Enterprise Products

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

ENTERPRISE PRODUCTS OPERATING LLC

February 14, 2014

Federal Express

Mr. Randy Pitre
United States Environmental Agency – Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Re: Enterprise Field Services, LLC
Lindrith Compressor Station
Lindrith, Rio Arriba County, New Mexico
Revision to Previously Submitted Application Dated May 14, 2010
Title V Permit Number R6FOPP71-03, Permit No. NM-1544-M1

Dear Mr. Pitre:

Enterprise Fields Services, LLC (Enterprise) is submitting a permit application update for the above referenced facility. Enterprise submitted a permit renewal package to EPA on May 12, 2008 and an update on May 14, 2010.

On October 2, 2013 Enterprise submitted an application for a synthetic minor source permit for operations at Lindrith, as provided by EPA's Tribal New Source Review Rule in 40 CFR §§ 49.153(a)(3)(iv) and 49.158(c)(2)(iii). The cover letter of that application indicated that Enterprise would submit separately an update to the Part 71 renewal application to reflect the information in the Tribal NSR application. This updated application accounts for all changes made at Lindrith since the issuance of the Part 71 permit in 2003.

If you or your staff should have any questions during your review, please feel free to contact me at (713) 381-4535. An electronic copy of the application is also available upon request.

Sincerely,

J. Neely Ashe
Sr. Environmental Engineer

/sjn
Attachments
cc: Environmental Director, Jicarilla
Wren Stenger, Director, Multimedia Planning and Permitting Division, EPA Region 6

P. O. BOX 4324
HOUSTON, TX 77210-4324
713.381.6500

1100 LOUISIANA STREET
HOUSTON, TX 77002-5227
www.enterpriseproducts.com

PART 71 AIR PERMIT
RENEWAL APPLICATION UPDATE
ENTERPRISE FIELD SERVICES LLC

LINDRITH COMPRESSOR STATION

RIO ARRIBA COUNTY, NEW MEXICO
PERMIT NO. R6FOPP71-03

December 2013

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Executive Summary

Lindrith Compressor Station
Part 71 Renewal Application Update

Enterprise Field Services LLC (Enterprise) owns and operates the Lindrith Compressor Station located in Rio Arriba County, New Mexico. The station is located on Jicarilla Apache Nation land and is subject to the 40 CFR Part 71 federal operating program. The station is currently authorized to operate under EPA Part 71 Permit No. R6FOPP71-03. The current operating permit expired on 11/16/2008. Enterprise submitted the required renewal application in 2008 and is currently operating under the application shield. At this time Enterprise is submitting a permit renewal update package to document changes to the station that are reflected on the Federal Tribal Minor New Source dated September 2013.

The Lindrith Compressor Station is a natural gas gathering compressor station defined by Standard Industrial Classification (SIC) code 1311. The existing operating permit authorizes the following emission sources:

1. Two 3,267-hp Caterpillar 3612LE compressor engines equipped with oxidation catalysts (A-01 and A-02)
2. One 3,267-hp Caterpillar 3612LE compressor engine (A-03)
3. One Glycol Dehydrator equipped with controls (DEHY-1RBLR and DEHY-STL)
4. Two 500-bbl condensate tanks (TK-1 and TK-2)
5. Insignificant sources (drain tanks, lube oil tanks, etc.).

Proposed Changes

This application is an update of the renewal application to account for recent changes to the station. Enterprise is representing the following changes to the Lindrith Compressor Station.

1. The glycol dehydrator and reboiler are permanently shutdown and will be removed from the permit along with all applicable requirements;
2. Remove the two 500-barrel condensate storage tanks;
3. Install eight (8) 450-bbl Fixed Roof Storage Tanks for Condensate and Water Storage. Include these emission sources under a single emission cap (TBATTERY);
4. Add condensate truck loading emissions (TLOAD);

5. Add fugitive emissions (FUGVOC); and
6. Add Maintenance, Startup, and Shutdown Emissions (MSS);
7. Add a 192 hp Caterpillar 3304 emergency generator (EMERGEN);
8. Add 40 CFR Part 63, Subpart ZZZZ to the three (3) compressor engines and the emergency generator.

Enterprise is also updating the insignificant source activity list with three 120 bbl drain tanks, which collected gravity separated water from the condensate tanks.

Table 1-1

Pollutant	Current Limits (tpy)	Proposed Limits (tpy)	Change in PTE (tpy)
Nitrogen Oxides	68.48	66.28	-2.20
Carbon Monoxide	95.5	102.57	+7.01
Volatile Organic Compounds	153.3	137.22	-16.08
$PM_{10}/PM_{2.5}$	N/A	2.90	+2.90
Sulfur Dioxides	0.22	4.27	+4.05
Total HAP	55	37.04	-17.96
Formaldehyde	21	31.05	+10.05
CO2e	N/A	35,554	+35,554

The changes in the proposed station potential to emit totals are due to equipment shutdown and removals, equipment installations, and changes in the emission calculation methodologies. These changes are discussed further in this application.

Calculations Summary

Lindrith Compressor Station
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The Lindrith Compressor Station is equipped with gas-fired engines, storage tanks in volatile organic liquid service, truck loading, fugitives, and natural gas releases for MSS purposes. The methodologies used to estimate emissions from these sources are detailed in this section.

Engine Emissions (A-01, A-02, A-03)

The station is equipped with three identical 3,267-hp Caterpillar 3612LE gas-fired low emission technology engines to drive gas compressors. Two of the three engines are equipped with oxidation catalysts to reduce CO and VOC/HAP emissions. The engines are permitted to operate continuously at full load (8,760 hours/year). Enterprise is proposing no physical changes to these sources other than updating the emission methodologies.

Emissions of NO_x, CO, VOC, and formaldehyde are based on vendor data. The Caterpillar 3612LE is a clean burn source that does not require any add-on control device to reduce emissions of NO_x. Engines A-01 and A-02 are equipped with oxidation catalysts to reduce emissions of CO by up to 85%. This control technology all reduces VOC/HAP by up to 30%.

Emissions on $PM_{10}/PM_{2.5}$ are calculated using the current AP-42 factors for 4-cycle lean burn engines. Both the filterable and the condensable emissions are included in the proposed $PM_{10}/PM_{2.5}$ emission limits.

Emissions of SO_2 are based on a maximum sulfur content of 5 grains/100 scf in the natural gas.

Engine HAP emissions, other than formaldehyde, are based on current AP-42 factors for 4-cycle lean burn engines. Formaldehyde emissions are based on emissions from similar facilities. For the two engines equipped with oxidation catalysts it was assumed that the emissions were reduced by 30% from the AP-42-based rates.

Emergency Generator Emissions (EMERGEN)

The station is equipped with 192-hp Caterpillar 3304 diesel fired engine to provide the site with emergency back-up power. The engine is run approximately 52 hours per year for maintenance checks.

Emission factors for NO_x, CO, and PM_{10} based on NSPS Subpart IIII, Table 4. Emissions of VOC based on AP-42 factors (5th Edition, 10/96) from Table 3.3-1 Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines. NO_x Factor use is NSPS NO_x + NMHC factor minus AP-42 VOC factor. The PM_{10} emission factor is assumed to be the same for PM, PM_{10}, and $PM_{2.5}$.

Emission factor for SO_2 based on 100% conversion of fuel bound sulfur into SO_2.

Maintenance, Startup, and Shutdown Emissions (MSS)

Enterprise conducts periodic planned and unplanned maintenance, startup, and shutdown activities that result in the venting of natural gas from the station's blowdown vent. These activities include, but are not limited to, engine starts, compressor shutdowns, vessel and piping blowdowns, and pipeline pigging activities, etc. Emission estimates for these activities are based on the estimated volume of natural gas that may be released during an operating year and the VOC content of the natural gas based on a typical analysis of the natural gas received at the station.

Condensate Storage Tank Battery (TBATTERY)

Enterprise has replaced the two 500-bbl fixed roof condensate tanks with eight (8) 454-bbl fixed roof storage tanks to handle the produced condensate and water at the station. Enterprise has re-engineered the liquid collection systems in the vicinity of the station to reduce the potential volume of liquids which can be collected at the Lindrith Compressor Station. This reduction in liquid storage potential also reduces the potential VOC emissions at the station.

