propane	29.09%	70.91%
Isobutane	27.53%	72.47%
n-Butane	32.26%	67.74%
Isopentane	36.39%	63.61%
n-Pentane	40.16%	59.84%
n-Hexane	47.10%	52.90%
Other Hexanes	41.57%	58.43%
Heptanes	54.34%	45.66%
Benzene	91.80%	8.20%
Toluene	93.34%	6.66%
Ethylbenzene	93.53%	6.47%
Xylenes	95.78%	4.22%
C8+ Heavies	57.81%	42.19%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	89.82%	10.18%
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	1.37%	98.63%
n-Pentane	1.25%	98.75%
n-Hexane	1.06%	98.94%
Other Hexanes	2.41%	97.59%
Heptanes	0.92%	99.08%
Benzene	5.45%	94.55%
Toluene	8.46%	91.54%
Ethylbenzene	11.12%	88.88%
Xylenes	13.47%	86.53%
C8+ Heavies	20.76%	79.24%

STREAM REPORTS:

WET GAS STREAM

Temperature: 100.00 deg. F
Pressure: 814.70 psia
Flow Rate: 1.58e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.46e-001	1.09e+002
Carbon Dioxide	1.81e-001	3.32e+002
Hydrogen Sulfide	3.99e-004	5.68e-001
Nitrogen	7.90e-001	9.23e+002
Methane	7.87e+001	5.26e+004
Ethane	1.12e+001	1.41e+004
Propane	5.11e+000	9.40e+003
Isobutane	7.30e-001	1.77e+003
n-Butane	1.62e+000	3.93e+003
Isopentane	3.82e-001	1.15e+003
n-Pentane	3.97e-001	1.20e+003
n-Hexane	1.79e-001	6.42e+002
Other Hexanes	2.15e-001	7.72e+002
Heptanes	2.33e-001	9.72e+002
Benzene	4.99e-004	1.63e+000
Toluene	2.00e-002	7.67e+001
Ethylbenzene	2.00e-003	8.84e+000
Xylenes	5.99e-003	2.65e+001
C8+ Heavies	1.12e-001	7.95e+002
Total Components	100.00	8.88e+004

DRY GAS STREAM

Temperature: -45.00 deg. F
Pressure: 264.70 psia
Flow Rate: 1.46e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	4.60e-004	3.18e-001
Carbon Dioxide	1.85e-001	3.13e+002
Hydrogen Sulfide	3.43e-004	4.49e-001
Nitrogen	8.54e-001	9.19e+002
Methane	8.40e+001	5.18e+004
Ethane	1.17e+001	1.36e+004
Propane	2.77e+000	4.69e+003
Isobutane	1.89e-001	4.22e+002
n-Butane	2.72e-001	6.08e+002
Isopentane	2.07e-002	5.74e+001
n-Pentane	6.21e-003	1.72e+001
n-Hexane	1.13e-003	3.73e+000
Other Hexanes	2.63e-003	8.72e+000
Heptanes	1.24e-004	4.78e-001
Benzene	2.51e-006	7.53e-003
Toluene	1.36e-006	4.82e-003
Ethylbenzene	5.75e-007	2.35e-003
Xylenes	9.75e-007	3.98e-003
C8+ Heavies	6.20e-007	4.06e-003
Total Components	100.00	7.24e+004

LEAN GLYCOL STREAM

Temperature: 100.00 deg. F
Flow Rate: 7.00e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
EG	8.00e+001	3.05e+003
Water	2.00e+001	7.62e+002
Carbon Dioxide	3.17e-012	1.21e-010
Hydrogen Sulfide	2.45e-014	9.33e-013
Nitrogen	4.55e-014	1.73e-012
Methane	1.22e-018	4.65e-017
Ethane	4.42e-008	1.68e-006
Propane	1.26e-009	4.80e-008
Isobutane	1.12e-010	4.27e-009
n-Butane	2.24e-010	8.54e-009
Isopentane	7.87e-006	3.00e-004
n-Pentane	3.67e-006	1.40e-004
n-Hexane	1.95e-006	7.44e-005
Other Hexanes	5.51e-006	2.10e-004
Heptanes	6.25e-007	2.38e-005
Benzene	4.72e-006	1.80e-004
Toluene	1.06e-005	4.04e-004
Ethylbenzene	1.11e-005	4.21e-004
Xylenes	4.85e-005	1.85e-003
C8+ Heavies	1.36e-007	5.20e-006
Total Components	100.00	3.81e+003

RICH GLYCOL STREAM

Temperature: -45.00 deg. F
Pressure: 264.70 psia
Flow Rate: 7.18e+000 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
EG	7.80e+001	3.04e+003
Water	2.18e+001	8.48e+002
Carbon Dioxide	3.10e-002	1.21e+000
Hydrogen Sulfide	2.39e-004	9.33e-003
Nitrogen	4.45e-004	1.73e-002
Methane	3.55e-002	1.38e+000
Ethane	9.14e-002	3.56e+000
Propane	3.03e-002	1.18e+000
Isobutane	3.65e-003	1.42e-001
n-Butane	8.83e-003	3.44e-001
Isopentane	1.54e-003	6.00e-002
n-Pentane	7.16e-004	2.79e-002
n-Hexane	3.82e-004	1.49e-002
Other Hexanes	5.38e-004	2.10e-002
Heptanes	1.22e-004	4.76e-003
Benzene	9.22e-005	3.59e-003
Toluene	1.31e-004	5.11e-003
Ethylbenzene	1.04e-004	4.05e-003
Xylenes	3.68e-004	1.43e-002
C8+ Heavies	1.11e-006	4.33e-005

Total Components	100.00	3.90e+003

COLD SEPARATOR OIL STREAM

Temperature: -45.00 deg. F
Flow Rate: 3.84e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
EG	3.09e-002	5.05e+000
Water	1.38e-001	2.25e+001
Carbon Dioxide	1.05e-001	1.71e+001
Hydrogen Sulfide	6.72e-004	1.10e-001
Nitrogen	2.35e-002	3.84e+000
Methane	5.33e+000	8.70e+002
Ethane	2.92e+000	4.76e+002
Propane	2.89e+001	4.71e+003
Isobutane	8.25e+000	1.35e+003
n-Butane	2.03e+001	3.32e+003
Isopentane	6.70e+000	1.09e+003
n-Pentane	7.22e+000	1.18e+003
n-Hexane	3.91e+000	6.39e+002
Other Hexanes	4.67e+000	7.63e+002
Heptanes	5.95e+000	9.72e+002
Benzene	9.90e-003	1.62e+000
Toluene	4.70e-001	7.67e+001
Ethylbenzene	5.41e-002	8.84e+000
Xylenes	1.62e-001	2.65e+001
C8+ Heavies	4.87e+000	7.95e+002
Total Components	100.00	1.63e+004

FLASH TANK OFF GAS STREAM

Temperature: 170.00 deg. F
Pressure: 59.70 psia
Flow Rate: 8.71e+001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	5.26e+000	2.18e-001
Carbon Dioxide	5.21e+000	5.27e-001
Hydrogen Sulfide	1.76e-002	1.38e-003
Nitrogen	2.44e-001	1.57e-002
Methane	3.32e+001	1.22e+000
Ethane	4.49e+001	3.10e+000
Propane	8.27e+000	8.37e-001
Isobutane	7.74e-001	1.03e-001
n-Butane	1.75e+000	2.33e-001
Isopentane	2.30e-001	3.82e-002
n-Pentane	1.01e-001	1.67e-002
n-Hexane	3.98e-002	7.88e-003
Other Hexanes	6.20e-002	1.23e-002
Heptanes	9.46e-003	2.17e-003
Benzene	1.64e-003	2.95e-004
Toluene	1.61e-003	3.40e-004
Ethylbenzene	1.08e-003	2.62e-004
Xylenes	2.48e-003	6.05e-004

Component	Conc. (wt%)	Loading (lb/hr)
C8+ Heavies	4.68e-005	1.83e-005
Total Components	100.00	6.33e+000

FLASH TANK OIL STREAM

Temperature: 170.00 deg. F

The calculated flow rate is less than 0.000001 #mol/hr.
The stream flow rate and composition are not reported.

FLASH TANK GLYCOL STREAM

Temperature: 170.00 deg. F
Flow Rate: 7.17e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
EG	7.82e+001	3.04e+003
Water	2.18e+001	8.48e+002
Carbon Dioxide	1.75e-002	6.82e-001
Hydrogen Sulfide	2.04e-004	7.96e-003
Nitrogen	4.22e-005	1.64e-003
Methane	4.19e-003	1.63e-001
Ethane	1.21e-002	4.70e-001
Propane	8.82e-003	3.43e-001
Isobutane	1.01e-003	3.92e-002
n-Butane	2.85e-003	1.11e-001
Isopentane	5.61e-004	2.18e-002
n-Pentane	2.88e-004	1.12e-002
n-Hexane	1.80e-004	7.01e-003
Other Hexanes	2.24e-004	8.72e-003
Heptanes	6.65e-005	2.59e-003
Benzene	8.48e-005	3.30e-003
Toluene	1.23e-004	4.77e-003
Ethylbenzene	9.73e-005	3.79e-003
Xylenes	3.53e-004	1.37e-002
C8+ Heavies	6.43e-007	2.50e-005
Total Components	100.00	3.89e+003

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 1.84e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.89e+001	8.63e+001
Carbon Dioxide	3.20e-001	6.82e-001
Hydrogen Sulfide	4.82e-003	7.95e-003
Nitrogen	1.21e-003	1.64e-003
Methane	2.10e-001	1.63e-001
Ethane	3.22e-001	4.70e-001
Propane	1.61e-001	3.43e-001
Isobutane	1.39e-002	3.92e-002
n-Butane	3.94e-002	1.11e-001

Isopentane	6.15e-003	2.15e-002
n-Pentane	3.17e-003	1.11e-002
n-Hexane	1.66e-003	6.94e-003
Other Hexanes	2.04e-003	8.51e-003
Heptanes	5.28e-004	2.56e-003
Benzene	8.24e-004	3.12e-003
Toluene	9.77e-004	4.36e-003
Ethylbenzene	6.54e-004	3.37e-003
Xylenes	2.31e-003	1.19e-002
C8+ Heavies	2.40e-006	1.98e-005
Total Components	100.00	8.82e+001

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: 2020_Willow Lake_Dehy 5
File Name: P:\1. CLIENTS\Crestwood\Willow Lake NSR\ProMax and GlyCalc\GlyCalc Runs\2020_Dehy5_WillowLake 2020 0817.ddf
Date: August 17, 2020

DESCRIPTION: DEHY-805

Description: 2020 PTE Calculations

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0068	0.162	0.0296
Methane	1.3979	33.549	6.1227
Ethane	1.5788	37.892	6.9152
Propane	2.2892	54.940	10.0266
Isobutane	0.6413	15.392	2.8090
n-Butane	1.9162	45.989	8.3930
Isopentane	0.4313	10.351	1.8891
n-Pentane	0.5788	13.892	2.5352
n-Hexane	0.3897	9.353	1.7069
Other Hexanes	0.3860	9.263	1.6905
Heptanes	0.6258	15.020	2.7412
Benzene	0.0595	1.429	0.2608
Toluene	1.4731	35.354	6.4522
Ethylbenzene	0.0678	1.628	0.2971
Xylenes	0.2574	6.177	1.1273
C8+ Heavies	0.0078	0.186	0.0340
Total Emissions	12.1073	290.576	53.0302
Total Hydrocarbon Emissions	12.1006	290.414	53.0006
Total VOC Emissions	9.1239	218.974	39.9627
Total HAP Emissions	2.2475	53.941	9.8442
Total BTEX Emissions	1.8578	44.588	8.1373

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0073	0.174	0.0318
Methane	1.4039	33.693	6.1490
Ethane	1.6159	38.783	7.0778
Propane	2.5594	61.425	11.2102
Isobutane	0.7913	18.992	3.4661
n-Butane	2.5220	60.527	11.0462
Isopentane	0.8215	19.716	3.5981
n-Pentane	1.1584	27.801	5.0736
n-Hexane	1.2758	30.620	5.5881
Other Hexanes	1.0618	25.484	4.6508
Heptanes	4.5189	108.454	19.7928

Benzene	0.2927	7.025	1.2820
Toluene	18.5091	444.218	81.0698
Ethylbenzene	2.5935	62.244	11.3596
Xylenes	10.5216	252.517	46.0844
C8+ Heavies	16.4331	394.394	71.9769
Total Emissions	66.0861	1586.067	289.4572
Total Hydrocarbon Emissions	66.0789	1585.892	289.4254
Total VOC Emissions	63.0590	1513.417	276.1985
Total HAP Emissions	33.1927	796.624	145.3839
Total BTEX Emissions	31.9168	766.004	139.7958

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0132	0.317	0.0579
Methane	208.9957	5015.897	915.4011
Ethane	65.9011	1581.625	288.6466
Propane	47.5613	1141.472	208.3186
Isobutane	9.5035	228.084	41.6253
n-Butane	22.9093	549.824	100.3428
Isopentane	6.3946	153.471	28.0084
n-Pentane	7.2055	172.932	31.5601
n-Hexane	4.2568	102.162	18.6446
Other Hexanes	4.7382	113.716	20.7531
Heptanes	7.1305	171.131	31.2314
Benzene	0.0331	0.795	0.1451
Toluene	1.3065	31.356	5.7225
Ethylbenzene	0.1025	2.461	0.4491
Xylenes	0.2857	6.857	1.2515
C8+ Heavies	2.1529	51.671	9.4299
Total Emissions	388.4904	9323.770	1701.5880
Total Hydrocarbon Emissions	388.4772	9323.453	1701.5301
Total VOC Emissions	113.5804	2725.931	497.4823
Total HAP Emissions	5.9847	143.632	26.2128
Total BTEX Emissions	1.7279	41.470	7.5682

EQUIPMENT REPORTS:

CONDENSER

Condenser Outlet Temperature:	120.00 deg. F
Condenser Pressure:	13.50 psia
Condenser Duty:	1.24e-001 MM BTU/hr
Hydrocarbon Recovery:	4.35 bbls/day
Produced Water:	10.49 bbls/day
VOC Control Efficiency:	85.53 %
HAP Control Efficiency:	93.23 %
BTEX Control Efficiency:	94.18 %
Dissolved Hydrocarbons in Water:	383.12 mg/L

Component	Emitted	Condensed
Water	0.49%	99.51%

Carbon Dioxide	97.99%	2.01%
Hydrogen Sulfide	93.05%	6.95%
Nitrogen	99.57%	0.43%
Methane	99.57%	0.43%
Ethane	97.70%	2.30%
Propane	89.44%	10.56%
Isobutane	81.04%	18.96%
n-Butane	75.98%	24.02%
Isopentane	52.50%	47.50%
n-Pentane	49.97%	50.03%
n-Hexane	30.55%	69.45%
Other Hexanes	36.35%	63.65%
Heptanes	13.85%	86.15%
Benzene	20.34%	79.66%
Toluene	7.96%	92.04%
Ethylbenzene	2.61%	97.39%
Xylenes	2.45%	97.55%
C8+ Heavies	0.05%	99.95%

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages:	1.25	
Calculated Dry Gas Dew Point:	3.04	lbs. H2O/MMSCF
Temperature:	100.0	deg. F
Pressure:	975.0	psig
Dry Gas Flow Rate:	65.0000	MMSCF/day
Glycol Losses with Dry Gas:	1.7246	lb/hr
Wet Gas Water Content:	Saturated	
Calculated Wet Gas Water Content:	59.85	lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	5.84	gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	5.07%	94.93%
Carbon Dioxide	99.68%	0.32%
Hydrogen Sulfide	98.10%	1.90%
Nitrogen	99.97%	0.03%
Methane	99.97%	0.03%
Ethane	99.93%	0.07%
Propane	99.90%	0.10%
Isobutane	99.87%	0.13%
n-Butane	99.83%	0.17%
Isopentane	99.84%	0.16%
n-Pentane	99.80%	0.20%
n-Hexane	99.70%	0.30%
Other Hexanes	99.77%	0.23%
Heptanes	99.51%	0.49%
Benzene	88.52%	11.48%
Toluene	85.15%	14.85%
Ethylbenzene	82.43%	17.57%
Xylenes	76.44%	23.56%
C8+ Heavies	98.84%	1.16%

FLASH TANK

Flash Control: Vented to atmosphere
Flash Temperature: 120.0 deg. F
Flash Pressure: 45.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.75%	0.25%
Carbon Dioxide	7.74%	92.26%
Hydrogen Sulfide	35.44%	64.56%
Nitrogen	0.64%	99.36%
Methane	0.67%	99.33%
Ethane	2.39%	97.61%
Propane	5.11%	94.89%
Isobutane	7.69%	92.31%
n-Butane	9.92%	90.08%
Isopentane	11.58%	88.42%
n-Pentane	14.06%	85.94%
n-Hexane	23.29%	76.71%
Other Hexanes	18.74%	81.26%
Heptanes	39.01%	60.99%
Benzene	90.33%	9.67%
Toluene	93.92%	6.08%
Ethylbenzene	96.59%	3.41%
Xylenes	97.70%	2.30%
C8+ Heavies	89.62%	10.38%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	45.15%	54.85%
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	1.88%	98.12%
n-Pentane	1.75%	98.25%
n-Hexane	1.26%	98.74%
Other Hexanes	2.83%	97.17%
Heptanes	0.90%	99.10%
Benzene	5.44%	94.56%
Toluene	8.31%	91.69%
Ethylbenzene	10.66%	89.34%
Xylenes	13.13%	86.87%
C8+ Heavies	11.58%	88.42%

STREAM REPORTS:

WET GAS STREAM

Temperature: 100.00 deg. F
Pressure: 989.70 psia
Flow Rate: 2.71e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.26e-001	1.62e+002
Carbon Dioxide	1.81e-001	5.69e+002
Hydrogen Sulfide	4.00e-004	9.73e-001
Nitrogen	7.90e-001	1.58e+003
Methane	7.87e+001	9.02e+004
Ethane	1.12e+001	2.41e+004
Propane	5.11e+000	1.61e+004
Isobutane	7.30e-001	3.03e+003
n-Butane	1.62e+000	6.74e+003
Isopentane	3.83e-001	1.97e+003
n-Pentane	3.98e-001	2.05e+003
n-Hexane	1.79e-001	1.10e+003
Other Hexanes	2.15e-001	1.32e+003
Heptanes	2.33e-001	1.67e+003
Benzene	4.99e-004	2.79e+000
Toluene	2.00e-002	1.32e+002
Ethylbenzene	2.00e-003	1.52e+001
Xylenes	5.99e-003	4.55e+001
C8+ Heavies	1.12e-001	1.36e+003
Total Components	100.00	1.52e+005

DRY GAS STREAM

Temperature: 100.00 deg. F
Pressure: 989.70 psia
Flow Rate: 2.71e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.40e-003	8.23e+000
Carbon Dioxide	1.80e-001	5.67e+002
Hydrogen Sulfide	3.93e-004	9.55e-001
Nitrogen	7.91e-001	1.58e+003
Methane	7.88e+001	9.02e+004
Ethane	1.12e+001	2.41e+004
Propane	5.11e+000	1.61e+004
Isobutane	7.30e-001	3.03e+003
n-Butane	1.62e+000	6.72e+003
Isopentane	3.83e-001	1.97e+003
n-Pentane	3.97e-001	2.05e+003
n-Hexane	1.79e-001	1.10e+003
Other Hexanes	2.15e-001	1.32e+003
Heptanes	2.32e-001	1.66e+003
Benzene	4.43e-004	2.47e+000
Toluene	1.70e-002	1.12e+002
Ethylbenzene	1.65e-003	1.25e+001

Component	Conc. (wt%)	Loading (lb/hr)
Xylenes	4.59e-003	3.48e+001
C8+ Heavies	1.11e-001	1.35e+003
Total Components	100.00	1.52e+005

LEAN GLYCOL STREAM

Temperature: 100.00 deg. F
Flow Rate: 1.50e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.84e+001	8.30e+003
Water	1.50e+000	1.27e+002
Carbon Dioxide	2.16e-012	1.82e-010
Hydrogen Sulfide	2.19e-014	1.85e-012
Nitrogen	5.74e-013	4.84e-011
Methane	9.38e-018	7.92e-016
Ethane	9.85e-008	8.31e-006
Propane	8.08e-009	6.82e-007
Isobutane	1.43e-009	1.20e-007
n-Butane	3.38e-009	2.85e-007
Isopentane	1.86e-004	1.57e-002
n-Pentane	2.45e-004	2.07e-002
n-Hexane	1.94e-004	1.63e-002
Other Hexanes	3.66e-004	3.09e-002
Heptanes	4.88e-004	4.12e-002
Benzene	2.00e-004	1.68e-002
Toluene	1.99e-002	1.68e+000
Ethylbenzene	3.67e-003	3.10e-001
Xylenes	1.88e-002	1.59e+000
C8+ Heavies	2.55e-002	2.15e+000
Total Components	100.00	8.44e+003

RICH GLYCOL AND PUMP GAS STREAM

Temperature: 100.00 deg. F
Pressure: 989.70 psia
Flow Rate: 1.63e+001 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.17e+001	8.30e+003
Water	3.11e+000	2.81e+002
Carbon Dioxide	3.32e-002	3.00e+000
Hydrogen Sulfide	2.26e-004	2.05e-002
Nitrogen	4.16e-002	3.76e+000
Methane	2.32e+000	2.10e+002
Ethane	7.46e-001	6.75e+001
Propane	5.54e-001	5.01e+001
Isobutane	1.14e-001	1.03e+001
n-Butane	2.81e-001	2.54e+001
Isopentane	7.99e-002	7.23e+000
n-Pentane	9.26e-002	8.38e+000
n-Hexane	6.13e-002	5.55e+000
Other Hexanes	6.44e-002	5.83e+000
Heptanes	1.29e-001	1.17e+001

Benzene	3.79e-003	3.43e-001
Toluene	2.37e-001	2.15e+001
Ethylbenzene	3.32e-002	3.01e+000
Xylenes	1.37e-001	1.24e+001
C8+ Heavies	2.29e-001	2.07e+001
Total Components	100.00	9.05e+003

FLASH TANK OFF GAS STREAM

Temperature: 120.00 deg. F
Pressure: 59.70 psia
Flow Rate: 6.64e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.20e-001	6.92e-001
Carbon Dioxide	3.60e-001	2.77e+000
Hydrogen Sulfide	2.22e-003	1.32e-002
Nitrogen	7.63e-001	3.74e+000
Methane	7.45e+001	2.09e+002
Ethane	1.25e+001	6.59e+001
Propane	6.17e+000	4.76e+001
Isobutane	9.35e-001	9.50e+000
n-Butane	2.25e+000	2.29e+001
Isopentane	5.07e-001	6.39e+000
n-Pentane	5.71e-001	7.21e+000
n-Hexane	2.82e-001	4.26e+000
Other Hexanes	3.14e-001	4.74e+000
Heptanes	4.07e-001	7.13e+000
Benzene	2.42e-003	3.31e-002
Toluene	8.11e-002	1.31e+000
Ethylbenzene	5.52e-003	1.03e-001
Xylenes	1.54e-002	2.86e-001
C8+ Heavies	7.23e-002	2.15e+000
Total Components	100.00	3.96e+002

FLASH TANK GLYCOL STREAM

Temperature: 120.00 deg. F
Flow Rate: 1.54e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.59e+001	8.30e+003
Water	3.24e+000	2.80e+002
Carbon Dioxide	2.68e-003	2.32e-001
Hydrogen Sulfide	8.38e-005	7.25e-003
Nitrogen	2.80e-004	2.43e-002
Methane	1.62e-002	1.40e+000
Ethane	1.87e-002	1.62e+000
Propane	2.96e-002	2.56e+000
Isobutane	9.14e-003	7.91e-001
n-Butane	2.91e-002	2.52e+000
Isopentane	9.67e-003	8.37e-001
n-Pentane	1.36e-002	1.18e+000
n-Hexane	1.49e-002	1.29e+000

Other Hexanes	1.26e-002	1.09e+000
Heptanes	5.27e-002	4.56e+000
Benzene	3.58e-003	3.10e-001
Toluene	2.33e-001	2.02e+001
Ethylbenzene	3.35e-002	2.90e+000
Xylenes	1.40e-001	1.21e+001
C8+ Heavies	2.15e-001	1.86e+001
Total Components	100.00	8.66e+003

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 3.54e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.16e+001	1.54e+002
Carbon Dioxide	5.66e-002	2.32e-001
Hydrogen Sulfide	2.28e-003	7.25e-003
Nitrogen	9.29e-003	2.43e-002
Methane	9.38e-001	1.40e+000
Ethane	5.76e-001	1.62e+000
Propane	6.22e-001	2.56e+000
Isobutane	1.46e-001	7.91e-001
n-Butane	4.65e-001	2.52e+000
Isopentane	1.22e-001	8.21e-001
n-Pentane	1.72e-001	1.16e+000
n-Hexane	1.59e-001	1.28e+000
Other Hexanes	1.32e-001	1.06e+000
Heptanes	4.84e-001	4.52e+000
Benzene	4.02e-002	2.93e-001
Toluene	2.15e+000	1.85e+001
Ethylbenzene	2.62e-001	2.59e+000
Xylenes	1.06e+000	1.05e+001
C8+ Heavies	1.03e+000	1.64e+001
Total Components	100.00	2.20e+002

CONDENSER VENT GAS STREAM

Temperature: 120.00 deg. F
Pressure: 13.50 psia
Flow Rate: 1.26e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.26e+001	7.57e-001
Carbon Dioxide	1.55e+000	2.28e-001
Hydrogen Sulfide	5.95e-002	6.75e-003
Nitrogen	2.59e-001	2.42e-002
Methane	2.62e+001	1.40e+000
Ethane	1.58e+001	1.58e+000
Propane	1.56e+001	2.29e+000
Isobutane	3.31e+000	6.41e-001
n-Butane	9.90e+000	1.92e+000
Isopentane	1.80e+000	4.31e-001

n-Pentane	2.41e+000	5.79e-001
n-Hexane	1.36e+000	3.90e-001
Other Hexanes	1.35e+000	3.86e-001
Heptanes	1.88e+000	6.26e-001
Benzene	2.29e-001	5.95e-002
Toluene	4.80e+000	1.47e+000
Ethylbenzene	1.92e-001	6.78e-002
Xylenes	7.28e-001	2.57e-001
C8+ Heavies	1.37e-002	7.76e-003
Total Components	100.00	1.31e+001

CONDENSER PRODUCED WATER STREAM

Temperature: 120.00 deg. F
Flow Rate: 3.06e-001 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
Water	1.00e+002	1.53e+002	999603.
Carbon Dioxide	1.25e-003	1.91e-003	12.
Hydrogen Sulfide	1.21e-004	1.86e-004	1.
Nitrogen	3.46e-006	5.29e-006	0.
Methane	3.86e-004	5.91e-004	4.
Ethane	4.96e-004	7.59e-004	5.
Propane	7.39e-004	1.13e-003	7.
Isobutane	1.13e-004	1.73e-004	1.
n-Butane	4.47e-004	6.84e-004	4.
Isopentane	7.10e-005	1.09e-004	1.
n-Pentane	1.02e-004	1.56e-004	1.
n-Hexane	5.70e-005	8.73e-005	1.
Other Hexanes	4.55e-005	6.97e-005	0.
Heptanes	5.08e-005	7.77e-005	1.
Benzene	1.39e-003	2.13e-003	14.
Toluene	2.83e-002	4.33e-002	283.
Ethylbenzene	9.81e-004	1.50e-003	10.
Xylenes	5.16e-003	7.90e-003	52.
C8+ Heavies	3.97e-007	6.08e-007	0.
Total Components	100.00	1.53e+002	1000000.