The eight storage tanks (T-1, T-2, T-3, T-4, T-5, T-6, T-7 and T-8) are plumbed together to aid in the collection of natural gas condensates and produced water. Each tank is vented to atmosphere individually. However, Enterprise is proposing to establish an emission cap on the eight tanks (TBATTERY) to allow maximum operational flexibility for operations. An emission cap will allow operations to direct the collected condensate and water to any of the eight storage tanks in the battery. As long as the volumetric limits (bbls/year) represented in the permit application are not exceeded then the limits on VOC emissions from the tank battery will not be exceeded.

Emissions from the condensate tanks were calculated using both a process model (AspenTech Hysys) and the EPA Tanks 4.09d software. The process model was used to calculate potential flash emissions from the storage tanks. The EPA Tanks software was used to calculate

breathing and working losses from the tanks. The process model estimates a liquid production rate of 6,389 barrels per year (bbl/yr) under the defined operating conditions; however, to account for operational variables, the storage tank emissions are based on an annual liquid production rate of 20,000 bbl/yr.

Process Model

For given input parameters the AspenTech Hysys process model estimates liquid volume production rates as well as component analyses for the storage tank vapor stream and the liquid product. Based on the Lindrith inlet gas quality, the process model predicts liquids are produced at the station during cool ambient conditions. During warmer months the model predicts the compressed inlet gas is not condensable even after it runs through the gas coolers. However, for this application it is conservatively assumed that liquids are produced year-round.

The process model predicts a total VOC emission rate (lb/hr) from the tank battery at the referenced liquid production rate over the specified time period. The emissions were then ratioed up based on the ratio of the proposed permitted production rate to the model production rate. The total flash emissions were then speciated using the calculated mass fractions from the process model.

EPA Tanks

Tanks 4.09d was used to calculate breathing and working losses from the storage tanks. For this application, a single storage tank handling gasoline (RVP 7) at 2,500 bbl/yr to was assumed to provide a conservative estimate of the tank emissions. The resulting emission rate was then multiplied by eight to get total emissions from the eight tanks in the tank battery. The emissions were speciated by conservatively assuming the emissions would be similar to the flash gas characteristics. The non-VOC mass fractions were deleted and then the remaining VOC fractions were normalized to give a total mass fraction of 1.0.

Condensate Truck Loading Emissions (TLOAD)

Emissions from the condensate truck loading were calculated using the AP-42 loading loss equation, hourly filling rate, and annual throughput. The annual throughput was estimated by assuming that the total throughput for the eight condensate tanks was loaded. Speciated emissions from this operation were calculated by conservatively assuming the loading vapors were of similar composition as the storage tank flash gas. The non-VOC mass fractions were

deleted and then the remaining VOC fractions were normalized to give a total mass fraction of 1.0.

Fugitive Emissions (FUGVOC)

Fugitive emissions were estimated based on an estimated piping component count and the April 2010 Gas Analysis mole percentage of non-methane/non-ethane hydrocarbons. The EPA Oil and Gas factors were used to estimate fugitives.

Applicable Requirements

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The following discussion addresses applicable and non-applicable requirements of Code of Federal Regulations, Title 40. General requirements imposed by the current operating permit are not addressed in this section.

Applicable Requirements

The following regulatory requirements have been determined to be potentially applicable to the Lindrith Compressor Station:

40 CFR 71 – Federal Operating Permits

The facility is a major source of CO, VOC, and HAP as defined by 40 CFR 71. Regulation 40 CFR 71.5(a)(1) requires that "for each part 71 source, the owner or operators shall submit a timely and complete application in accordance with this section". 40 CFR 71.5(a)(1)(iii) goes on to state that "for purposes of permit renewal, a timely application is one that is submitted at least 6 months but nor more than 18 months prior to the expiration of the part 70 or 71 permit."

Operating permit R6FOPP71-03 expired on 11/16/08; as required by this regulation, this application was submitted prior to 5/16/08. This current application is a revision to the initial application due to changes that have occurred during the period of review.

40 CFR 63 Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

The four existing RICE units currently operating at the facility are "existing" (constructed before December 19, 2002) 4 stroke lean burn engines. Since the site is a major source of HAP as defined by 40 CFR 63, Enterprise has been complying with the applicable requirement for this regulation since May 3, 2013, as stated in 40 CFR 63.6595(a)(1).

Non-Applicable Requirements

Certain regulatory requirements are discussed below for non-applicability because of the facility type and potential applicability.

40 CFR 50 – National Ambient Air Quality Standards

40 CFR 50 establishes National Ambient Air Quality Standards but does not directly impose requirements on a specific stationary source and is therefore not applicable.

40 CFR 52.21 – Prevention of Significant Deterioration of Air Quality

Enterprise has made a determination in accordance with 40 CFR 52.21(a)(1)(2) that the Lindrith Compressor Station is a minor source for PSD purposes as defined under 40 CFR 52.21(b). Lindrith Compressor Station is not a source identified in 40 CFR 52.21(a), and the facility-wide potential to emit is less than 250 tons per year (tpy) of any regulated pollutant. Therefore, PSD is not required for this permit renewal.

40 CFR 60, Subpart A – General Provisions

This subpart is only applicable to facilities that are subject to another NSPS. As detailed in this section no NSPS regulations currently apply to this facility

40 CFR 60, Subparts K, Ka, and Kb

The eight new fixed roof condensate storage tanks at the facility were constructed after July 23, 1984 making them potentially subject to the Subpart Kb rule. However, all eight of these storage tanks have a storage capacity of 454-bbls (72 m^3). Per 40 CFR 60.110b(a) storage tanks in VOL service with less than 75 m^3 in storage capacity are exempt from this regulation. Therefore, the condensate storage tanks included in the source cap TBATTERY are not subject to NSPS Subpart Kb. There are no storage tanks at the Lindrith Compressor Station which exceed 75 m^3.

40 CFR 60, Subpart KKK – Standards Of Performance For Equipment Leaks Of VOC From Onshore Natural Gas Processing Plants For Which Construction, Reconstruction, Or Modification Commenced After 01/20/1984, And On Or Before 08/23/2011

The Lindrith Compressor Station is not a natural gas processing plant as defined under this subpart. Therefore, Subpart KKK is not applicable.

40 CFR 60, Subpart LLL – Standards of Performance For SO_2 Emissions From Onshore Natural Gas Processing For Which Construction, Reconstruction, Or Modification Commenced After 01/20/1984, And On Or Before 08/23/2011

The Lindrith Compressor Station is not an onshore natural gas treating plant as defined in this subpart. Therefore, Subpart LLL is not applicable.

40 CFR 60, Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

All engines at the facility were constructed before June 12, 2006 (40 CFR 60.4230(a)(4)) and have not been modified or reconstructed since (40 CFR 40.4230(a)(5)). Therefore, this subpart does not currently apply to this facility.

40 CFR 60, Subpart OOOO – Standards of Performance For Crude Oil And Natural Gas Production, Transmission And Distribution

All components were constructed before August 23, 2011 (40 CFR 60.5365) and have not been modified or reconstructed since. Therefore, this subpart does not currently apply to this facility.

40 CFR 61 – National Emissions Standards for Hazardous Air Pollutants (NESHAP)

There are no 40 CFR 61 NESHAPs regulation currently applicable to this facility.

40 CFR 63 Subpart HH – National Emissions Standards for Hazardous Air Pollutants from Oil and Gas Production Facilities

"Major source," as defined in 40 CFR 63.761, specifies that "for facilities that are production field facilities, only HAP emissions from glycol dehydration units and storage vessels shall be aggregated for a major source determination." From this definition the Lindrith Compressor Station is a minor HAP source. The facility is equipped with condensate storage tanks with the potential for flash emissions. Therefore, the requirements of this subpart are potentially applicable. Enterprise has removed the glycol dehydrator from the station which would have been an affected source.

By definition storage vessels with the potential for flash emissions means any storage vessel that contains a hydrocarbon liquid with a stock tank GOR equal to or greater than 0.31 cubic

meters per liter (1740 scf/bbl) and an API gravity equal to or greater than 40 degrees and an actual annual average hydrocarbon liquid throughput equal to or greater than 79,500 liters per day (500 bbls/day). The volume of condensate collected at the Lindrith Compressor Station is less than 79,500 liters per day. Therefore, Subpart HH is not currently applicable.

Case-by-Case MACT Determinations

The Lindrith Compressor Station is a major HAP source. The RICE units, condensate storage tanks, and fugitives are addressed under the promulgated MACT Subpart HH and ZZZZ regulations as addressed above. Emissions of HAP from truck loading (TLOAD) AND maintenance, startup, and shutdown releases (MSS) do not exceed major source levels for HAP. Therefore, case-by-case MACT determinations for these two source categories are not required.