CONDENSER RECOVERED OIL STREAM

Temperature: 120.00 deg. F
Flow Rate: 1.27e-001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
Water	4.01e-002	2.16e-002
Carbon Dioxide	5.12e-003	2.76e-003
Hydrogen Sulfide	5.90e-004	3.18e-004
Nitrogen	1.85e-004	9.99e-005
Methane	1.01e-002	5.42e-003
Ethane	6.74e-002	3.64e-002
Propane	4.99e-001	2.69e-001
Isobutane	2.78e-001	1.50e-001
n-Butane	1.12e+000	6.05e-001
Isopentane	7.23e-001	3.90e-001

n-Pentane	1.07e+000	5.79e-001
n-Hexane	1.64e+000	8.86e-001
Other Hexanes	1.25e+000	6.76e-001
Heptanes	7.22e+000	3.89e+000
Benzene	4.28e-001	2.31e-001
Toluene	3.15e+001	1.70e+001
Ethylbenzene	4.68e+000	2.52e+000
Xylenes	1.90e+001	1.03e+001
C8+ Heavies	3.04e+001	1.64e+001
Total Components	100.00	5.39e+001

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: 2020_Willow Lake_Dehy_80MMSCFD
File Name: P:\1. CLIENTS\Crestwood\Willow Lake NSR Sig Rev\ProMax and GlyCalc\GlyCalc Runs\Dehydration Unit\2020_Dehy_WLCS_80MMSCFD.ddf
Date: December 08, 2020

DESCRIPTION: DEHY-1505

Description: 2020 PTE Calculations

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0081	0.194	0.0353
Methane	1.8638	44.731	8.1633
Ethane	2.0662	49.589	9.0500
Propane	3.0541	73.299	13.3771
Isobutane	0.8593	20.623	3.7636
n-Butane	2.5787	61.889	11.2947
Isopentane	0.6127	14.706	2.6838
n-Pentane	0.8160	19.584	3.5741
n-Hexane	0.5606	13.455	2.4555
Other Hexanes	0.5560	13.344	2.4352
Heptanes	0.8949	21.478	3.9198
Benzene	0.0757	1.818	0.3318
Toluene	1.9355	46.452	8.4774
Ethylbenzene	0.0908	2.178	0.3975
Xylenes	0.3473	8.335	1.5211
C8+ Heavies	0.0102	0.246	0.0449
Total Emissions	16.3300	391.919	71.5252
Total Hydrocarbon Emissions	16.3219	391.725	71.4899
Total VOC Emissions	12.3919	297.406	54.2765
Total HAP Emissions	3.0099	72.237	13.1833
Total BTEX Emissions	2.4493	58.783	10.7278

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0086	0.206	0.0375
Methane	1.8701	44.881	8.1908
Ethane	2.1037	50.488	9.2140
Propane	3.3304	79.930	14.5872
Isobutane	1.0133	24.319	4.4382
n-Butane	3.2040	76.895	14.0334
Isopentane	1.0360	24.863	4.5376
n-Pentane	1.4482	34.757	6.3431
n-Hexane	1.5384	36.923	6.7384
Other Hexanes	1.3023	31.255	5.7040
Heptanes	5.1747	124.194	22.6653

Benzene	0.3026	7.262	1.3253
Toluene	19.0405	456.973	83.3975
Ethylbenzene	2.6596	63.831	11.6491
Xylenes	10.9008	261.619	47.7454
C8+ Heavies	16.6000	398.401	72.7081
Total Emissions	71.5331	1716.795	313.3150
Total Hydrocarbon Emissions	71.5245	1716.589	313.2775
Total VOC Emissions	67.5508	1621.220	295.8726
Total HAP Emissions	34.4419	826.606	150.8556
Total BTEX Emissions	32.9035	789.684	144.1172

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0118	0.284	0.0519
Methane	209.1286	5019.087	915.9834
Ethane	65.4390	1570.537	286.6230
Propane	46.8732	1124.957	205.3047
Isobutane	9.2882	222.917	40.6824
n-Butane	22.2317	533.562	97.3750
Isopentane	6.1784	148.283	27.0616
n-Pentane	6.9083	165.800	30.2585
n-Hexane	3.9783	95.479	17.4250
Other Hexanes	4.4851	107.643	19.6449
Heptanes	6.4042	153.701	28.0504
Benzene	0.0264	0.634	0.1156
Toluene	1.0450	25.081	4.5773
Ethylbenzene	0.0827	1.984	0.3621
Xylenes	0.2318	5.564	1.0154
C8+ Heavies	1.7714	42.513	7.7586
Total Emissions	384.0844	9218.026	1682.2898
Total Hydrocarbon Emissions	384.0726	9217.742	1682.2380
Total VOC Emissions	109.5049	2628.118	479.6315
Total HAP Emissions	5.3642	128.742	23.4953
Total BTEX Emissions	1.3859	33.262	6.0704

EQUIPMENT REPORTS:

CONDENSER

Condenser Outlet Temperature:	120.00 deg. F
Condenser Pressure:	13.50 psia
Condenser Duty:	1.49e-001 MM BTU/hr
Hydrocarbon Recovery:	4.45 bbls/day
Produced Water:	12.85 bbls/day
VOC Control Efficiency:	81.66 %
HAP Control Efficiency:	91.26 %
BTEX Control Efficiency:	92.56 %
Dissolved Hydrocarbons in Water:	377.75 mg/L

Component	Emitted	Condensed
Water	0.54%	99.46%

Carbon Dioxide	98.33%	1.67%
Hydrogen Sulfide	94.24%	5.76%
Nitrogen	99.67%	0.33%
Methane	99.66%	0.34%
Ethane	98.22%	1.78%
Propane	91.70%	8.30%
Isobutane	84.80%	15.20%
n-Butane	80.48%	19.52%
Isopentane	59.15%	40.85%
n-Pentane	56.35%	43.65%
n-Hexane	36.44%	63.56%
Other Hexanes	42.69%	57.31%
Heptanes	17.29%	82.71%
Benzene	25.04%	74.96%
Toluene	10.17%	89.83%
Ethylbenzene	3.41%	96.59%
Xylenes	3.19%	96.81%
C8+ Heavies	0.06%	99.94%

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages:	1.25
Calculated Dry Gas Dew Point:	3.35 lbs. H2O/MMSCF
Temperature:	100.0 deg. F
Pressure:	975.0 psig
Dry Gas Flow Rate:	80.0000 MMSCF/day
Glycol Losses with Dry Gas:	2.1234 lb/hr
Wet Gas Water Content:	Saturated
Calculated Wet Gas Water Content:	59.85 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	4.77 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	5.58%	94.42%
Carbon Dioxide	99.74%	0.26%
Hydrogen Sulfide	98.47%	1.53%
Nitrogen	99.98%	0.02%
Methane	99.98%	0.02%
Ethane	99.94%	0.06%
Propane	99.92%	0.08%
Isobutane	99.89%	0.11%
n-Butane	99.86%	0.14%
Isopentane	99.87%	0.13%
n-Pentane	99.84%	0.16%
n-Hexane	99.76%	0.24%
Other Hexanes	99.81%	0.19%
Heptanes	99.60%	0.40%
Benzene	90.58%	9.42%
Toluene	87.77%	12.23%
Ethylbenzene	85.47%	14.53%
Xylenes	80.28%	19.72%
C8+ Heavies	99.07%	0.93%

FLASH TANK

Flash Control: Vented to atmosphere
Flash Temperature: 120.0 deg. F
Flash Pressure: 65.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.82%	0.18%
Carbon Dioxide	10.04%	89.96%
Hydrogen Sulfide	41.98%	58.02%
Nitrogen	0.85%	99.15%
Methane	0.89%	99.11%
Ethane	3.11%	96.89%
Propane	6.63%	93.37%
Isobutane	9.84%	90.16%
n-Butane	12.60%	87.40%
Isopentane	14.54%	85.46%
n-Pentane	17.53%	82.47%
n-Hexane	28.10%	71.90%
Other Hexanes	22.91%	77.09%
Heptanes	44.88%	55.12%
Benzene	92.37%	7.63%
Toluene	95.20%	4.80%
Ethylbenzene	97.30%	2.70%
Xylenes	98.18%	1.82%
C8+ Heavies	91.36%	8.64%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	40.18%	59.82%
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	1.49%	98.51%
n-Pentane	1.40%	98.60%
n-Hexane	1.04%	98.96%
Other Hexanes	2.30%	97.70%
Heptanes	0.78%	99.22%
Benzene	5.32%	94.68%
Toluene	8.20%	91.80%
Ethylbenzene	10.59%	89.41%
Xylenes	13.07%	86.93%
C8+ Heavies	11.34%	88.66%

STREAM REPORTS:

WET GAS STREAM

Temperature: 100.00 deg. F
Pressure: 989.70 psia
Flow Rate: 3.34e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.26e-001	2.00e+002
Carbon Dioxide	1.81e-001	7.00e+002
Hydrogen Sulfide	4.00e-004	1.20e+000
Nitrogen	7.90e-001	1.95e+003
Methane	7.87e+001	1.11e+005
Ethane	1.12e+001	2.97e+004
Propane	5.11e+000	1.98e+004
Isobutane	7.30e-001	3.73e+003
n-Butane	1.62e+000	8.29e+003
Isopentane	3.83e-001	2.43e+003
n-Pentane	3.98e-001	2.52e+003
n-Hexane	1.79e-001	1.36e+003
Other Hexanes	2.15e-001	1.63e+003
Heptanes	2.33e-001	2.05e+003
Benzene	4.99e-004	3.43e+000
Toluene	2.00e-002	1.62e+002
Ethylbenzene	2.00e-003	1.87e+001
Xylenes	5.99e-003	5.60e+001
C8+ Heavies	1.12e-001	1.68e+003
Total Components	100.00	1.87e+005

DRY GAS STREAM

Temperature: 100.00 deg. F
Pressure: 989.70 psia
Flow Rate: 3.33e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	7.05e-003	1.12e+001
Carbon Dioxide	1.81e-001	6.98e+002
Hydrogen Sulfide	3.94e-004	1.18e+000
Nitrogen	7.91e-001	1.95e+003
Methane	7.88e+001	1.11e+005
Ethane	1.12e+001	2.96e+004
Propane	5.12e+000	1.98e+004
Isobutane	7.30e-001	3.73e+003
n-Butane	1.62e+000	8.28e+003
Isopentane	3.83e-001	2.43e+003
n-Pentane	3.97e-001	2.52e+003
n-Hexane	1.79e-001	1.35e+003
Other Hexanes	2.15e-001	1.63e+003
Heptanes	2.32e-001	2.04e+003
Benzene	4.53e-004	3.11e+000
Toluene	1.76e-002	1.42e+002
Ethylbenzene	1.71e-003	1.60e+001

Component	Conc. (wt%)	Loading (lb/hr)
Xylenes	4.82e-003	4.49e+001
C8+ Heavies	1.11e-001	1.66e+003
Total Components	100.00	1.87e+005

LEAN GLYCOL STREAM

Temperature: 100.00 deg. F
Flow Rate: 1.50e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.84e+001	8.30e+003
Water	1.50e+000	1.27e+002
Carbon Dioxide	2.15e-012	1.82e-010
Hydrogen Sulfide	2.18e-014	1.84e-012
Nitrogen	5.69e-013	4.80e-011
Methane	9.30e-018	7.85e-016
Ethane	9.75e-008	8.22e-006
Propane	8.05e-009	6.79e-007
Isobutane	1.42e-009	1.20e-007
n-Butane	3.36e-009	2.83e-007
Isopentane	1.85e-004	1.56e-002
n-Pentane	2.44e-004	2.06e-002
n-Hexane	1.92e-004	1.62e-002
Other Hexanes	3.63e-004	3.07e-002
Heptanes	4.83e-004	4.08e-002
Benzene	2.02e-004	1.70e-002
Toluene	2.02e-002	1.70e+000
Ethylbenzene	3.73e-003	3.15e-001
Xylenes	1.94e-002	1.64e+000
C8+ Heavies	2.52e-002	2.12e+000
Total Components	100.00	8.44e+003

RICH GLYCOL AND PUMP GAS STREAM

Temperature: 100.00 deg. F
Pressure: 989.70 psia
Flow Rate: 1.64e+001 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.14e+001	8.30e+003
Water	3.47e+000	3.16e+002
Carbon Dioxide	3.30e-002	3.00e+000
Hydrogen Sulfide	2.25e-004	2.04e-002
Nitrogen	4.15e-002	3.77e+000
Methane	2.32e+000	2.11e+002
Ethane	7.43e-001	6.75e+001
Propane	5.53e-001	5.02e+001
Isobutane	1.13e-001	1.03e+001
n-Butane	2.80e-001	2.54e+001
Isopentane	7.96e-002	7.23e+000
n-Pentane	9.22e-002	8.38e+000
n-Hexane	6.09e-002	5.53e+000
Other Hexanes	6.40e-002	5.82e+000
Heptanes	1.28e-001	1.16e+001

Benzene	3.81e-003	3.46e-001
Toluene	2.40e-001	2.18e+001
Ethylbenzene	3.36e-002	3.06e+000
Xylenes	1.41e-001	1.28e+001
C8+ Heavies	2.26e-001	2.05e+001
Total Components	100.00	9.09e+003

FLASH TANK OFF GAS STREAM

Temperature: 120.00 deg. F
Pressure: 79.70 psia
Flow Rate: 6.61e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.86e-001	5.84e-001
Carbon Dioxide	3.52e-001	2.70e+000
Hydrogen Sulfide	1.99e-003	1.18e-002
Nitrogen	7.66e-001	3.74e+000
Methane	7.49e+001	2.09e+002
Ethane	1.25e+001	6.54e+001
Propane	6.10e+000	4.69e+001
Isobutane	9.18e-001	9.29e+000
n-Butane	2.20e+000	2.22e+001
Isopentane	4.92e-001	6.18e+000
n-Pentane	5.50e-001	6.91e+000
n-Hexane	2.65e-001	3.98e+000
Other Hexanes	2.99e-001	4.49e+000
Heptanes	3.67e-001	6.40e+000
Benzene	1.94e-003	2.64e-002
Toluene	6.51e-002	1.05e+000
Ethylbenzene	4.47e-003	8.27e-002
Xylenes	1.25e-002	2.32e-001
C8+ Heavies	5.97e-002	1.77e+000
Total Components	100.00	3.91e+002