40 CFR 68 – Accidental Release Prevention Program

This regulation arises form section 112 (r) of the Clean Air Act and establishes thresholds based on inventoried quantities of specific substances in process. This facility odes not manufacture, process, use, store or otherwise handle regulated substances in excess of the quantities specified in 40 CFR 68, therefore this regulation does not apply.

40 CFR 72 – Acid Rain Regulation

The facility is not an electric utility generating facility as defined in under this part and therefore is not an affected facility under the Acid Rain Program.

40 CFR 82, Subpart F & H – Protection of Stratospheric Ozone

No operations involving CFCs are conducted at this facility and no halon-containing fire extinguishers are used, stored or disposed of at this facility.

EPA Part 71 Application Administrative Forms

Lindrith Compressor Station
Part 71 Renewal Application Update

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

GENERAL INFORMATION AND SUMMARY (GIS)

A. Mailing Address and Contact Information

Facility name: Lindrith Compressor Station

Mailing address: Street or P.O. Box: Enterprise Field Services, LLC c/o Environmental Dep't; PO Box 4324

City: Houston State: TX ZIP: 77210 - 4324

Contact person: Jim Lieb Title: Senior Environmental Engineer

Telephone (505) 599 - 2159 Ext. _____

Facsimile (866) 226 - 9817

B. Facility Location

Temporary source? ___Yes _X_ No Plant site location: 20 miles West of Lindrith, NM, East ½ of the Southeast ¼ of Section 18, Township 24 North, Range 5 West

City: Lindrith State: NM County: Rio Arriba EPA Region: 6

Is the facility located within:

Indian lands? _X_ YES ___ NO OCS waters? ___YES _X_ NO

Non-attainment area? ___ YES _X_ NO If yes, for what air pollutants? _____

Within 50 miles of affected State? _X_ YES ___ NO If yes, What State(s)? NM

C. Owner

Name: Enterprise Field Service LLC Street/P.O. Box: PO Box 4324

City: Houston State: TX ZIP: 77210 - 4324

Telephone (713) 381 - 6595 Ext_____

D. Operator

Name: Enterprise Products Operating LLC Street/P.O. Box: PO Box 4324

City: Houston State: TX ZIP: 77210 - 4324

Telephone (713) 381 - 6500 Ext_____

GIS

E. Application Type

Mark only one permit application type and answer the supplementary question appropriate for the type marked.

___ Initial Permit __X__ Renewal ___ Significant Mod ___ Minor Permit Mod(MPM)

___ Group Processing, MPM ___ Administrative Amendment

For initial permits, when did operations commence? _____/_____/_____

For permit renewal, what is the expiration date of current permit? **__11__/__16__/__2008__**

F. Applicable Requirement Summary

Mark all types of applicable requirements that apply.

___ SIP ___ FIP/TIP ___ PSD ___Non-attainment NSR

___ Minor source NSR ___ Section 111 ___ Phase I acid rain ___Phase II acid rain

___ Stratospheric ozone ___ OCS regulations ___ NESHAP __X__ Sec. 112(d) MACT

___ Sec. 112(g) MACT ___ Early reduction of HAP ___ Sec 112(j) MACT ___ RMP [Sec.112(r)]

___ Tank Vessel requirements, sec. 183(f)) ___ Section 129 Standards/Requirement

___ Consumer / comm. products, ' 183(e) ___ NAAQS, increments or visibility (temp. sources)

Has a risk management plan been registered? ___YES __X__ NO Regulatory agency _____

Phase II acid rain application submitted? ___YES __X__ NO If yes, Permitting authority _____

G. Source-Wide PTE Restrictions and Generic Applicable Requirements

Cite and describe any emissions-limiting requirements and/or facility-wide "generic" applicable requirements.

Facility previously issue NSR Permit NM-1644-M1, limiting fuel consumption, requiring oxidation catalysts on two RICE, with quarterly testing requirements and condenser on dehydrator still vent. Permit establishes emissions limits for each unit.
Generic requirements identified in Conditions 3.2 of Operating Permit R6FOPP71-03

GIS

H. Process Description

List processes, products, and SIC codes for the facility.

Process	Products	SIC
Natural gas gathering and transmission facility, with pressurized natural gas as product delivered to pipeline.	Pressurized natural gas	1311

I. Emission Unit Identification

Assign an emissions unit ID and describe each emissions unit at the facility. Control equipment and/or alternative operating scenarios associated with emissions units should by listed on a separate line. Applicants may exclude from this list any insignificant emissions units or activities.

Emissions Unit ID	Description of Unit
A-01	Caterpillar 3612 LE, Natural Gas Fired Engine
A-01-CD#1	Oxidation Catalyst for RICE A-01 (Control Device)
A-02	Caterpillar 3612 LE, Natural Gas Fired Engine
A-02-CD#2	Oxidation Catalyst for RICE A-02 (Control Device)
A-03	Caterpillar 3612 LE, Natural Gas Fired Engine
EMERGEN	Caterpillar 3304, Diesel Generator
FUG	Fugitive VOCs
MSS	Maintenance, Startup, and Shutdown Emissions
TBATTERY	Eight 450-bbl Condensate Storage Tanks (capped emissions and throughput)
TLOAD	Condensate Truck Loading

GIS

J. Facility Emissions Summary

Enter potential to emit (PTE) for the facility as a whole for each air pollutant listed below. Enter the name of the single HAP emitted in the greatest amount and its PTE. For all pollutants stipulations to major source status may be indicated by entering "major" in the space for PTE. Indicate the total actual emissions for fee purposes for the facility in the space provided. Applications for permit modifications need not include actual emissions information.

NOx 66.28 tons/yr VOC: 137.22 tons/yr SO_2: 4.27 tons/yr PM_{10}: 2.90 tons/yr

$PM_{2.5}$: 2.90 tons/yr CO: 102.57 tons/yr Lead: N/A tons/yr Total HAP: 37.04 tons/yr

Single HAP emitted in the greatest amount: Formaldehyde PTE: 31.05 tons/yr

Total of regulated pollutants (for fee calculation), Sec. F, line 5 of form FEE: N/A tons/yr

K. Existing Federally-Enforceable Permits

Permit number(s): NM 1644 M1 Permit type: NSR Permitting Authority: NMED

Permit number(s): R6FOPP71-03 Permit type: Title V (Part 71) Permitting Authority: USEPA

L. Emission Unit(s) Covered by General Permits

Emission unit(s) subject to general permit _____

Check one: ___ Application made ___ Coverage granted

General permit identifier _____ Expiration Date ___/___/___

M. Cross-referenced Information

Does this application cross-reference information? ___ YES _X_ NO (If yes, see instructions)

EPA United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

POTENTIAL TO EMIT (PTE)

For each unit with emissions that count towards applicability, list the emissions unit ID and the PTE for the air pollutants listed below and sum them up to show totals for the facility. You may find it helpful to complete form **EMISS** before completing this form. Show other pollutants not listed that are present in major amounts at the facility on attachment in a similar fashion. You may round values to the nearest tenth of a ton. Also report facility totals in section J of form **GIS**.

Emissions Unit ID	Regulated Air Pollutants and Pollutants for which the Source is Major (tons/yr)								
	NO_X	VOC	SO_2	PM_{10}	$PM_{2.5}$	CO	Lead	HAP	CO_2e
A-01	22.09	20.54	1.42	0.97	0.97	11.83	0	10.28	11,304
A-02	22.09	20.54	1.42	0.97	0.97	11.83	0	10.28	11, 304
A-03	22.09	29.34	1.42	0.97	0.97	78.88	0	14.69	11,305
EMERGEN	0.02	0.01	0.0001	0.002	0.002	0.03	0		5
FUGVOC		2.23						0.03	80
MSS		23.85						0.62	1,437
TBATTERY		37.39						1.07	110
TLOAD		2.23						0.07	9
FACILTY TOTALS	66.29	137.13	4.26	2.91	2.91	102.57	0	37.04	35,554

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

INITIAL COMPLIANCE PLAN AND COMPLIANCE CERTIFICATION (I-COMP)

SECTION A - COMPLIANCE STATUS AND COMPLIANCE PLAN

Complete this section for each unique combination of applicable requirements and emissions units at the facility. List all compliance methods (monitoring, recordkeeping and reporting) you used to determine compliance with the applicable requirement described above. Indicate your compliance status at this time for this requirement and compliance methods and check "YES" or "NO" to the follow-up question.