FLASH TANK GLYCOL STREAM

Temperature: 120.00 deg. F
Flow Rate: 1.55e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.55e+001	8.30e+003
Water	3.62e+000	3.15e+002
Carbon Dioxide	3.47e-003	3.01e-001
Hydrogen Sulfide	9.85e-005	8.56e-003
Nitrogen	3.71e-004	3.22e-002
Methane	2.15e-002	1.87e+000
Ethane	2.42e-002	2.10e+000
Propane	3.83e-002	3.33e+000
Isobutane	1.17e-002	1.01e+000
n-Butane	3.68e-002	3.20e+000
Isopentane	1.21e-002	1.05e+000
n-Pentane	1.69e-002	1.47e+000
n-Hexane	1.79e-002	1.55e+000

Component	Conc. (vol%)	Loading (lb/hr)
Other Hexanes	1.53e-002	1.33e+000
Heptanes	6.00e-002	5.22e+000
Benzene	3.68e-003	3.20e-001
Toluene	2.39e-001	2.07e+001
Ethylbenzene	3.42e-002	2.97e+000
Xylenes	1.44e-001	1.25e+001
C8+ Heavies	2.15e-001	1.87e+001
Total Components	100.00	8.69e+003

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 4.31e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.21e+001	1.88e+002
Carbon Dioxide	6.03e-002	3.01e-001
Hydrogen Sulfide	2.21e-003	8.56e-003
Nitrogen	1.01e-002	3.22e-002
Methane	1.03e+000	1.87e+000
Ethane	6.16e-001	2.10e+000
Propane	6.65e-001	3.33e+000
Isobutane	1.53e-001	1.01e+000
n-Butane	4.85e-001	3.20e+000
Isopentane	1.26e-001	1.04e+000
n-Pentane	1.77e-001	1.45e+000
n-Hexane	1.57e-001	1.54e+000
Other Hexanes	1.33e-001	1.30e+000
Heptanes	4.55e-001	5.17e+000
Benzene	3.41e-002	3.03e-001
Toluene	1.82e+000	1.90e+001
Ethylbenzene	2.21e-001	2.66e+000
Xylenes	9.04e-001	1.09e+001
C8+ Heavies	8.58e-001	1.66e+001
Total Components	100.00	2.60e+002

CONDENSER VENT GAS STREAM

Temperature: 120.00 deg. F
Pressure: 13.50 psia
Flow Rate: 1.69e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.26e+001	1.01e+000
Carbon Dioxide	1.51e+000	2.96e-001
Hydrogen Sulfide	5.32e-002	8.07e-003
Nitrogen	2.57e-001	3.21e-002
Methane	2.61e+001	1.86e+000
Ethane	1.54e+001	2.07e+000
Propane	1.55e+001	3.05e+000
Isobutane	3.32e+000	8.59e-001
n-Butane	9.96e+000	2.58e+000
Isopentane	1.91e+000	6.13e-001

n-Pentane	2.54e+000	8.16e-001
n-Hexane	1.46e+000	5.61e-001
Other Hexanes	1.45e+000	5.56e-001
Heptanes	2.00e+000	8.95e-001
Benzene	2.18e-001	7.57e-002
Toluene	4.71e+000	1.94e+000
Ethylbenzene	1.92e-001	9.08e-002
Xylenes	7.34e-001	3.47e-001
C8+ Heavies	1.35e-002	1.02e-002
Total Components	100.00	1.77e+001

CONDENSER PRODUCED WATER STREAM

Temperature: 120.00 deg. F
Flow Rate: 3.75e-001 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
Water	1.00e+002	1.87e+002	999609.
Carbon Dioxide	1.22e-003	2.28e-003	12.
Hydrogen Sulfide	1.08e-004	2.03e-004	1.
Nitrogen	3.44e-006	6.44e-006	0.
Methane	3.85e-004	7.21e-004	4.
Ethane	4.85e-004	9.09e-004	5.
Propane	7.37e-004	1.38e-003	7.
Isobutane	1.13e-004	2.12e-004	1.
n-Butane	4.49e-004	8.43e-004	4.
Isopentane	7.54e-005	1.41e-004	1.
n-Pentane	1.08e-004	2.02e-004	1.
n-Hexane	6.13e-005	1.15e-004	1.
Other Hexanes	4.90e-005	9.19e-005	0.
Heptanes	5.42e-005	1.02e-004	1.
Benzene	1.32e-003	2.48e-003	13.
Toluene	2.77e-002	5.20e-002	277.
Ethylbenzene	9.81e-004	1.84e-003	10.
Xylenes	5.21e-003	9.76e-003	52.
C8+ Heavies	3.91e-007	7.34e-007	0.
Total Components	100.00	1.87e+002	1000000.

CONDENSER RECOVERED OIL STREAM

Temperature: 120.00 deg. F
Flow Rate: 1.30e-001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
Water	3.97e-002	2.19e-002
Carbon Dioxide	4.99e-003	2.75e-003
Hydrogen Sulfide	5.26e-004	2.90e-004
Nitrogen	1.81e-004	9.98e-005
Methane	1.01e-002	5.56e-003
Ethane	6.62e-002	3.65e-002
Propane	4.98e-001	2.75e-001
Isobutane	2.79e-001	1.54e-001
n-Butane	1.13e+000	6.24e-001
Isopentane	7.67e-001	4.23e-001

n-Pentane	1.15e+000	6.32e-001
n-Hexane	1.77e+000	9.78e-001
Other Hexanes	1.35e+000	7.46e-001
Heptanes	7.76e+000	4.28e+000
Benzene	4.07e-001	2.24e-001
Toluene	3.09e+001	1.71e+001
Ethylbenzene	4.65e+000	2.57e+000
Xylenes	1.91e+001	1.05e+001
C8+ Heavies	3.01e+001	1.66e+001
Total Components	100.00	5.52e+001

HOWARD
Athens, TX (903) 677-0700 . Beeville, TX (361) 354-5200 . Midland, TX (432) 704-5351

GAS ANALYSIS REPORT

LABORATORY REPORT NUMBER 200226-5000-02-022620-19

PHYSICAL CONSTANTS PER GPA 2145-16

COMPANY:	CRESTWOOD	CYLINDER NO.:	12174
STATION:	WL2-0002	DATE ON:	02/17/2020
PROD.:	CRESTWOOD	DATE OFF:	
LEASE:	WL PLANT 2 INLET	DATE ANALYZED:	02/26/2020
TEMP:	64	EFFECTIVE DATE:	02/01/2020
PRESS.	182	SAMPLED BY	JG

COMPONENT	MOLE %	GPM	WT. %
H2S	0.0000		
OXYGEN	0.0030		0.0040
CARBON DIOXIDE	0.0940		0.1900
NITROGEN	0.8930		1.1490
METHANE	76.0090		55.9900
ETHANE	12.6090	3.3840	17.4090
PROPANE	6.1250	1.6940	12.4010
I-BUTANE	0.8400	0.2760	2.2420
N-BUTANE	1.9530	0.6180	5.2120
I-PENTANE	0.4450	0.1630	1.4740
N-PENTANE	0.4910	0.1790	1.6270
HEXANE PLUS	0.5380	0.2340	2.3020
TOTAL	100.0000	6.5480	100.0000

PRESSURE BASE	14.65	14.73	15.025
BTU DRY BASIS	1302.05	1309.17	1335.38
BTU SAT BASIS	1279.39	1286.37	1312.14

REAL GRAVITY	0.7545	H2S:	0.4 ppm
Z FACTOR	0.9961	SAMPLE TYPE:	SPOT
MERCAPTAN PPM:	0		

ANALYZED BY: PETER DOUGLAS CHROMATOGRAPH 5000-02-022620-19

06-20-2018

HOWARD
Athens, TX (903) 677-0700 . Beeville, TX (361) 354-5200 . Midland, TX (432) 704-5351

GAS ANALYSIS REPORT

LABORATORY REPORT NUMBER 190522-5000-05-052219-15

PHYSICAL CONSTANTS PER GPA 2145-16

COMPANY:	CRESTWOOD	CYLINDER NO.:	1589
STATION:	WL2-0002FL	DATE ON:	05/07/2019
PROD.:	CRESTWOOD	DATE OFF:	
LEASE:	WL PLANT 2 FUEL	DATE ANALYZED:	05/22/2019
TEMP:	88	EFFECTIVE DATE:	05/01/2019
PRESS.	157	SAMPLED BY	PL

COMPONENT	MOLE %	GPM	WT. %
H2S	0.0000		
OXYGEN	0.0140		0.0270
CARBON DIOXIDE	0.0350		0.0920
NITROGEN	1.4900		2.4960
METHANE	95.0800		91.1980
ETHANE	3.2800	0.8790	5.8970
PROPANE	0.0930	0.0260	0.2450
I-BUTANE	0.0000	0.0000	0.0000
N-BUTANE	0.0000	0.0000	0.0000
I-PENTANE	0.0000	0.0000	0.0000
N-PENTANE	0.0000	0.0000	0.0000
HEXANE PLUS	0.0080	0.0030	0.0450
TOTAL	100.0000	0.9080	100.0000

PRESSURE BASE	14.65	14.73	15.025
BTU DRY BASIS	1020.05	1025.62	1046.16
BTU SAT BASIS	1002.29	1007.76	1027.94

REAL GRAVITY	0.5785	H2S:	0 ppm
Z FACTOR	0.9979	SAMPLE TYPE:	SPOT
COMMENT:	SPOT		

ANALYZED BY: PETER DOUGLAS CHROMATOGRAPH 5000-05-052219-15

06-20-2018

HOWARD
Athens, TX (903) 677-0700 . Beeville, TX (361) 354-5200 . Midland, TX (432) 704-5351

GAS EXTENDED ANALYSIS REPORT

LAB REPORT NUMBER: 200601-5000-05-060120-01

PHYSICAL CONSTANTS PER GPA 2145-09 & TP-17 (1998)

CUSTOMER :	CRESTWOOD	DATE ON:	05/28/2020
STATION:	BLACK RIVER COMP DEHY UPSTREAM	DATE ANALYZED:	06/01/2020
PRODUCER:	CRESTWOOD	EFFECTIVE DATE:	05/01/2020
LEASE:	BLACK RIVER COMP DEHY UPSTREAM	DATE OFF:	

COMPONENT	MOLE %	GPM	WT. %
H2S	0.000		0.000
OXYGEN	0.002		0.003
NITROGEN	0.791		1.044
CARBON DIOXIDE	0.181		0.375
METHANE	78.781		59.530
ETHANE	11.225	3.012	15.898
PROPANE	5.118	1.415	10.628
I-BUTANE	0.731	0.240	2.001
N-BUTANE	1.623	0.513	4.443
I-PENTANE	0.383	0.141	1.302
N-PENTANE	0.398	0.145	1.353
HEXANES (C6's)	0.394	0.163	1.599
HEPTANES (C7+)	0.253	0.109	1.177
OCTANES (C8+)	0.109	0.055	0.582
NONANES (C9+)	0.007	0.002	0.041
DECANES (C10+)	0.004	0.001	0.024
TOTAL	100.000	5.796	100.000

REAL SP. GRAVITY	0.7354	REAL BTU DRY	1277.894
MOL. WT.	21.230	REAL BTU SAT	1255.646
Z FACTOR	0.9963	PRESS BASE	14.730
C2+ GPM	5.796	C4+ GPM	1.369
C3+ GPM	2.784	C5+ GPM	0.616
C6-C10+ MOL WT	103.795	C6-C10+ GRAVITY	3.574

SAMPLED BY	WJ	SAMPLE PRESS:	865
SAMPLE TYPE:	SPOT	SAMPLE TEMP:	100
CYLINDER NO.:		COUNTY / STATE:	14.73
COMMENT:	SPOT	ANALYST	MIKE HOBGOOD

* SEE NEXT PAGE FOR C6+ COMPOSITIONAL BREAKDOWN

06-04-2020

HOWARD
Athens, TX (903) 677-0700 . Beeville, TX (361) 354-5200 . Midland, TX (432) 704-5351

STATION: BLACK RIVER COMP DEH LEASE: BLACK RIVER COMP DEHY UPSTREAM

C6+ FRACTION COMPOSITION

HEXANE ISOMERS (C6'S)		MOLE %	GPM	WT. %
2,2-Dimethylbutane	P	0.010	0.004	0.040
2,3-Dimethylbutane	PN	0.000	0.000	0.000
2-Methylpentane	P	0.133	0.055	0.538
3-Methylpentane	P	0.071	0.029	0.288
Methylcyclopentane	N	0.000	0.000	0.000
Benzene	A	0.000	0.000	0.000
Cyclohexane	N	0.002	0.001	0.008
n-Hexane	P	0.179	0.074	0.725
HEPTANE ISOMERS (C7'S)				
3,3-Dimethylpentane	P	0.000	0.000	0.001
2,2-Dimethylpentane	P	0.003	0.001	0.012
2,4-Dimethylpentane	P	0.007	0.003	0.034
2 & 3-Methylhexane	P	0.031	0.015	0.148
2,3-Dimethylpentane	P	0.020	0.009	0.093
1,t-3-Dimethylcyclopentane	N	0.000	0.000	0.000
1,c-3-Dimethylcyclopentane	N	0.000	0.000	0.000
3-Ethlypentane	N	0.000	0.000	0.000
1,t-2-Dimethylcyclopentane	N	0.000	0.000	0.000
Toluene	A	0.020	0.007	0.087
Methylcyclohexane	N	0.105	0.043	0.487
Ethylcyclopentane	N	0.000	0.000	0.000
n-Heptane	P	0.067	0.031	0.315
OCTANE ISOMERS (C8'S)				
2,4 & 2,5-Dimethylhexane	P	0.006	0.003	0.033
2,2,4-Trimethylpentane	N	0.000	0.000	0.000
1,t-2,c-4-Trimethylcyclopentane	N	0.000	0.000	0.000
1,t-2,c-3-Trimethylcyclopentane	N	0.000	0.000	0.000
2-Methylheptane	P	0.021	0.011	0.112
1,c-2,t-4-Trimethylcyclopentane	N	0.000	0.000	0.000
3-Methylheptane	P	0.013	0.007	0.071
1,c-3-Dimethylcyclohexane	N	0.004	0.002	0.019
1,t-4-Dimethylcyclohexane	N	0.000	0.000	0.000
methyl-ethylcyclopentanes	N	0.000	0.000	0.000
1,t-3 & 1,c-4 Dimethylcyclohexane	N	0.009	0.004	0.046
1,c-2-Dimethylcyclohexane	N	0.002	0.001	0.000
Ethylcyclohexane	N	0.013	0.006	0.069
Ethylbenzene	A	0.002	0.001	0.012
m & p-Xylene	A	0.002	0.001	0.008
o-Xylene	A	0.004	0.002	0.022
Cyclooctane	P	0.001	0.000	0.005
n-Octane	P	0.032	0.017	0.174