Emission Unit ID(s): N/A

Applicable Requirement (Describe and Cite)

There are no units for which an initial compliance plan or compliance certification is required.

Compliance Methods for the Above (Description and Citation):

Compliance Status:

_X_ In Compliance: Will you continue to comply up to permit issuance? __X__Yes ___No

___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No

_X_ Future-Effective Requirement: Do you expect to meet this on a timely basis? __X__Yes ____No

B. SCHEDULE OF COMPLIANCE

Complete this section if you answered "NO" to any of the questions in section A. Also complete this section if required to submit a schedule of compliance by an applicable requirement. Please attach copies of any judicial consent decrees or administrative orders for this requirement.

Unit(s)_____ Requirement_____

Reason for Noncompliance. Briefly explain reason for noncompliance at time of permit issuance or that future-effective requirement will not be met on a timely basis:

Narrative Description of how Source Compliance Will be Achieved. Briefly explain your plan for achieving compliance:

Schedule of Compliance. Provide a schedule of remedial measures, including an enforceable sequence of actions with milestones, leading to compliance, including a date for final compliance.

Remedial Measure or Action	Date to be Achieved

C. SCHEDULE FOR SUBMISSION OF PROGRESS REPORTS

Only complete this section if you are required to submit one or more schedules of compliance in section B or if an applicable requirement requires submittal of a progress report. If a schedule of compliance is required, your progress report should start within 6 months of application submittal and subsequently, no less than every six months. One progress report may include information on multiple schedules of compliance.

Contents of Progress Report (describe):

First Report____/____/___ Frequency of Submittal_____

Contents of Progress Report (describe):

First Report____/____/___ Frequency of Submittal_____

D. SCHEDULE FOR SUBMISSION OF COMPLIANCE CERTIFICATIONS

This section must be completed once by every source. Indicate when you would prefer to submit compliance certifications during the term of your permit (at least once per year).

Frequency of submittal_____ Beginning____/____/____

E. COMPLIANCE WITH ENHANCED MONITORING & COMPLIANCE CERTIFICATION REQUIREMENTS

This section must be completed once by every source. To certify compliance with these, you must be able to certify compliance for every applicable requirement related to monitoring and compliance certification at every unit.

Enhanced Monitoring Requirements: ____ In Compliance ____ Not In Compliance

Compliance Certification Requirements: ____ In Compliance ____ Not In Compliance

EPA United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

CERTIFICATION OF TRUTH, ACCURACY, AND COMPLETENESS (CTAC)

This form must be completed, signed by the "Responsible Official" designated for the facility or emission unit, and sent with each submission of documents (i.e., application forms, updates to applications, reports, or any information required by a part 71 permit).

A. Responsible Official

Name: (Last) Hurlburt (First) Terry (MI) L.

Title: Senior Vice President

Street or P.O. Box: P.O. Box 4324

City: Houston State: TX ZIP: 77210 - 4324

Telephone (713) 381-6595 Ext. _____ Facsimile (866) 226-9817

B. Certification of Truth, Accuracy and Completeness (to be signed by the responsible official)

I certify under penalty of law, based on information and belief formed after reasonable inquiry, the statements and information contained in these documents are true, accurate and complete.

Name (signed): Terry L Hurlburt

Name (typed): Terry Hurlburt Date: 02 / 13 / 2014

EPA Part 71 Application Source Forms

Lindrith Compressor Station

Part 71 Renewal Application Update

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

EMISSION CALCULATIONS (EMISS)

Calculate potential to emit (PTE) for applicability purposes and actual emissions for fee purposes for each emissions unit, control device, or alternative operating scenario identified in section I of form **GIS**. If form **FEE** does not need to be submitted with the application, do not calculate actual emissions.

A. Emissions Unit ID: A-01

B. Identification and Quantification of Emissions

First, list each air pollutant that is either regulated at the unit or present in major amounts, then list any other regulated pollutant (for fee calculation) not already listed. HAP may be simply listed as "HAP." Next, calculate PTE for applicability purposes and actual emissions for fee purposes for each pollutant. Do not calculate PTE for air pollutants listed solely for fee purposes. Include all fugitives for fee purposes. You may round to the nearest tenth of a ton for yearly values or tenth of a pound for hourly values.

Air Pollutants	Emission Rates			CAS No.
	Actual Annual Emissions (tons/yr)	Potential to Emit		
		Hourly (lb/hr)	Annual (tons/yr)	
PM	N/A	0.22	0.97	N/A
PM_{10}	N/A	0.22	0.97	N/A
$PM_{2.5}$	N/A	0.22	0.97	N/A
SO_2	N/A	0.32	1.42	7446-09-5
NO_x	N/A	5.04	22.09	N/A
CO	N/A	2.70	11.83	630-08-0
VOC	N/A	4.69	20.54	N/A
Acetaldehyde	N/A	0.13	0.57	00075-07-0
Acrolein	N/A	0.08	0.35	00107-02-8
Benzene	N/A	0.01	0.03	00071-43-2
Formaldehyde	N/A	2.07	9.06	00050-00-0
Methanol	N/A	0.04	0.17	00067-56-1
n-hexane	N/A	0.02	0.08	00110-54-3
Toluene	N/A	0.01	0.03	00108-88-3
Xylene (mixed isomers)	N/A	0.00	0.01	N/A
N_2O	N/A	0.00	0.01	N/A
Methane	N/A	0.02	0.07	N/A
CO_2	N/A	2,580	11,304	N/A

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

EMISSION CALCULATIONS (EMISS)

Calculate potential to emit (PTE) for applicability purposes and actual emissions for fee purposes for each emissions unit, control device, or alternative operating scenario identified in section I of form **GIS**. If form **FEE** does not need to be submitted with the application, do not calculate actual emissions.

A. Emissions Unit ID: A-02

B. Identification and Quantification of Emissions

First, list each air pollutant that is either regulated at the unit or present in major amounts, then list any other regulated pollutant (for fee calculation) not already listed. HAP may be simply listed as "HAP." Next, calculate PTE for applicability purposes and actual emissions for fee purposes for each pollutant. Do not calculate PTE for air pollutants listed solely for fee purposes. Include all fugitives for fee purposes. You may round to the nearest tenth of a ton for yearly values or tenth of a pound for hourly values.

Air Pollutants	Emission Rates			CAS No.
	Actual Annual Emissions (tons/yr)	Potential to Emit		
		Hourly (lb/hr)	Annual (tons/yr)	
PM	N/A	0.22	0.97	N/A
PM_{10}	N/A	0.22	0.97	N/A
$PM_{2.5}$	N/A	0.22	0.97	N/A
SO_2	N/A	0.32	1.42	7446-09-5
NO_x	N/A	5.04	22.09	N/A
CO	N/A	2.70	11.83	630-08-0
VOC	N/A	4.69	20.54	N/A
Acetaldehyde	N/A	0.13	0.57	00075-07-0
Acrolein	N/A	0.08	0.35	00107-02-8
Benzene	N/A	0.01	0.03	00071-43-2
Formaldehyde	N/A	2.07	9.06	00050-00-0
Methanol	N/A	0.04	0.17	00067-56-1
n-hexane	N/A	0.02	0.08	00110-54-3
Toluene	N/A	0.01	0.03	00108-88-3
Xylene (mixed isomers)	N/A	0.00	0.01	N/A
N_2O	N/A	0.00	0.01	N/A
Methane	N/A	0.02	0.07	N/A
CO_2	N/A	2,580	11,304	N/A

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

EMISSION CALCULATIONS (EMISS)

Calculate potential to emit (PTE) for applicability purposes and actual emissions for fee purposes for each emissions unit, control device, or alternative operating scenario identified in section I of form **GIS**. If form **FEE** does not need to be submitted with the application, do not calculate actual emissions.

A. Emissions Unit ID: A-03

B. Identification and Quantification of Emissions

First, list each air pollutant that is either regulated at the unit or present in major amounts, then list any other regulated pollutant (for fee calculation) not already listed. HAP may be simply listed as "HAP." Next, calculate PTE for applicability purposes and actual emissions for fee purposes for each pollutant. Do not calculate PTE for air pollutants listed solely for fee purposes. Include all fugitives for fee purposes. You may round to the nearest tenth of a ton for yearly values or tenth of a pound for hourly values.

Air Pollutants	Emission Rates			CAS No.
	Actual Annual Emissions (tons/yr)	Potential to Emit		
		Hourly (lb/hr)	Annual (tons/yr)	
PM	N/A	0.22	0.97	N/A
PM_{10}	N/A	0.22	0.97	N/A
$PM_{2.5}$	N/A	0.22	0.97	N/A
SO_2	N/A	0.32	1.42	7446-09-5
NO_x	N/A	5.04	22.09	N/A
CO	N/A	18.01	78.88	630-08-0
VOC	N/A	6.70	29.34	N/A
Acetaldehyde	N/A	0.18	0.81	00075-07-0
Acrolein	N/A	0.11	0.50	00107-02-8
Benzene	N/A	0.01	0.04	00071-43-2
Formaldehyde	N/A	2.95	12.94	00050-00-0
Methanol	N/A	0.06	0.24	00067-56-1
n-hexane	N/A	0.02	0.11	00110-54-3
Toluene	N/A	0.01	0.04	00108-88-3
Xylene (mixed isomers)	N/A	0.00	0.02	N/A
N_2O	N/A	0.00	0.01	N/A
Methane	N/A	0.02	0.07	N/A
CO_2	N/A	2,580	11,305	N/A

United States Environmental Protection Agency

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Federal Operating Permit Program (40 CFR Part 71)

EMISSION CALCULATIONS (EMISS)

Calculate potential to emit (PTE) for applicability purposes and actual emissions for fee purposes for each emissions unit, control device, or alternative operating scenario identified in section I of form **GIS**. If form **FEE** does not need to be submitted with the application, do not calculate actual emissions.

A. Emissions Unit ID: TBATTERY (Includes emissions from 8 Condensate Tanks)

B. Identification and Quantification of Emissions

First, list each air pollutant that is either regulated at the unit or present in major amounts, then list any other regulated pollutant (for fee calculation) not already listed. HAP may be simply listed as "HAP." Next, calculate PTE for applicability purposes and actual emissions for fee purposes for each pollutant. Do not calculate PTE for air pollutants listed solely for fee purposes. Include all fugitives for fee purposes. You may round to the nearest tenth of a ton for yearly values or tenth of a pound for hourly values.

Air Pollutants	Emission Rates			CAS No.
	Actual Annual Emissions (tons/yr)	Potential to Emit		
		Hourly (lb/hr)	Annual (tons/yr)	
VOC	N/A	8.54	37.39	N/A
n-Hexane	N/A	0.19	0.84	00110-54-3
Benzene	N/A	0.03	0.12	00071-43-2
Toluene	N/A	0.03	0.11	00108-88-3
CO_2e	N/A	25.11	110	N/A

United States Environmental Protection Agency

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Federal Operating Permit Program (40 CFR Part 71)

EMISSION CALCULATIONS (EMISS)

Calculate potential to emit (PTE) for applicability purposes and actual emissions for fee purposes for each emissions unit, control device, or alternative operating scenario identified in section I of form **GIS**. If form **FEE** does not need to be submitted with the application, do not calculate actual emissions.

A. Emissions Unit ID: MSS

B. Identification and Quantification of Emissions

First, list each air pollutant that is either regulated at the unit or present in major amounts, then list any other regulated pollutant (for fee calculation) not already listed. HAP may be simply listed as "HAP." Next, calculate PTE for applicability purposes and actual emissions for fee purposes for each pollutant. Do not calculate PTE for air pollutants listed solely for fee purposes. Include all fugitives for fee purposes. You may round to the nearest tenth of a ton for yearly values or tenth of a pound for hourly values.

Air Pollutants	Emission Rates			CAS No.
	Actual Annual Emissions (tons/yr)	Potential to Emit		
		Hourly (lb/hr)	Annual (tons/yr)	
VOC	N/A	119.25	23.85	N/A
Benzene	N/A	0.35	0.07	00071-43-2
n-Hexane	N/A	2.74	0.55	00110-54-3
CO_2e	N/A	285.4	1,437	N/A

EPA United States Environmental Protection Agency

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Federal Operating Permit Program (40 CFR Part 71)

EMISSION CALCULATIONS (EMISS)

Calculate potential to emit (PTE) for applicability purposes and actual emissions for fee purposes for each emissions unit, control device, or alternative operating scenario identified in section I of form **GIS**. If form **FEE** does not need to be submitted with the application, do not calculate actual emissions.

A. Emissions Unit ID: FUGVOC

B. Identification and Quantification of Emissions

First, list each air pollutant that is either regulated at the unit or present in major amounts, then list any other regulated pollutant (for fee calculation) not already listed. HAP may be simply listed as "HAP." Next, calculate PTE for applicability purposes and actual emissions for fee purposes for each pollutant. Do not calculate PTE for air pollutants listed solely for fee purposes. Include all fugitives for fee purposes. You may round to the nearest tenth of a ton for yearly values or tenth of a pound for hourly values.

Air Pollutants	Emission Rates			CAS No.
	Actual Annual Emissions (tons/yr)	Potential to Emit		
		Hourly (lb/hr)	Annual (tons/yr)	
VOC	N/A	0.76	3.31	N/A
Benzene	N/A	0.001	0.004	00071-43-2
n-Hexane	N/A	0.007	0.031	00110-54-3
CO_2e	N/A	18.30	80	N/A

United States Environmental Protection Agency

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EMISSION CALCULATIONS (EMISS)

Calculate potential to emit (PTE) for applicability purposes and actual emissions for fee purposes for each emissions unit, control device, or alternative operating scenario identified in section I of form **GIS**. If form **FEE** does not need to be submitted with the application, do not calculate actual emissions.

A. Emissions Unit ID: TLOAD

B. Identification and Quantification of Emissions

First, list each air pollutant that is either regulated at the unit or present in major amounts, then list any other regulated pollutant (for fee calculation) not already listed. HAP may be simply listed as "HAP." Next, calculate PTE for applicability purposes and actual emissions for fee purposes for each pollutant. Do not calculate PTE for air pollutants listed solely for fee purposes. Include all fugitives for fee purposes. You may round to the nearest tenth of a ton for yearly values or tenth of a pound for hourly values.

Air Pollutants	Emission Rates			CAS No.
	Actual Annual Emissions (tons/yr)	Potential to Emit		
		Hourly (lb/hr)	Annual (tons/yr)	
VOC	N/A	89.32 (Max)	2.23	N/A
Benzene	N/A	0.30 (Max)	0.01	00071-43-2
Toluene	N/A	0.25 (Max)	0.01	00108-88-3
n-Hexane	N/A	2.0 (Max)	0.05	00110-54-3
CO_2e	N/A	360 (Max)	9	N/A

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EMISSION CALCULATIONS (EMISS)

Calculate potential to emit (PTE) for applicability purposes and actual emissions for fee purposes for each emissions unit, control device, or alternative operating scenario identified in section I of form **GIS**. If form **FEE** does not need to be submitted with the application, do not calculate actual emissions.

A. Emissions Unit ID EMERGEN

B. Identification and Quantification of Emissions

First, list each air pollutant that is either regulated at the unit or present in major amounts, then list any other regulated pollutant (for fee calculation) not already listed. HAP may be simply listed as "HAP." Next, calculate PTE for applicability purposes and actual emissions for fee purposes for each pollutant. Do not calculate PTE for air pollutants listed solely for fee purposes. Include all fugitives for fee purposes. You may round to the nearest tenth of a ton for yearly values or tenth of a pound for hourly values.

Air Pollutants	Emission Rates			CAS No.
	Actual Annual Emissions (tons/yr)	Potential to Emit		
		Hourly (lb/hr)	Annual (tons/yr)	
PM	N/A	0.06	0.002	N/A
PM_{10}	N/A	0.06	0.002	N/A
$PM_{2.5}$	N/A	0.06	0.002	N/A
SO_2	N/A	0.002	0.0001	7446-09-5
NO_x	N/A	0.69	0.02	N/A
CO	N/A	1.10	0.03	630-08-0
VOC	N/A	0.58	0.01	N/A
N_2O	N/A	0.00	0.00	N/A
Methane	N/A	0.00	0.00	N/A
CO_2	N/A	220	5	N/A

EUD-1

United States Environmental Protection Agency

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Federal Operating Permit Program (40 CFR Part 71)

EMISSION UNIT DESCRIPTION FOR FUEL COMBUSTION SOURCES (EUD-1)

A. General Information

Emissions unit ID: A-01 Description: Compressor No. 1 Engine

SIC Code (4-digit): 4922 SCC Code: 31000203

B. Emissions Unit Description

Primary use: Engine for Compressor No. 1 Temporary Source ___Yes __X__No

Manufacturer: Caterpillar Model No.: 3612 LE

Serial Number: 1YG00055 Installation Date: 4 / 17 / 1995

Boiler Type: ___ Industrial boiler ___ Process burner ___ Electric utility boiler

Other (describe) _____

Horsepower rating: 3,267 Boiler steam flow (lb/hr)_____

Type of Fuel-Burning Equipment (coal burning only):

___ Hand fired ___Spreader stoker ___Underfeed stoker ___Overfeed stoker

___ Traveling grate ___Shaking grate ___Pulverized, wet bed ___ Pulverized, dry bed

Actual Heat Input 22.09 MM BTU/hr Max. Design Heat Input 22.09 MM BTU/hr

C. Fuel Data

Primary fuel type(s) Natural Gas Standby fuel type(s) N/A

Describe each fuel you expected to use during the term of the permit.