HOWARD
Athens, TX (903) 677-0700 . Beeville, TX (361) 354-5200 . Midland, TX (432) 704-5351

STATION: BLACK RIVER COMP DEH LEASE: BLACK RIVER COMP DEHY UPSTREAM

C6+ FRACTION COMPOSITION

NONANE ISOMERS (C9'S)		MOLE %	GPM	WT. %
Trimethylhexanes	P	0.000	0.000	0.000
Dimethylpentanes	P	0.000	0.000	0.000
Isopropylcyclopentane	N	0.000	0.000	0.000
n-Propylcyclopentane	N	0.000	0.000	0.000
3-Methyloctane	P	0.000	0.000	0.000
Trimethylcyclohexanes	N	0.000	0.000	0.000
Isopropylbenzene	A	0.003	0.001	0.016
Isopropylcyclohexane	N	0.000	0.000	0.000
n-Propylcyclohexane	N	0.000	0.000	0.002
n-Propylbenzene	A	0.002	0.001	0.014
m-Ethyltoluene	A	0.000	0.000	0.000
p-Ethyltoluene	A	0.000	0.000	0.000
1,3,5-Trimethylbenzene	A	0.000	0.000	0.001
4 & 5-Methylnonane	P	0.000	0.000	0.000
o-Ethyltoluene & 3-Methylnonane	AP	0.000	0.000	0.000
1,2,3-Trimethylbenzene	A	0.000	0.000	0.000
1,2,4-Trimethylbenzene	A	0.001	0.000	0.006
n-Nonane	P	0.000	0.000	0.002
DECANE ISOMERS (C10'S)				
2-Methylnonane	P	0.000	0.000	0.000
tert-Butylbenzene	A	0.003	0.001	0.017
Isobutylcyclohexane & tert-Butylcyclohexane		0.000	0.000	0.000
Isobutylbenzene	A	0.000	0.000	0.000
sec-Butylbenzene	A	0.000	0.000	0.002
n-Butylcyclohexane	N	0.001	0.000	0.005
1,3-Diethylbenzene	A	0.000	0.000	0.000
1,2-Diethylbenzene & n-Butylbenzene	A	0.000	0.000	0.000
1,4-Diethylbenzene	A	0.000	0.000	0.000
n-Decane	P	0.000	0.000	0.000
UNDECANE ISOMERS (C11'S)				
n-Undecane	P	0.000	0.000	0.000
DODECANE ISOMERS (C12'S)				
n-Dodecane +	P	0.000	0.000	0.000

x Michael Howard

ANALYST

HOWARD
Athens, TX (903) 677-0700 . Beeville, TX (361) 354-5200 . Edmond, OK (405) 525-0579

LIQUID EXTENDED ANALYSIS REPORT

LABORATORY REPORT NUMBER 200604-5000-05-060420-01

PHYSICAL CONSTANTS PER GPA 2145-09 & TP-17 (1998)

CUSTOMER :	CRESTWOOD	DATE ON:	05/28/2020
STATION:	BLACK RIVER CONDENSATE	DATE ANALYZED:	06/04/2020
PRODUCER:	CRESTWOOD	EFFECTIVE DATE:	05/01/2020'
LEASE:	BLACK RIVER CONDENSATE	DATE OFF:	

COMPONENT	MOLE %	LIQUID VOL %	WT. %
H2S	0.000	0.000	0.000
OXYGEN	0.000	0.000	0.000
NITROGEN	0.085	0.024	0.029
CARBON DIOXIDE	0.027	0.012	0.014
METHANE	5.070	2.214	0.974
ETHANE	4.815	3.316	1.734
PROPANE	7.670	5.441	4.052
I-BUTANE	2.497	2.104	1.738
N-BUTANE	8.122	6.595	5.654
I-PENTANE	4.386	4.131	3.790
N-PENTANE	6.011	5.612	5.195
HEXANES (C6's)	12.302	12.277	12.581
HEPTANES (C7+)	19.991	21.607	23.563
OCTANES (C8+)	22.113	27.049	29.782
NONANES (C9+)	4.108	5.505	6.191
DECANES (C10+)	2.803	4.113	4.703
TOTAL	100.000	100.000	100.000

IDEAL SP. GRAVITY	0.6813	BTU / GAL	116521.77
MOL. WT.	83.486	VAPOR PRESS.	319.80
CUBIC FT / GAL	25.819	LBS / GAL	5.68
C1/C2 LV % RATIO	66.767	API GRAVITY	76.19
CO2/C2 LV % RATIO	0.362	SP GRAV AS VAPOR	2.88
C6-C10+ MOL WT	104.594	C6-C10+ GRAVITY	

SAMPLED BY	WJ	SAMPLE PRESS:	140
SAMPLE TYPE:	SPOT	SAMPLE TEMP:	80
CYLINDER NO.:		COUNTY / STATE:	0
COMMENT:	SPOT	ANALYST	MIKE HOBGOOD

* SEE NEXT PAGE FOR C6+ COMPOSITIONAL BREAKDOWN

06-04-2020

HOWARD
Athens, TX (903) 677-0700 . Beeville, TX (361) 354-5200 . Edmond, OK (405) 525-0579

STATION: BLACK RIVER CONDENS/LEASE: BLACK RIVER CONDENSATE

C6+ FRACTION COMPOSITION

HEXANE ISOMERS (C6'S)		MOLE %	LIQ VOL %	WT. %
2,2-Dimethylbutane	P	0.106	0.114	0.109
2,3-Dimethylbutane	PN	0.000	0.000	0.000
2-Methylpentane	P	2.369	2.531	2.446
3-Methylpentane	P	1.434	1.506	1.480
Methylcyclopentane	N	0.000	0.000	0.000
Benzene	A	0.341	0.246	0.320
Cyclohexane	N	3.535	3.097	3.564
n-Hexane	P	4.516	4.783	4.662
HEPTANE ISOMERS (C7'S)				
3,3-Dimethylpentane	P	0.038	0.044	0.045
2,3-Dimethylpentane	P	0.000	0.000	0.000
2,2-Dimethylpentane	P	0.096	0.116	0.115
2,4-Dimethylpentane	P	0.579	0.698	0.695
2 & 3-Methylhexane	P	1.260	1.499	1.512
1,t-3-Dimethylcyclopentane	N	0.000	0.000	0.000
1,c-3-Dimethylcyclopentane	N	0.000	0.000	0.000
1,t-2-Dimethylcyclopentane	N	0.000	0.000	0.000
3-Ethylpentane	N	0.000	0.000	0.000
Toluene	A	2.011	1.734	2.220
Methylcyclohexane	N	9.803	10.144	11.529
Ethylcyclopentane	N	0.000	0.000	0.000
n-Heptane	P	6.204	7.372	7.447
OCTANE ISOMERS (C8'S)				
2,4 & 2,5-Dimethylhexane	P	0.525	0.701	0.718
1,t-2,c-4-Trimethylcyclopentane	N	0.000	0.000	0.000
1,t-2,c-3-Trimethylcyclopentane	N	0.000	0.000	0.000
2-Methylheptane	P	3.883	5.151	5.313
1,c-2,t-4-Trimethylcyclopentane	N	0.000	0.000	0.000
3-Methylheptane	P	1.857	2.437	2.541
1,c-3-Dimethylcyclohexane	N	0.257	0.305	0.345
1,t-4-Dimethylcyclohexane	N	0.000	0.000	0.000
methyl-ethylcyclopentanes	N	0.000	0.000	0.000
1,t-3 & 1,c-4 Dimethylcyclohexane	N	1.359	1.576	1.827
1,c-2-Dimethylcyclohexane	N	2.510	2.869	3.374
Ethylcyclohexane	N	1.904	2.199	2.559
Ethylbenzene	A	0.413	0.411	0.526
m & p-Xylene	A	2.415	2.407	3.071
o-Xylene	A	0.520	0.509	0.661
n-Octane	P	6.242	8.236	8.541

HOWARD
Athens, TX (903) 677-0700 .. Beeville, TX (361) 354-5200 .. Edmond, OK (405) 525-0579

STATION: BLACK RIVER CONDENS/LEASE: BLACK RIVER CONDENSATE

C6+ FRACTION COMPOSITION

NONANE ISOMERS (C9'S)		MOLE %	LIQ VOL %	WT. %
Trimethylhexanes	P	0.000	0.000	0.000
Dimethylpentanes	P	0.000	0.000	0.000
Isopropylcyclopentane	N	0.000	0.000	0.000
n-Propylcyclopentane	N	0.000	0.000	0.000
3-Methyloctane	P	0.000	0.000	0.000
Trimethylcyclohexanes	N	0.000	0.000	0.000
Isopropylbenzene	A	0.201	0.228	0.290
Isopropylcyclohexane	N	0.000	0.000	0.000
n-Propylcyclohexane	N	0.550	0.710	0.832
n-Propylbenzene	A	0.372	0.421	0.535
m-Ethyltoluene	A	0.000	0.000	0.000
p-Ethyltoluene	A	0.000	0.000	0.000
1,3,5-Trimethylbenzene	A	0.006	0.007	0.009
4 & 5-Methylnonane	P	0.000	0.000	0.000
o-Ethyltoluene & 3-Methylnonane	AP	0.000	0.000	0.000
1,2,3-Trimethylbenzene	A	0.000	0.000	0.000
1,2,4-Trimethylbenzene	A	0.530	0.590	0.763
n-Nonane	P	2.449	3.549	3.762
DECANE ISOMERS (C10'S)				
2-Methylnonane	P	0.000	0.000	0.000
tert-Butylbenzene	A	0.187	0.235	0.301
Isobutylcyclohexane & tert-Butylcyclohexane		0.497	0.696	0.835
Isobutylbenzene	A	0.113	0.145	0.182
sec-Butylbenzene	A	0.089	0.112	0.142
n-Butylcyclohexane	N	0.365	0.520	0.613
1,3-Diethylbenzene	A	0.000	0.000	0.000
1,2-Diethylbenzene & n-Butylbenzene	A	0.152	0.192	0.244
1,4-Diethylbenzene	A	0.000	0.000	0.000
n-Decane	P	1.400	2.213	2.386
UNDECANE ISOMERS (C11'S)				
n-Undecane	P	0.000	0.000	0.000
DODECANE ISOMERS (C12'S)				
n-Dodecane +	P	0.000	0.000	0.000

x _____
ANALYST

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. $CO_2[lb/10^6 scf] = (3.67) (CON) (C)(D)$, 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 1.4-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM NATURAL GAS COMBUSTION[a]

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
91-57-6	2-Methylnaphthalene[b, c]	2.4E-05	D
56-49-5	3-Methylcholanthrene[b, c]	<1.8E-06	E
	7,12-Dimethylbenz(a)anthracene[b,c]	<1.6E-05	E
83-32-9	Acenaphthene[b,c]	<1.8E-06	E
203-96-8	Acenaphthylene[b,c]	<1.8E-06	E
120-12-7	Anthracene[b,c]	<2.4E-06	E
56-55-3	Benz(a)anthracene[b,c]	<1.8E-06	E
71-43-2	Benzene[b]	2.1E-03	B
50-32-8	Benzo(a)pyrene[b,c]	<1.2E-06	E
205-99-2	Benzo(b)fluoranthene[b,c]	<1.8E-06	E
191-24-2	Benzo(g,h,i)perylene[b,c]	<1.2E-06	E
207-08-9	Benzo(k)fluoranthene[b,c]	<1.8E-06	E
106-97-8	Butane	2.1E+00	E
218-01-9	Chrysene[b,c]	<1.8E-06	E
53-70-3	Dibenzo(a,h)anthracene[b,c]	<1.2E-06	E
25321-22-6	Dichlorobenzene[b]	1.2E-03	E
74-84-0	Ethane	3.1E+00	E
206-44-0	Fluoranthene[b,c]	3.0E-06	E
86-73-7	Fluorene[b,c]	2.8E-06	E
50-00-0	Formaldehyde[b]	7.5E-02	B
110-54-3	Hexane[b]	1.8E+00	E
193-39-5	Indeno(1,2,3-cd)pyrene[b,c]	<1.8E-06	E
91-20-3	Naphthalene[b]	6.1E-04	E
109-66-0	Pentane	2.6E+00	E
85-01-8	Phenanathrene[b,c]	1.7E-05	D
74-98-6	Propane	1.6E+00	E

WDEOH#1706#PLVVLRQ#DFWRUV#RU#SHFLDWHG#RUJDQLF#FRPSRXQGV#URP#
QDWXUDO#DV#FRPEXVWLRQ#Frqwlqxhg,#

#

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
129-00-0	Pyrene[b, c]	5.0E-06	E
108-88-3	Toluene[b]	3.4E-03	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 $1b/10^6$ scf to lb/MMBtu, divide by 1,020. Emission Factors preceeded with a less-than symbol are based on method detection limits.

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

[c] HAP because it is Polycyclic Organic Matter (POM). POM is a HAP as defined by Section 112(b) of the Clean Air Act.

[d] The sum of individual organic compounds may exceed the VOC and TOC emission factors due to differences in test methods and the availability of test data for each pollutant.

United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Research Triangle Park NC 27711

EPA-453/R-95-017
November 1995

Air

EPA

Protocol for Equipment Leak Emission Estimates

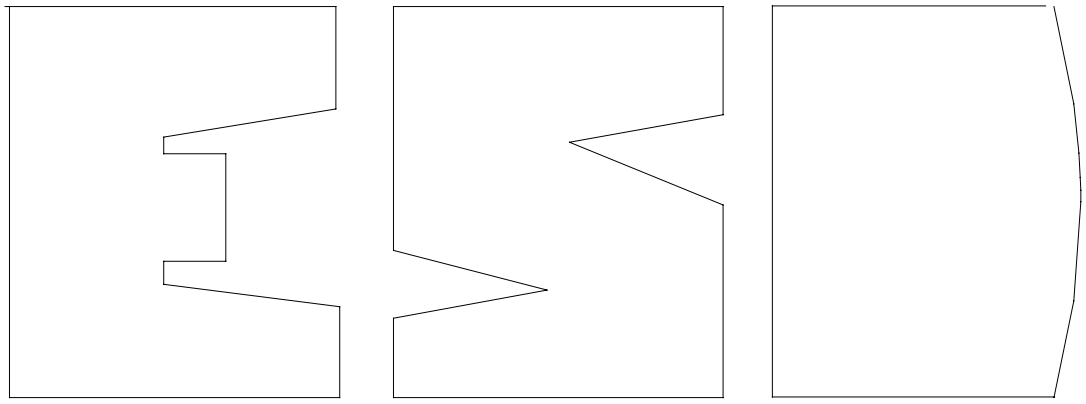

TABLE 2-4. OIL AND GAS PRODUCTION OPERATIONS AVERAGE EMISSION FACTORS (kg/hr/source)

Equipment Type	Service[a]	Emission Factor (kg/hr/source)[b]
Valves	Gas	4.5E-03
	Heavy Oil	8.4E-06
	Light Oil	2.5E-03
	Water/Oil	9.8E-05
Pump seals	Gas	2.4E-03
	Heavy Oil	NA
	Light Oil	1.3E-02
	Water/Oil	2.4E-05
Others[c]	Gas	8.8E-03
	Heavy Oil	3.2E-05
	Light Oil	7.5E-03
	Water/Oil	1.4E-02
Connectors	Gas	2.0E-04
	Heavy Oil	7.5E-06
	Light Oil	2.1E-04
	Water/Oil	1.1E-04
Flanges	Gas	3.9E-04
	Heavy Oil	3.9E-07
	Light Oil	1.1E-04
	Water/Oil	2.9E-06
Open-ended lines	Gas	2.0E-03
	Heavy Oil	1.4E-04
	Light Oil	1.4E-03
	Water/Oil	2.5E-04

[a]Water/Oil emission factors apply to water streams in oil service with a water content greater than 50%, from the point of origin to the point where the water content reaches 99%. For water streams with a water content greater than 99%, the emission rate is considered negligible.

[b]These factors are for total organic compound emission rates (including non-VOC's such as methane and ethane) and apply to light crude, heavy crude, gas plant, gas production, and off shore facilities. "NA" indicates that not enough data were available to develop the indicated emission factor.

[c]The "other" equipment type was derived from compressors, diaphrams, drains, dump arms, hatches, instruments, meters, pressure relief valves, polished rods, relief valves, and vents. This "other" equipment type should be applied for any equipment type other than connectors, flanges, open-ended lines, pumps, or valves.

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:

$$E = k\,(s/12)^a (W/3)^b \quad (1a)$$

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

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

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

as shown in Table 13.2.2-4

Table 13.2.2-4. EMISSION FACTOR FOR 1980'S VEHICLE FLEET EXHAUST, BRAKE WEAR AND TIRE WEAR

Particle Size Range[a]	*C*, Emission Factor for Exhaust, Brake Wear and Tire Wear[b] lb/VMT
$PM_{2.5}$	0.00036
PM_{10}	0.00047
PM_{30}[c]	0.00047

[a] Refers to airborne particulate matter (PM-x) with an aerodynamic diameter equal to or less than x micrometers.
[b] Units shown are pounds per vehicle mile traveled (lb/VMT).
[c] PM-30 is sometimes termed "suspendable particulate" (SP) and is often used as a surrogate for TSP.

It is important to note that the vehicle-related source conditions refer to the average weight, speed, and number of wheels for all vehicles traveling the road. For example, if 98 percent of traffic on the road are 2-ton cars and trucks while the remaining 2 percent consists of 20-ton trucks, then the mean weight is 2.4 tons. More specifically, Equations 1a and 1b are *not* intended to be used to calculate a separate emission factor for each vehicle class within a mix of traffic on a given unpaved road. That is, in the example, one should *not* determine one factor for the 2-ton vehicles and a second factor for the 20-ton trucks. Instead, only one emission factor should be calculated that represents the "fleet" average of 2.4 tons for all vehicles traveling the road.

Moreover, to retain the quality ratings when addressing a group of unpaved roads, it is necessary that reliable correction parameter values be determined for the road in question. The field and laboratory procedures for determining road surface silt and moisture contents are given in AP-42 Appendices C.1 and C.2. Vehicle-related parameters should be developed by recording visual observations of traffic. In some cases, vehicle parameters for industrial unpaved roads can be determined by reviewing maintenance records or other information sources at the facility.

In the event that site-specific values for correction parameters cannot be obtained, then default values may be used.In the absence of site-specific silt content information, an appropriate mean value from Table 13.2.2-1 may be used as a default value, but the quality rating of the equation is reduced by two letters. Because of significant differences found between different types of road surfaces and between different areas of the country, use of the default moisture content value of 0.5 percent in Equation 1b is discouraged. The quality rating should be downgraded two letters when the default moisture content value is used. (It is assumed that readers addressing industrial roads have access to the information needed to develop average vehicle information in Equation 1a for their facility.)

The effect of routine watering to control emissions from unpaved roads is discussed below in Section 13.2.2.3, “Controls”. However, all roads are subject to some natural mitigation because of rainfall and other precipitation. The Equation 1a and 1b emission factors can be extrapolated to annual

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:

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

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 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 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. Vehicle restrictions that limit the speed, weight or number of vehicles on the road;

2. Surface improvement, by measures such as (a) paving or (b) adding gravel or slag to a dirt road; and
3. Surface treatment, such as watering or treatment with chemical dust suppressants.

Available control options span broad ranges in terms of cost, efficiency, and applicability. For example, traffic controls provide moderate emission reductions (often at little cost) but are difficult to enforce. Although paving is highly effective, its high initial cost is often prohibitive. Furthermore, paving is not feasible for industrial roads subject to very heavy vehicles and/or spillage of material in transport. Watering and chemical suppressants, on the other hand, are potentially applicable to most industrial roads at moderate to low costs. However, these require frequent reapplication to maintain an acceptable level of control. Chemical suppressants are generally more cost-effective than water but not in cases of temporary roads (which are common at mines, landfills, and construction sites). In summary, then, one needs to consider not only the type and volume of traffic on the road but also how long the road will be in service when developing control plans.

Vehicle restrictions. These measures seek to limit the amount and type of traffic present on the road or to lower the mean vehicle speed. For example, many industrial plants have restricted employees from driving on plant property and have instead instituted bussing programs. This eliminates emissions due to employees traveling to/from their worksites. Although the heavier average vehicle weight of the busses increases the base emission factor, the decrease in vehicle-miles-traveled results in a lower overall emission rate.

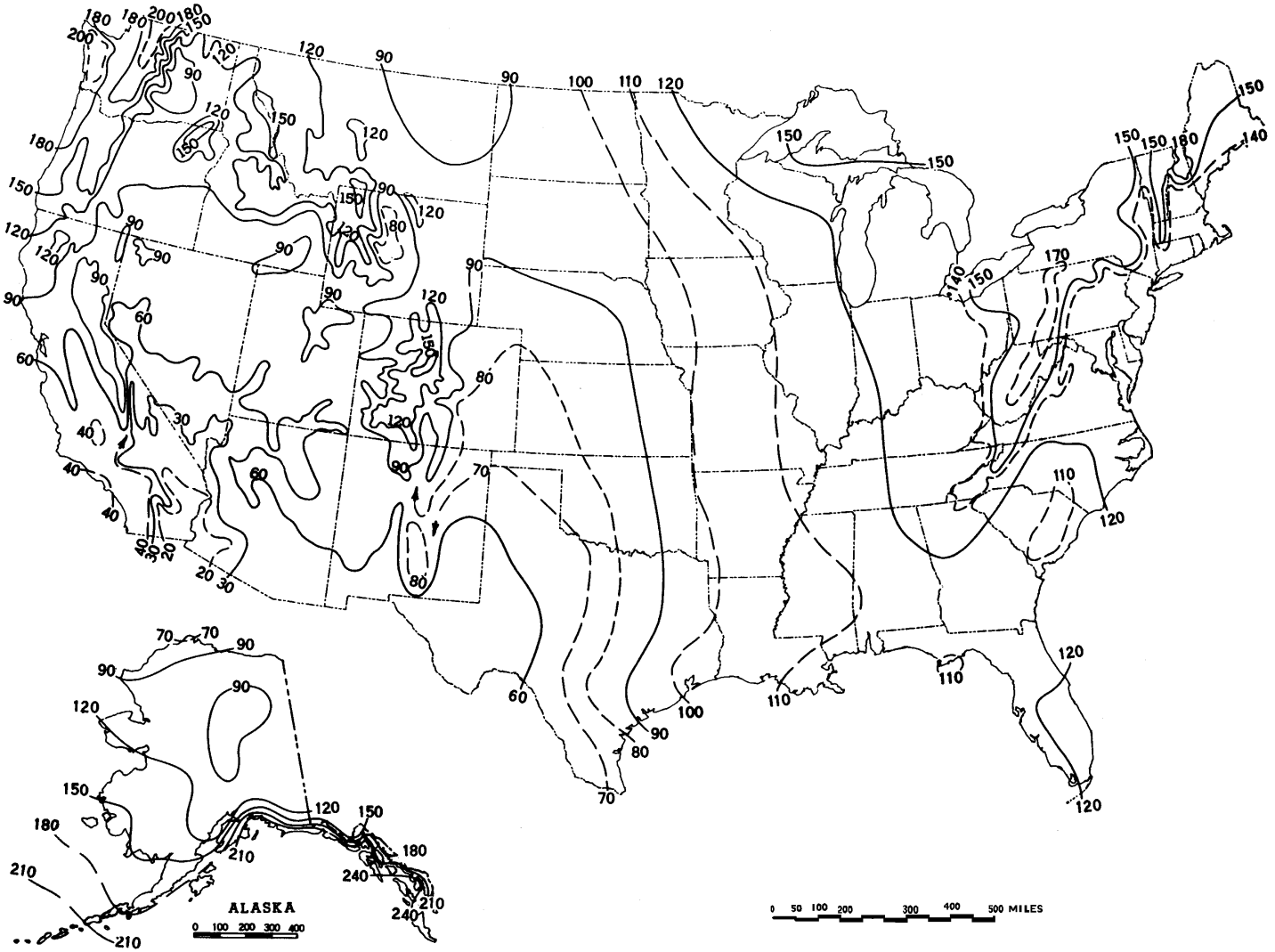

Figure 13.2.2-1. Mean number of days with 0.01 inch or more of precipitation in United States.

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DEPUTY SECRETARY

DEPARTMENT ACCEPTED VALUES FOR:
AGGREGATE HANDLING, STORAGE PILE, and HAUL ROAD EMISSIONS

TO: Applicants and Air Quality Bureau Permitting Staff

SUBJECT: Department accepted default values for percent silt, wind speed, moisture content, and control efficiencies for haul road control measures

This guidance document provides the Department accepted default values for correction parameters in the emission calculation equations for aggregate handling and storage piles emissions in construction permit applications and notices of intent submitted under 20.2.72 and 20.2.73 NMAC; and the Department accepted control efficiencies for haul road control measures for applications submitted under 20.2.72 NMAC.

Aggregate Handling and Storage Pile Emission Calculations

Applicants should calculate the particulate matter emissions from aggregate handling and storage piles using the EPA's AP-42 Chapter 13.2.4.
http://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0204.pdf

Equation 1 from Chapter 13.2.4 requires users to input values for two correction parameters, U and M, where U = mean wind speed and M = material moisture content. Below are the accepted values for U and M:

Default Values for Chapter 13.2.4, Equation 1:

Parameter	Default Value
U = Mean wind speed (miles per hour)	11 mph
M = Material moisture content (% water)	2%

Applicants must receive preapproval from the Department if they wish to assume a higher moisture content and/or a lower wind speed in these calculations. Higher moisture contents may require site specific testing either as a permit condition or submitted with the application. Applicants may assume higher wind speeds and lower percent moisture content in their calculations without prior approval from the Department.

Haul Road Emissions and Control Measure Efficiencies

Applicants should calculate the particulate matter emissions from unpaved haul roads using the EPA's AP-42 Chapter 13.2.2. http://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0202.pdf

Equation 1(a) from Chapter 13.2.2 requires users to input values for two correction parameters, s and W, where s = surface material silt content (%) and W = mean vehicle weight (tons). The applicant should calculate the mean vehicle weight in accordance with the chapter's instructions. Below is the accepted value for the parameter s:

Default Values for Chapter 13.2.2, Equation 1(a):

Parameter	Default Value
s = surface material silt content (%)	4.8%

Applicants may use a higher silt content without prior approval from the Department. Use of a lower silt content requires prior approval from the Department and may require site specific testing in support of the request.

Equation 2 from Chapter 13.2.2 allows users to take credit for the number of days that receive precipitation in excess of 0.01 inches, in the annual emissions calculation, where P = number of days in a year with at least 0.01 inches of precipitation.

Default Values for Chapter 13.2.2, Equation 2:

Parameter	Default Value
P = number of days in a year with at least 0.01 inches of precipitation	70 days

Applications submitted under Part 72 may request to apply control measures to reduce the particulate matter emissions from facility haul roads. Applications submitted under Part 73 may not consider any emission reduction from control measures in the potential emission rate calculation, as registrations issued under Part 73 are not federally enforceable under the Clean Air Act or the New Mexico Air Quality Control Act. In order for those control measures to be federally enforceable, the controls must be a requirement in an air quality permit.

Below are the Department accepted control efficiencies for various haul road control measures:

Haul Road Control Measures and Control Efficiency:

Control Measure	Control Efficiency
None	0%
Base course **or** watering	60%
Base course **and** watering	80%
Base course **and** surfactant	90%
Paved **and** Swept	95%

October 2000
RG-109 (Draft)

Air Permit Technical Guidance for Chemical Sources:

Flares and Vapor Oxidizers

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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.