Fuel Type	Max. Sulfur Content (%)	Max. Ash Content (%)	BTU Value (cf, gal., or lb.)
Natural Gas	0.02%	Negligible	905 Btu/scf

D. Fuel Usage Rates

Fuel Type	Annual Actual Usage	Maximum Usage Hourly	Maximum Usage Annual
Natural Gas	N/A	0.024 MMscf/hr	213.83 MMscf/yr

EUD-1

E. Associated Air Pollution Control Equipment

Emissions unit ID: A-01-CD#1 Device type: Catalytic Oxidation System

Air pollutant(s) Controlled: CO, VOC Manufacturer: Houston Industrial Silencing

Model No.: DeCOHx33c22/24PL Serial No.: Unknown

Installation date: 4 / 17 / 1995 Control efficiency (%): 85% (CO); 30% (VOC)

Efficiency estimation method

F. Ambient Impact Assessment

This information must be completed by temporary sources or when ambient impact assessment is an applicable requirement for this emissions unit (this is not common).

Stack height (ft): 15.0 Inside stack diameter (ft): 1.5

Stack temp (°F): 858 Design stack flow rate (ACFM): 24,273

Actual stack flow rate (ACFM): 24,273 Velocity (ft/sec): 228.9

EUD-1

EPA United States Environmental Protection Agency

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Federal Operating Permit Program (40 CFR Part 71)

EMISSION UNIT DESCRIPTION FOR FUEL COMBUSTION SOURCES (EUD-1)

A. General Information

Emissions unit ID: A-02 Description: Compressor No. 2 Engine

SIC Code (4-digit): 4922 SCC Code: 31000203

B. Emissions Unit Description

Primary use: Engine for Compressor No. 2 Temporary Source ___Yes __X__No

Manufacturer: Caterpillar Model No.: 3612 LE

Serial Number: 1YG00054 Installation Date: 5 / 1 / 1995

Boiler Type: ___ Industrial boiler ___ Process burner ___ Electric utility boiler

Other (describe) _____

Horsepower rating: 3,267 Boiler steam flow (lb/hr)_____

Type of Fuel-Burning Equipment (coal burning only):

___ Hand fired ___Spreader stoker ___Underfeed stoker ___Overfeed stoker

___ Traveling grate ___Shaking grate ___Pulverized, wet bed ___ Pulverized, dry bed

Actual Heat Input 22.09 MM BTU/hr Max. Design Heat Input 22.09 MM BTU/hr

C. Fuel Data

Primary fuel type(s) Natural Gas Standby fuel type(s) N/A

Describe each fuel you expected to use during the term of the permit.

Fuel Type	Max. Sulfur Content (%)	Max. Ash Content (%)	BTU Value (cf, gal., or lb.)
Natural Gas	0.02%	Negligible	905 Btu/scf

D. Fuel Usage Rates

Fuel Type	Annual Actual Usage	Maximum Usage Hourly	Maximum Usage Annual
Natural Gas	N/A	0.024 MMscf/hr	213.83 MMscf/yr

EUD-1

E. Associated Air Pollution Control Equipment

Emissions unit ID: A-01-CD#1 Device type: Catalytic Oxidation System

Air pollutant(s) Controlled: CO, VOC Manufacturer: Houston Industrial Silencing

Model No.: DeCOHx33c22/24PL Serial No.: Unknown

Installation date: 4 / 17 / 1995 Control efficiency (%): 85% (CO); 30% (VOC)

Efficiency estimation method

F. Ambient Impact Assessment

This information must be completed by temporary sources or when ambient impact assessment is an applicable requirement for this emissions unit (this is not common).

Stack height (ft): 15.0 Inside stack diameter (ft): 1.5

Stack temp (°F): 858 Design stack flow rate (ACFM): 24,273

Actual stack flow rate (ACFM): 24,273 Velocity (ft/sec): 228.9

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

EMISSION UNIT DESCRIPTION FOR FUEL COMBUSTION SOURCES (EUD-1)

A. General Information

Emissions unit ID: A-03 Description: Compressor No. 3 Engine

SIC Code (4-digit): 4922 SCC Code: 31000203

B. Emissions Unit Description

Primary use: Engine for Compressor No. 3 Temporary Source ___Yes __X__No

Manufacturer: Caterpillar Model No.: 3612 LE

Serial Number: 1YG00072 Installation Date: 5 / 15 / 1995

Boiler Type: ___ Industrial boiler ___ Process burner ___ Electric utility boiler

Other (describe) _____

Horsepower rating: 3,267 Boiler steam flow (lb/hr)_____

Type of Fuel-Burning Equipment (coal burning only):

___ Hand fired ___Spreader stoker ___Underfeed stoker ___Overfeed stoker

___ Traveling grate ___Shaking grate ___Pulverized, wet bed ___ Pulverized, dry bed

Actual Heat Input 22.09 MM BTU/hr Max. Design Heat Input 22.09 MM BTU/hr

C. Fuel Data

Primary fuel type(s): Natural Gas Standby fuel type(s): N/A

Describe each fuel you expected to use during the term of the permit.

Fuel Type	Max. Sulfur Content (%)	Max. Ash Content (%)	BTU Value (cf, gal., or lb.)
Natural Gas	0.02%	Negligible	905 Btu/scf

D. Fuel Usage Rates

Fuel Type	Annual Actual Usage	Maximum Usage Hourly	Maximum Usage Annual
Natural Gas	N/A	0.024 MMscf/hr	213.83 MMscf/yr

E. Associated Air Pollution Control Equipment

Emissions unit ID: N/A Device type:

Air pollutant(s) Controlled: Manufacturer:

Model No.: Serial No.:

Installation date: / / Control efficiency (%):

Efficiency estimation method

F. Ambient Impact Assessment

This information must be completed by temporary sources or when ambient impact assessment is an applicable requirement for this emissions unit (this is not common).

Stack height (ft): 15.0 Inside stack diameter (ft): 1.5

Stack temp (°F): 858 Design stack flow rate (ACFM): 24,273

Actual stack flow rate (ACFM): 24,273 Velocity (ft/sec): 228.9

United States Environmental Protection Agency

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EMISSION UNIT DESCRIPTION FOR FUEL COMBUSTION SOURCES (EUD-1)

A. General Information

Emissions unit ID EMERGEN Description Emergency Generator

SIC Code (4-digit): 4922 SCC Code: 31000203

B. Emissions Unit Description

Primary use Emergency Generator Temporary Source ___ Yes _X_ No

Manufacturer Caterpillar Model No. 3304

Serial Number 83X09381 Installation Date 5 / 1 / 1995

Boiler Type: ___ Industrial boiler ___ Process burner ___ Electric utility boiler

Other (describe) _____

Boiler horsepower rating 192 Boiler steam flow (lb/hr)_____

Type of Fuel-Burning Equipment (coal burning only):

___ Hand fired ___Spreader stoker ___Underfeed stoker ___Overfeed stoker

___ Traveling grate ___Shaking grate ___Pulverized, wet bed ___ Pulverized, dry bed

Actual Heat Input 1.30 MM BTU/hr Max. Design Heat Input 1.30 MM BTU/hr

C. Fuel Data

Primary fuel type(s) Diesel Standby fuel type(s) N/A

Describe each fuel you expected to use during the term of the permit.

Fuel Type	Max. Sulfur Content (%)	Max. Ash Content (%)	BTU Value (cf, gal., or lb.)
Diesel Fuel	0.00015%	Negligible	19,300 BTU/lb

D. Fuel Usage Rates

Fuel Type	Annual Actual Usage	Maximum Usage Hourly	Maximum Usage Annual
Diesel Fuel	N/A	9.7 gallons	504.4 gallons

E. Associated Air Pollution Control Equipment

Emissions unit ID N/A Device type _____

Air pollutant(s) Controlled _____ Manufacturer _____

Model No. _____ Serial No. _____

Installation date ____/____/_____ Control efficiency (%) _____

Efficiency estimation method _____

F. Ambient Impact Assessment

This information must be completed by temporary sources or when ambient impact assessment is an applicable requirement for this emissions unit (this is not common).