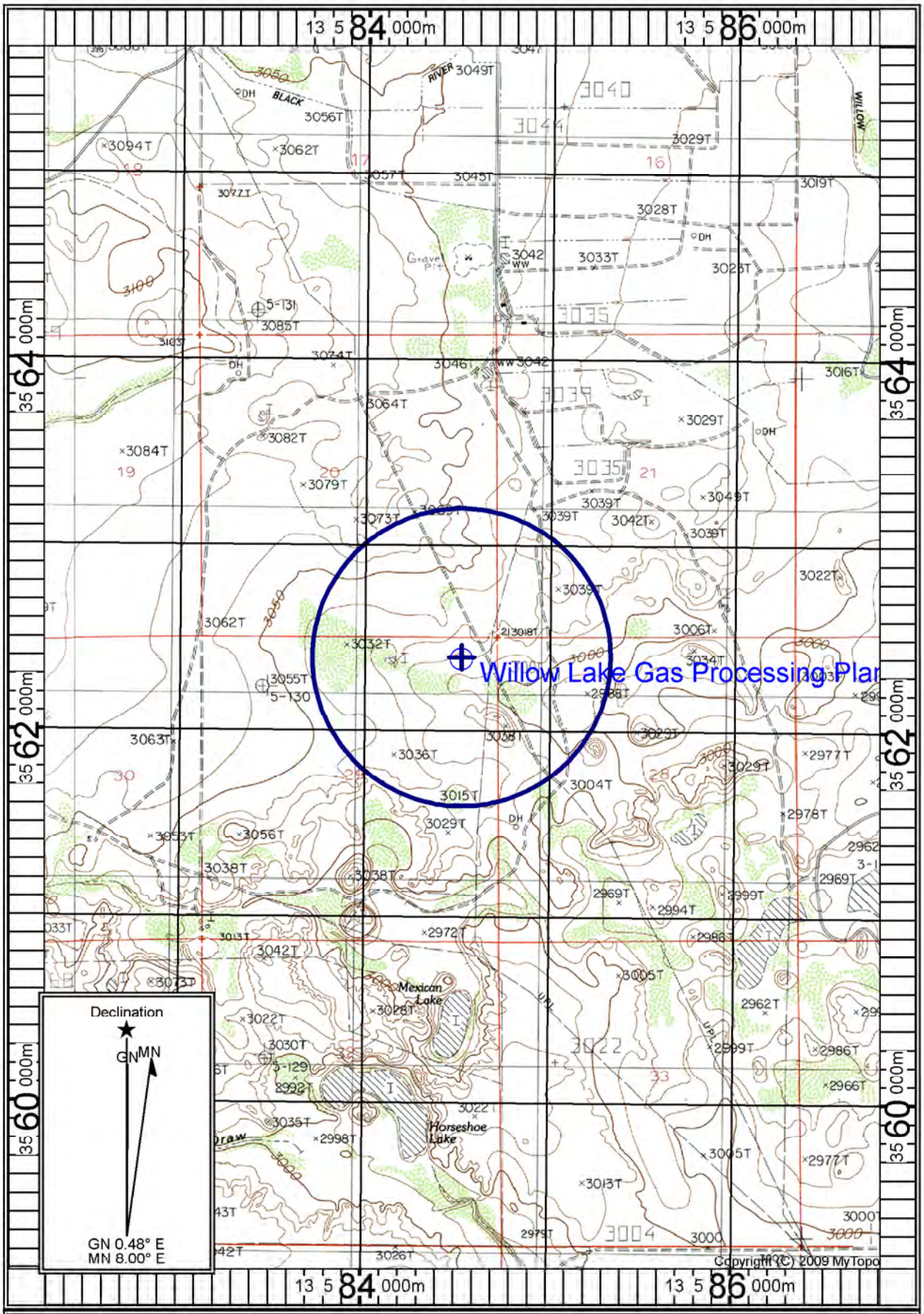
Section 8

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.



Map Name: MALAGA
Print Date: 08/20/20
Scale: 1 inch = 2,500 ft.
Map Center: 13 0584520 E 3562399 N

Horizontal Datum: WGS84

Section 9

Proof of Public Notice

(for NSR applications submitting under 20.2.72 or 20.2.74 NMAC)
(This proof is required by: 20.2.72.203.A.14 NMAC "Documentary Proof of applicant's public notice")

☑ **I have read the AQB "Guidelines for Public Notification for Air Quality Permit Applications"**
This document provides detailed instructions about public notice requirements for various permitting actions. It also provides public notice examples and certification forms. Material mistakes in the public notice will require a re-notice before issuance of the permit.

Unless otherwise allowed elsewhere in this document, the following items document proof of the applicant's Public Notification. Please include this page in your proof of public notice submittal with checkmarks indicating which documents are being submitted with the application.

New Permit and **Significant Permit Revision** public notices must include all items in this list.

Technical Revision public notices require only items 1, 5, 9, and 10.

Per the Guidelines for Public Notification document mentioned above, include:

1. ☐ A copy of the certified letter receipts with post marks (20.2.72.203.B NMAC)
2. ☐ A list of the places where the public notice has been posted in at least four publicly accessible and conspicuous places, including the proposed or existing facility entrance. (e.g: post office, library, grocery, etc.)
3. ☐ A copy of the property tax record (20.2.72.203.B NMAC).
4. ☐ A sample of the letters sent to the owners of record.
5. ☐ A sample of the letters sent to counties, municipalities, and Indian tribes.
6. ☐ A sample of the public notice posted and a verification of the local postings.
7. ☐ A table of the noticed citizens, counties, municipalities and tribes and to whom the notices were sent in each group.
8. ☐ A copy of the public service announcement (PSA) sent to a local radio station and documentary proof of submittal.
9. ☐ A copy of the classified or legal ad including the page header (date and newspaper title) or its affidavit of publication stating the ad date, and a copy of the ad. When appropriate, this ad shall be printed in both English and Spanish.
10. ☐ A copy of the display ad including the page header (date and newspaper title) or its affidavit of publication stating the ad date, and a copy of the ad. When appropriate, this ad shall be printed in both English and Spanish.
11. ☐ A map with a graphic scale showing the facility boundary and the surrounding area in which owners of record were notified by mail. This is necessary for verification that the correct facility boundary was used in determining distance for notifying land owners of record.

N/A – Public notice requirements are not applicable for applications submitted pursuant to 20.2.70 NMAC.

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.

Crestwood New Mexico Pipeline LLC (Crestwood) owns and operates the Willow Lake Gas Processing Plant (Willow Lake) located in Eddy County, New Mexico. As permitted, The Willow Lake facility consists of two (2) gas processing plants to recover natural gas liquids (NGL): Willow Lake 1 consists of a turbo-expander cryogenic separation system that removes a significant fraction of the C2+ compounds from the cooled gas stream, and Willow Lake 2 consists of a refrigerated Joule-Thompson (RJT) plant that also removes C2+ compounds using a combination of mechanical refrigeration and a Joule-Thompson effect. The NGL streams from these units are routed to pressurized storage tanks prior to truck loading and transport. Willow Lake 1 has a maximum processing capacity of 20 MMSCFD of natural gas. Willow Lake 2 has a maximum processing capacity of 35 MMSCFD of natural gas. The two processing units have separate inlets but share two outlet residue lines.

During normal operation, the gas enters Willow Lake 1 through an inlet scrubber. Produced water and condensate is sent to atmospheric storage tanks, and the gas stream is sent to inlet compression and filter separation. The gas is then sent to a 25 MMSCFD TEG dehydration unit (Unit DEHY-803) where water is removed from the wet gas. The dry gas from the contactor is sent to a molecular sieve dehydrator to further remove water from the gas stream before additional processing. Gas that is utilized during molecular sieve regeneration is routed to a 3.5 MMSCFD TEG dehydration unit (Unit DEHY-804) The cryogenic separation system separates and extracts NGLs from the dry gas stream. The resulting lean residual gas stream is sent to the residue compressor and to the sales pipeline. The resulting NGL stream is sent to one 90,000-gallon bullet tank, then trucked offsite.

Gas enters Willow Lake 2 through an inlet gas separator. The produced water is sent to atmospheric storage tanks, and the gas stream is sent to the RJT skid. A combination of mechanical refrigeration and a Joule-Thompson effect separates and extracts NGLs. The resulting lean residual gas stream is sent to two residue compressors and to the sales pipeline. The resulting NGL stream is sent to three 30,000 gallon bullet tanks, then trucked offsite. Ethylene glycol is injected at various stages in the RJT process for hydrate formation prevention. The system includes a 35 MMSCF ethylene glycol unit (Unit DEHY-EG), whose associated flash tank and still column are controlled by a flare (Unit WL2-FL). Relief valves and blowdowns at Willow Lake 2 also are routed to the flare.

Willow Lake 1 and Willow Lake 2 (in addition to operating as two processing units) may also operate as a standalone compressor station (i.e., without processing). A standalone compressor station is also located at the Willow Lake facility. The compressor station includes five compressor engines (unit C-1110 though C-1150), three 400-bbl condensate/produced water storage tanks (WLCS-TK2301 through WLCS-TK2303). Three (3) compressor engines (units C-1160 through C-1180) will operate in conjunction with the existing units (C-1110 through C-1150) as a compressor station within the existing Willow Lake 1 area. An additional TEG dehydration unit (DEHY-1505) and associated reboiler (HTR-1505) support the existing compressor station TEG dehydrator (Unit DEHY-805). The site also includes a 400 barrel atmospheric storage tank (Unit WLCS-TK2304) to store produced water and condensate. A VRU (WL1-VRU that controls emissions from the Willow Lake 1 existing tanks controls emissions from the compressor station tanks (WLCS-TK2301 through WLCS-TK2304), an additional VRU (WLCS-VRU) is also located on site and storage tank emissions during VRU downtime will be directed to a flare (Unit WL1-FL). The flare also controls truck loading vapors from WL1 and WLCS (Unit ATM LOAD) as well as emissions from compressor blowdowns. In addition to loading condensate into tank truck for removal offsite, condensate may also be pumped into the facility's discharge pipeline.

The emissions represented in this application represent the worst-case emissions calculated as if each piece of equipment operates 8,760 hours/year, even though only certain equipment will actually be operated in each scenario.

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)**:**
See emission sources listed in Table 2-A.

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.**

N/A – This application is being submitted pursuant to 20.2.70 NMAC.

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/

STATE REGULATIONS:

STATE REGU-LATIONS CITATION	Title	Applies?	Unit(s) or Facility	JUSTIFICATION:
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 Sulfur Compounds, Carbon Monoxide and Nitrogen Dioxide. The facility meets maximum allowable concentrations of 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	Facility	This regulation does not apply as the facility has no need to 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	No	N/A	This regulation establishes sulfur emission standards for natural gas processing plants. The facility does not meet the minimum sulfur emission requirement of an average of 5 tons/day [20.2.35.110.A NMAC]. Therefore, this facility is not subject to the operational, recordkeeping, or reporting requirements of this regulation.
20.2.37 and 20.2.36 NMAC	Petroleum Processing Facilities and Petroleum Refineries	No	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 does not meet the definition of a petroleum production facility or tank battery as defined in 20.2.38 NMAC and is therefore not subject to this regulation.
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.
20.2.61.109 NMAC	Smoke & Visible Emissions	Yes	C-1100, C-1200, C-2300, C-2400, C-1110 to C-1180, HTR-802 to HTR-805, HTR-730, HTR-1505, WL1-FL, WL2-FL	This regulation establishes controls on smoke and visible emissions from certain sources, including stationary combustion equipment. The engines, heaters, flares and combustors at this facility are subject to this regulation.
20.2.70 NMAC	Operating Permits	Yes	Facility	The facility increased emissions to above Title V thresholds with the transition to a minor NSR. It is major with respect to Title V and is submitting this initial Title V permit within one (1) year of commencing operations as a Title V facility.
20.2.71 NMAC	Operating Permit Fees	Yes	Facility	This facility is subject to 20.2.70 and will therefore comply with the fee 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 currently complies with NSR-5142-M8.

STATE REGU-LATIONS CITATION	Title	Applies?	Unit(s) or Facility	JUSTIFICATION:
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	N/A	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.
20.2.77 NMAC	New Source Performance Standards	Yes	C-1100, C-1200, C-2300 C-2400, C-1110 to C-1180, FUG-1 and FUG-2	The facility currently operates equipment that is subject to subparts of 40 CFR 60: the compressors associated with Units C-2300, C-2400 and units C-1110 to C-1180 will be subject to subpart OOOOa. All engines will be subject to subpart JJJJ. Additionally, the new fugitive components (FUG-2) associated with the expansion of the compressor station will trigger subpart OOOOa applicability. The collection of fugitive components at Willow Lake 1 (FUG-1) will still remain subject to NSPS OOOO as the compressor station will be considered a separate process unit.
20.2.78 NMAC	Emission Standards for HAPS	No	Units Subject to 40 CFR 61	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	N/A	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	Yes	Facility	This regulation establishes requirements for the evaluation of stack heights and other dispersion techniques. As this facility is a new facility pursuant to 20.2.80.110, this facility is subject to this regulation.
20.2.82 NMAC	MACT Standards for source categories of HAPS	Yes	C-1100, C-1200, C-2300, C-2400, C-1110 to C-1180, DEHY-803, DEHY-804, DEHY-805, DEHY-1505	The engines at this facility are subject to 40 CFR 63 subpart ZZZZ and the TEG dehydrators at this facility are subject to 40 CFR 63 subpart HH. Therefore, this regulation applies.

FEDERAL REGULATIONS:

FEDERAL REGU-LATIONS CITATION	Title	Applies?	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	C-1100, C-1200, C-2300 C-2400, C-1110 to C-1180, FUG-1, FUG-2	The facility currently operates equipment that is subject to subparts of 40 CFR 60: the compressors associated with Units C-2300, C-2400 and units C-1110 to C-1180 will be subject to subpart OOOOa. All engines will be subject to subpart JJJJ. Additionally, the new fugitive components (FUG-2) associated with the expansion of the compressor station will trigger subpart OOOOa applicability. The collection of fugitive components at Willow Lake 1 (FUG-1) will still remain subject to NSPS OOOO as the compressor station will be considered a separate process unit.
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.
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 which meet the applicability criteria of a heat input greater than or equal to 10 MMBtu/hr.
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 400 bbl (16,800 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."

FEDERAL REGULATIONS CITATION	Title	Applies?	Unit(s) or Facility	JUSTIFICATION:
NSPS 40 CFR 60.330 Subpart GG	Stationary Gas Turbines	No	N/A	There are no stationary gas turbines at this facility; this regulation does not apply.
NSPS 40 CFR 60, Subpart KKK	Leaks of VOC from Onshore Gas Plants	No	N/A	This subpart applies to gas processing plants constructed after January 20, 1984, and on or before August 23, 2011. The gas processing plants were constructed after August 23, 2011.
NSPS 40 CFR Part 60 Subpart LLL	Standards of Performance for Onshore Natural Gas Processing: SO_2 Emissions	No	N/A	NSPS Subpart LLL applies to onshore natural gas processing facilities that contain sweetening units that commenced construction after January 20, 1984 but before August 23, 2011. The facility is an onshore natural gas processing plant for which construction, reconstruction, or modification commenced after August 23, 2011. This subpart does not apply.
NSPS 40 CFR Part 60 Subpart OOOO	Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution for which construction, modification or reconstruction commenced after August 23, 2011 and before September 18, 2015	Yes	FUG-1	Units C-1100 and C-1200 were constructed prior to August 23, 2011 and are therefore not subject to this regulation. The compressors associated with Units C-2300, C-2400 and units C-1110 to C-1180 will be or were constructed or modified after September 18, 2015 and are subject to subpart OOOOa. The collection of fugitive components at Willow Lake 1 (FUG-1) will remain subject to NSPS OOOO as the compressor station will be considered a separate process unit. Finally, the new fugitive components (FUG-2) associated with the expansion of the compressor station will trigger subpart OOOOa applicability (not NSPS OOOO). The storage vessels at this facility each emit less than 6 tpy of VOC and are therefore 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	C-2300 C-2400, C-1110 to C-1180, FUG-2	The compressors associated with Units C-2300, C-2400 and units C-1110 to C-1180 will be or were constructed or modified after September 18, 2015 and are subject to subpart OOOOa. The collection of fugitive components at Willow Lake 1 (FUG-1) will remain subject to NSPS OOOO as the compressor station will be considered a separate process unit. Finally, the new fugitive components (FUG-2) associated with the addition of the compressor station will trigger subpart OOOOa applicability (not NSPS OOOO). The fugitive components installed as part of the compressor station (FUG-2) will operate as a separate process unit than the WL1 gas processing plant. The fugitive components at the WL1 gas processing plant (FUG-1) will remain subject to NSPS OOOO and the new compressor station component will be subject to NSPS OOOOa. The storage vessels at this facility each emit less than 6 tpy of VOC and are therefore not subject to this regulation.
NSPS 40 CFR 60 Subpart IIII	Standards of performance for Stationary Compression Ignition Internal Combustion Engines	No	N/A	There are no CI engines at this facility; this regulation does not apply.

FEDERAL REGULATIONS CITATION	Title	Applies?	Unit(s) or Facility	JUSTIFICATION:
NSPS 40 CFR Part 60 Subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	Yes	C-1100, C-1200, C-2300, C-2400, C-1110 to C-1180	All engines at this facility are new stationary spark ignition engines with respect to NSPS JJJJ pursuant to 40 CFR 60.4230(4)(i). This regulation applies.
NSPS 40 CFR 60 Subpart TTTT	Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units	No	N/A	There are no electric generating units at this facility; 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	There are no electric utility generating units at this facility; this regulation does not apply.
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 municipal solid waste landfill; 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 no 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	C-1100, C-1200, C-2300, C-2400, C-1110 to C-1180, DEHY-803, DEHY-804, DEHY-805, DEHY-1505	The engines at this facility are subject to 40 CFR 63 subpart ZZZZ and the TEG dehydrators at this facility are subject to 40 CFR 63 subpart HH. Therefore, this regulation applies.

FEDERAL REGULATIONS CITATION	Title	Applies?	Unit(s) or Facility	JUSTIFICATION:
MACT 40 CFR 63.760 Subpart HH	Oil and Natural Gas Production Facilities	Yes	DEHY-803, DEHY-804, DEHY-805, DEHY-1505	This regulation establishes national emission standards for hazardous air pollutants from oil and natural gas production facilities. The facility is an area source of HAPs and meets the definition of a natural gas processing plant. MACT Subpart HH applies to emission points at oil and natural gas production facilities that are HAP major or HAP area sources and that process, upgrade, or store either hydrocarbon liquids or natural gas prior to the point of custody transfer. This regulation applies to TEG units at area sources pursuant to 40 CFR 63.760(b)(2). Unit DEHY-EG is an ethylene glycol unit and is not subject to this regulation. The facility's TEG dehydrators will comply with the requirements of this subpart as applicable. Since benzene emissions from each dehydrator are less than 1 tpy, the facility is subject to only recordkeeping requirements.
MACT 40 CFR 63 Subpart HHH	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	Subpart DDDDD covers majors sources of HAPs. Willow Lake GPP is an area source of HAPS; and therefore, is not subject to Subpart DDDDD.
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.
MACT 40 CFR 63 Subpart ZZZZ	National Emissions Standards for Hazardous Air Pollutants for Stationary RICE	Yes	C-1100, C-1200, C-2300, C-2400, C-1110 to C-1180	The engines at this facility are subject to MACT ZZZZ. Units C-1100, C-1200, C-2300, C-2400 and C-1110 through C-1180 will fulfill the requirements of this regulation by complying with NSPS JJJJ.
40 CFR 64	Compliance Assurance Monitoring	No	N/A	Units C-1200, C-2300 and C-2400 have an uncontrolled PTE > 100 tpy of NOx and CO but are subject to NSPS JJJJ and per 40 CFR 64.2(b)(1)(i) can take credit for an emissions reductions. These units are therefore not subject to CAM. Units DEHY-803, DEHY-805 and DEHY-1505 have uncontrolled VOC emissions > 100 tpy. The flash tank vapors from DEHY-803 and DEHY-805 are rerouted to the reboilers to be used as fuel and the still vent vapors are sent to a BTEX condenser. The flash tank vapors from DEHY-1505 are routed to the suction side of the compressor station and the still vent vapors are sent to a BTEX condenser. The VRU serves to collect any flash tank vapors not utilized as fuel, or routed to the compressor station suction and returns vapors to the process. Although these TEG units could potentially be subject to CAM, pursuant to 40 CFR 64.1, the reboiler and condenser are considered passive control measures which are process design features. As such, these reductions are not considered to be taken as a result of a control device, but rather as inherent to the dehydration process. Additionally, the dehydration units are subject to 40 CFR Part 63, Subpart HH.
40 CFR 68	Chemical Accident Prevention	Yes	Facility	The facility does have a material above a threshold quantity listed in 40 CFR 68.130; and therefore, is subject to 40 CFR Part 68.

FEDERAL REGULATIONS CITATION	Title	Applies?	Unit(s) or Facility	JUSTIFICATION:
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	This facility does not operate any equipment that releases CFCs; This regulation does not apply.

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.

All required documentation is kept on site and will be made available to the department upon request.

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: https://www.env.nm.gov/aqb/permit/aqb_pol.html. 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.

No alternate operating scenarios are being proposed with this application.

Section 16

Air Dispersion Modeling

1) Minor Source Construction (20.2.72 NMAC) and Prevention of Significant Deterioration (PSD) (20.2.74 NMAC) ambient impact analysis (modeling): Provide an ambient impact analysis as required at 20.2.72.203.A(4) and/or 20.2.74.303 NMAC and as outlined in the Air Quality Bureau's Dispersion Modeling Guidelines found on the Planning Section's modeling website. If air dispersion modeling has been waived for one or more pollutants, attach the AQB Modeling Section modeling waiver approval documentation.
2) SSM Modeling: Applicants must conduct dispersion modeling for the total short term emissions during routine or predictable startup, shutdown, or maintenance (SSM) using realistic worst case scenarios following guidance from the Air Quality Bureau's dispersion modeling section. 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 modeling requirements.
3) Title V (20.2.70 NMAC) ambient impact analysis: Title V applications must specify the construction permit and/or Title V Permit number(s) for which air quality dispersion modeling was last approved. Facilities that have only a Title V permit, such as landfills and air curtain incinerators, are subject to the same modeling required for preconstruction permits required by 20.2.72 and 20.2.74 NMAC.

What is the purpose of this application?	Enter an X for each purpose that applies
New PSD major source or PSD major modification (20.2.74 NMAC). See #1 above.	
New Minor Source or significant permit revision under 20.2.72 NMAC (20.2.72.219.D NMAC). See #1 above. **Note:** Neither modeling nor a modeling waiver is required for VOC emissions.	
Reporting existing pollutants that were not previously reported.	
Reporting existing pollutants where the ambient impact is being addressed for the first time.	
Title V application (new, renewal, significant, or minor modification. 20.2.70 NMAC). See #3 above.	X
Relocation (20.2.72.202.B.4 or 72.202.D.3.c NMAC)	
Minor Source Technical Permit Revision 20.2.72.219.B.1.d.vi NMAC for like-kind unit replacements.	
Other: i.e. SSM modeling. See #2 above.	
This application does not require modeling since this is a No Permit Required (NPR) application.	
This application does not require modeling since this is a Notice of Intent (NOI) application (20.2.73 NMAC).	
This application does not require modeling according to 20.2.70.7.E(11), 20.2.72.203.A(4), 20.2.74.303, 20.2.79.109.D NMAC and in accordance with the Air Quality Bureau's Modeling Guidelines.	

Check each box that applies:

☐ See attached, approved modeling **waiver for all** pollutants from the facility.
☐ See attached, approved modeling **waiver for some** pollutants from the facility.
☐ Attached in Universal Application Form 4 (UA4) is a **modeling report for all** pollutants from the facility.
☐ Attached in UA4 is a **modeling report for some** pollutants from the facility.
☑ No modeling is required.

Modeling is not being submitted with this application pursuant to 20.2.70 NMAC. Air dispersion modeling for this facility was completed and submitted with NSR Permit 5142-M8.

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
C-1100	Tested quarterly in accordance with NSR Permit Condition A201A	3/15/2021
		5/7/2021
		8/26/2021
		11/18/2021
		2/28/2022
C-1200	Tested quarterly in accordance with NSR Permit Condition A201A	3/15/2021
		5/7/2021
		8/26/2021
		11/18/2021
		2/28/2022
C-2300	Tested quarterly in accordance with NSR Permit Condition A201A	3/15/2021
		5/7/2021
		8/26/2021
		11/18/2021
		2/28/2022
C-2400	Tested quarterly in accordance with NSR Permit Condition A201A	3/15/2021
		5/7/2021
		8/26/2021
		11/18/2021
		2/28/2022
C-1100	Tested quarterly in accordance with NSR Permit Condition A201A	7/15/2021
		11/19/2021
		1/26/2022
C-1120	Tested quarterly in accordance with NSR Permit Condition A201A	7/15/2021
		11/19/2021
		1/26/2022
C-1130	Tested quarterly in accordance with NSR Permit Condition A201A	7/14/2021
		11/19/2021
		1/26/2022
C-1140	Tested quarterly in accordance with NSR Permit Condition A201A	7/14/2021
		11/19/2021
		1/26/2022
C-1150	Tested quarterly in accordance with NSR Permit Condition A201A	7/14/2021
		11/19/2021
		1/26/2022
C-1160	These units have not yet been installed and as such, have no compliance test history to report.	N/A
C-1170		
C-1180		

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 http://www.env.nm.gov/aqb/index.html. 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.

No units are subject to 40 CFR 64, despite Units C-1200, C-2300 and C-2400 having an uncontrolled PTE > 100 tpy of NOx and CO and units DEHY-803, DEHY-805 and DEHY-1505 having uncontrolled VOC emissions > 100 tpy. These units have inherent process controls or are subject to federal regulations that bring their respective emission rates below emission monitoring thresholds.

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.

Based on information and belief formed after reasonable inquiry, Crestwood believes that Willow Lake is in compliance with each applicable requirement identified in Section 13. In the event that Crestwood should discover new information affecting the compliance status of the facility, Crestwood will make appropriate notifications and/or take corrective actions.

19.3 - Continued Compliance (20.2.70.300.D.10.c NMAC)

Provide a statement that Willow Lake 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.

Willow Lake will continue to comply with currently appliable regulations and is committed to complying with newly effective regulations.

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 and will begin with the issuance of this Title V operating permit.

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).

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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.)

No 40 CFR 82 requirements apply to this facility.

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 http://www.env.nm.gov/aqb/index.html. Sources that are subject to both the Title V and Acid Rain regulations are **encouraged** to submit both applications **simultaneously**.

No compliance plan is required as Willow Lake is in compliance.

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.

Willow Lake is not subject to RMP.

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.)

Yes, Willow Lake is located 21.6 km from the Texas border. Willow Lake is greater than 50 km from local pollution control programs, Indian Tribes, and Pueblos.

19.9 - Responsible Official

Provide the Responsible Official as defined in 20.2.70.7.AD NMAC:
Ben Hansen, Senior Vice President, Operations
811 Main St., Ste 3400, Houston, TX 77002
Ben.hansen@crestwoodlp.com, 832-519-2200

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 additional relevant information is being submitted with this application.

Section 22: Certification

Company Name: Crestwood

I Jonathan Smith, 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 18th day of May, 2022, upon my oath or affirmation, before a notary of the State of New Mexico.

*Signature — Date: 5-18-2022

Jonathan Smith — Printed Name

VP, Operations — Title

Scribed and sworn before me on this 18th day of May, 2022

My authorization as a notary of the State of New Mexico expires on the 18th day of December, 2024.

Kiara Doporto — Notary's Signature — Date: 5/18/22

Kiara Doporto — Notary's Printed Name

Official Seal
KIARA DOPORTO
Notary Public
State of New Mexico
My Comm. Expires 12/18/24

*For Title V applications, the signature must be of the Responsible Official as defined in 20.2.70.7.AE NMAC.