Stack height (ft) _____._____ Inside stack diameter (ft) _____._____

Stack temp (°F) _____._____ Design stack flow rate (ACFM) _____._____

Actual stack flow rate (ACFM) _____._____ Velocity (ft/sec) _____._____

EUD-3

United States Environmental Protection Agency

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Federal Operating Permit Program (40 CFR Part 71)

EMISSION UNIT DESCRIPTION FOR PROCESS SOURCES (EUD-3)

A. General Information

Emissions unit ID: FUGVOC Description: Fugitive emissions from leaking components

SIC Code (4-digit): 4922 SCC Code: 31000220

B. Emissions Unit Description

Primary use or equipment type: Components associated with equipment at the facility

Manufacturer: N/A Model No.: N/A

Serial No.: N/A Installation date ____/____/____

Raw materials _____

Finished products _____

Temporary source: X No ___Yes

C. Activity or Production Rates

Activity or Production Rate	Amount/Hour	Amount/Year
Actual Rate	0.76 lb/hr	3.31 TPY
Maximum rate		

D. Associated Air Pollution Control Equipment

Emissions unit ID: N/A Device Type_____

Manufacturer _____ Model No_____

Serial No. _____ Installation date ____/____/_____

Control efficiency (%) _____.___ Capture efficiency (%) _____.___

Air pollutant(s) controlled _____ Efficiency estimation method _____

E. Ambient Impact Assessment

This information must be completed by temporary sources or when ambient impact assessment is an applicable requirement for this emissions unit (This is not common)).

Stack height (ft) _____._____ Inside stack diameter (ft) _____._____

Stack temp (F) _____._____ Design stack flow rate (ACFM) _____._____

Actual stack flow rate (ACFM) _____._____ Velocity (ft/sec) _____._____

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EMISSION UNIT DESCRIPTION FOR PROCESS SOURCES (EUD-3)

A. General Information

Emissions unit ID: MSS Description: Compressor blowdowns for maintenance, startup and shutdown

SIC Code (4-digit): 4922 SCC Code: _____

B. Emissions Unit Description

Primary use or equipment type: Blowdowns associated with station operation

Manufacturer: N/A Model No.: N/A

Serial No.: N/A Installation date ____/____/____

Raw materials _____

Finished products _____

Temporary source: X No ___Yes

C. Activity or Production Rates

Activity or Production Rate	Amount/Hour	Amount/Year
Actual Rate		
Maximum rate	10,000 scf/hr	4.0 MMscf/yr

D. Associated Air Pollution Control Equipment

Emissions unit ID: N/A Device Type: N/A

Manufacturer _____ Model No _____

Serial No. _____ Installation date ____/____/____

Control efficiency (%) _____.___ Capture efficiency (%) _____.___

Air pollutant(s) controlled _____ Efficiency estimation method _____

E. Ambient Impact Assessment

This information must be completed by temporary sources or when ambient impact assessment is an applicable requirement for this emissions unit (This is not common)).

Stack height (ft) _____._____ Inside stack diameter (ft) _____._____

Stack temp (F) _____._____ Design stack flow rate (ACFM) _____._____

Actual stack flow rate (ACFM) _____._____ Velocity (ft/sec) _____._____

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EMISSION UNIT DESCRIPTION FOR PROCESS SOURCES (EUD-3)

A. General Information

Emissions unit ID: TBATTERY Description: Eight 454 bbl condensate tanks

SIC Code (4-digit): 4922 SCC Code: 40400311

B. Emissions Unit Description

Primary use or equipment type: Condensate storage

Manufacturer: N/A Model No.: N/A

Serial No.: N/A Installation date ____/____/____

Raw materials: Natural gas condensate

Finished products: Natural gas condensate

Temporary source: X No ___Yes

C. Activity or Production Rates

Activity or Production Rate	Amount/Hour	Amount/Year
Actual Rate	-	20,000 bbls/year
Maximum rate	-	-

D. Associated Air Pollution Control Equipment

Emissions unit ID: N/A Device Type

Manufacturer _____ Model No _____

Serial No. _____ Installation date ____/____/____

Control efficiency (%) _____.___ Capture efficiency (%) _____.___

Air pollutant(s) controlled _____ Efficiency estimation method _____

E. Ambient Impact Assessment

This information must be completed by temporary sources or when ambient impact assessment is an applicable requirement for this emissions unit (This is not common)).

Diameter (ft): 12.75 Shell Height (ft): 20.00 Average Liquid Height (ft.): 8

Capacity (bbls): 454 Design stack flow rate (ACFM): N/A

Actual stack flow rate (ACFM): N/A Velocity (ft/sec): N/A

** For each tank in battery

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EMISSION UNIT DESCRIPTION FOR PROCESS SOURCES (EUD-3)

A. General Information

Emissions unit ID: TLOAD Description: Loading of condensate from tanks into trucks

SIC Code (4-digit): 4922 SCC Code _____

B. Emissions Unit Description

Primary use or equipment type: Emissions associated with loading condensate into trucks

Manufacturer: N/A Model No.: N/A

Serial No.: N/A Installation date ____/____/____

Raw materials _____

Finished products _____

Temporary source: X No ___Yes

C. Activity or Production Rates

Activity or Production Rate	Amount/Hour	Amount/Year
Actual Rate	-	-
Maximum rate	-	20,000 bbls/yr

D. Associated Air Pollution Control Equipment

Emissions unit ID: N/A Device Type: N/A

Manufacturer _____ Model No _____

Serial No. _____ Installation date ____/____/_____

Control efficiency (%) _____.___ Capture efficiency (%) _____.___

Air pollutant(s) controlled _____ Efficiency estimation method _____

E. Ambient Impact Assessment

This information must be completed by temporary sources or when ambient impact assessment is an applicable requirement for this emissions unit (This is not common)).

Stack height (ft) _____._____ Inside stack diameter (ft) _____._____

Stack temp (F) _____._____ Design stack flow rate (ACFM) _____._____

Actual stack flow rate (ACFM) _____._____ Velocity (ft/sec) _____._____

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 09/30/2010

Federal Operating Permit Program (40 CFR Part 71)

INSIGNIFICANT EMISSIONS (IE)

List each insignificant activity or emission unit. In the "number" column, indicate the number of units in this category. Descriptions should be brief but unique. Indicate which emissions criterion of part 71 is the basis for the exemption.

Number	Description of Activities or Emissions Units	RAP, except HAP	HAP
T-9	120 bbl Compressor Skid Sump Drain Tank	X	
T-10	120 bbl Water Separation Tank	X	
T-11	120 bbl Water Separation Tank	X	
T-12	120 bbl Water Separation Tank	X	
T-13	500 gal Lube Oil Tank	X	
T-14	500 gal Lube Oil Tank	X	
T-15	500 gal Lube Oil Tank	X	
T-16	500 gal Ambitrol (AntiFreeze) Tank	X	
T-17	500 gal Ambitrol (AntiFreeze) Tank	X	
T-18	500 gal Ambitrol (AntiFreeze) Tank	X	

APPENDIX A

Emission Calculations and Supporting Data

Enterprise Field Services LLC

Lindrith Compressor Station

Part 71 Renewal Application Update

Emissions Calculations

Summary of Emissions

Max Single HAP **31.05**

Total HAPs **37.04**

Pollutant	CAS No.	Emissions (tons/yr)								
		A-01	A-02	A-03	EMERGEN	FUGVOC	MSS	TLOAD	TBATTERY	Total
Particulate Matter (PM_{10})		0.97	0.97	0.97	0.002					2.90
Particulate Matter ($PM_{2.5}$)		0.97	0.97	0.97	0.002					2.90
Sulfur Dioxide (SO_2)		1.42	1.42	1.42	0.002					4.27
Nitrogen Oxides (NO_x)		22.09	22.09	22.09	0.02					66.28
Carbon Monoxide (CO)		11.83	11.83	78.88	0.03					102.57
Volatile Organic Compounds (VOC)		20.54	20.54	29.34	0.01	3.31	23.85	2.23	37.39	137.22
Acetaldehyde	00075-07-0	0.57	0.57	0.81						1.94
Acrolein	00107-02-8	0.35	0.35	0.50						1.19
Benzene	00071-43-2	0.03	0.03	0.04		0.00	0.07	0.01	0.12	0.31
Formaldehyde	00050-00-0	9.06	9.06	12.94						31.05
Methanol	00067-56-1	0.17	0.17	0.24						0.58
n-Hexane	00110-54-3	0.08	0.08	0.11		0.03	0.55	0.05	0.84	1.72
Toluene	00108-88-3	0.03	0.03	0.04				0.01	0.11	0.21
Xylene (mixed isomers)		0.01	0.01	0.02				0.00	0.00	0.04
GHG (CO_2e)		11,304	11,304	11,305	5	80	1,437	9	110	35,554

Engines

Enterprise Field Services LLC
Lindrith Compressor Station
Part 71 Renewal Application Update

Emissions Calculations
Compressor No. 1 Engine
Source ID No.: A-01

Operating Parameters

Annual Operaton: 8,760 hrs/yr
Mfr Rating 3,550 bhp =
Elevation 6,653 ft MSL
DeRate 3% per 1,000 ft > 4000 ft

Average Operating Rate: 3,267 bhp = 6,761 BTU/bhp-hr = 22.09 MMBtu/hr
0.024 MMscf/hr @905 Btu/scf
213.83 MMscf/yr

Maximum Operating Rate: 3,267 bhp = 6,761 BTU/bhp-hr = 22.09 MMBtu/hr
0.024 MMscf/hr @905 Btu/scf
213.83 MMscf/yr

Pollutant	CAS No.	Emission Factor[1]	Control Efficiency[2] (%)	Emissions		
				Average[3] (lbs/hr)	Maximum[4] (lbs/hr)	Annual[5] (tons/yr)
Particulate Matter (PM_{10})		9.99E-03 lbs/MMBtu	0%	0.22	0.22	0.97
Particulate Matter ($PM_{2.5}$)		9.99E-03 lbs/MMBtu	0%	0.22	0.22	0.97
Sulfur Dioxide (SO_2)		1.47E-02 lbs/MMBtu	0%	0.32	0.32	1.42
Nitrogen Oxides (NO_x)		0.70 g/bhp-hr	0%	5.04	5.04	22.09
Carbon Monoxide (CO)		2.50 g/bhp-hr	85%	2.70	2.70	11.83
Volatile Organic Compounds (VOC)		0.93 g/bhp-hr	30%	4.69	4.69	20.54
Acetaldehyde	00075-07-0	8.36E-03 lbs/MMBtu	30%	0.13	0.13	0.57
Acrolein	00107-02-8	5.14E-03 lbs/MMBtu	30%	0.08	0.08	0.35
Benzene	00071-43-2	4.40E-04 lbs/MMBtu	30%	0.01	0.01	0.03
Formaldehyde	00050-00-0	0.41 g/bhp-hr	30%	2.07	2.07	9.06
Methanol	00067-56-1	2.50E-03 lbs/MMBtu	30%	0.04	0.04	0.17
n-Hexane	00110-54-3	1.11E-03 lbs/MMBtu	30%	0.02	0.02	0.08
Toluene	00108-88-3	4.08E-04 lbs/MMBtu	30%	0.01	0.01	0.03
Xylene (mixed isomers)		1.84E-04 lbs/MMBtu	30%	0.00	0.00	0.01
Nitrous Oxide (N_2O)		1.00E-04 lbs/MMBtu	0%	0.00	0.00	0.01
Methane		1.00E-03 lbs/MMBtu	30%	0.02	0.02	0.07
Carbon Dioxide		1.17E+02 lbs/MMBtu	0%	2,580	2,580	11,300

(1) Emission factors for NOx, CO, and VOC based on vendor specifications. All other emission factors from AP-42 (7/00); Table 3.2-2.
The AP-42 factor for SO2 is based on 2,000 grains/MMscf. The factor is adjusted to allow for up to 5 grains sulfur per 100 scf.
PM10 and PM2.5 include both condensible and filterable portions.

(2) Control efficiency based on vendor data for CO and VOC. Reduction efficiency for HAP assumed to be same as for VOC.

(3) For NOx, CO, and VOC, calculated as: Emission Factor (g/bhp-hr) X Avg Operating Rate (bhp) X (100 - % Control Eff.) ÷ 453.59 g/lb
All other pollutants calculated as: Emission Factor (lbs/MMBtu) X Avg Operating Rate (MMBtu/hr) X (100 - % Control Eff.)

(4) For NOx, CO, and VOC, calculated as: Emission Factor (g/bhp-hr) X Max Operating Rate (bhp) X (100 - % Control Eff.) ÷ 453.59 g/lb
All other pollutants calculated as: Emission Factor (lbs/MMBtu) X Max Operating Rate (MMBtu/hr) X (100 - % Control Eff.)

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

Enterprise Field Services LLC

Lindrith Compressor Station

Part 71 Renewal Application Update

Emissions Calculations

Compressor No. 2 Engine

Source ID No.: A-02

Operating Parameters

Annual Operaton: 8,760 hrs/yr

Mfr Rating 3,550 bhp =

Elevation 6,653 ft MSL

DeRate 3% per 1,000 ft > 4000 ft

Average Operating Rate: 3,267 bhp = 6,761 BTU/bhp-hr = 22.09 MMBtu/hr

0.024 MMscf/hr @905 Btu/scf

213.83 MMscf/yr

Maximum Operating Rate: 3,267 bhp = 6,761 BTU/bhp-hr = 22.09 MMBtu/hr

0.024 MMscf/hr @905 Btu/scf

213.83 MMscf/yr

Pollutant	CAS No.	Emission Factor[1]	Control Efficiency[2] (%)	Emissions		
				Average[3] (lbs/hr)	Maximum[4] (lbs/hr)	Annual[5] (tons/yr)
Particulate Matter (PM_{10})		9.99E-03 lbs/MMBtu	0%	0.22	0.22	0.97
Particulate Matter ($PM_{2.5}$)		9.99E-03 lbs/MMBtu	0%	0.22	0.22	0.97
Sulfur Dioxide (SO_2)		1.47E-02 lbs/MMBtu	0%	0.32	0.32	1.42
Nitrogen Oxides (NO_x)		0.70 g/bhp-hr	0%	5.04	5.04	22.09
Carbon Monoxide (CO)		2.50 g/bhp-hr	85%	2.70	2.70	11.83
Volatile Organic Compounds (VOC)		0.93 g/bhp-hr	30%	4.69	4.69	20.54
Acetaldehyde	00075-07-0	8.36E-03 lbs/MMBtu	30%	0.13	0.13	0.57
Acrolein	00107-02-8	5.14E-03 lbs/MMBtu	30%	0.08	0.08	0.35
Benzene	00071-43-2	4.40E-04 lbs/MMBtu	30%	0.01	0.01	0.03
Formaldehyde	00050-00-0	0.41 g/bhp-hr	30%	2.07	2.07	9.06
Methanol	00067-56-1	2.50E-03 lbs/MMBtu	30%	0.04	0.04	0.17
n-Hexane	00110-54-3	1.11E-03 lbs/MMBtu	30%	0.02	0.02	0.08
Toluene	00108-88-3	4.08E-04 lbs/MMBtu	30%	0.01	0.01	0.03
Xylene (mixed isomers)		1.84E-04 lbs/MMBtu	30%	0.00	0.00	0.01
Nitrous Oxide (N_2O)		1.00E-04 lbs/MMBtu	0%	0.00	0.00	0.01
Methane		1.00E-03 lbs/MMBtu	30%	0.02	0.02	0.07
Carbon Dioxide		1.17E+02 lbs/MMBtu	0%	2,580	2,580	11,300

(1) Emission factors for NOx, CO, and VOC based on vendor specifications. All other emission factors from AP-42 (7/00); Table 3.2-2. The AP-42 factor for SO2 is based on 2,000 grains/MMscf. The factor is adjusted to allow for up to 5 grains sulfur per 100 scf. PM10 and PM2.5 include both condensible and filterable portions.

(2) Control efficiency based on vendor data for CO and VOC. Reduction efficiency for HAP assumed to be same as for VOC.

(3) For NOx, CO, and VOC, calculated as: Emission Factor (g/bhp-hr) X Avg Operating Rate (bhp) X (100 - % Control Eff.) ÷ 453.59 g/lb
All other pollutants calculated as: Emission Factor (lbs/MMBtu) X Avg Operating Rate (MMBtu/hr) X (100 - % Control Eff.)

(4) For NOx, CO, and VOC, calculated as: Emission Factor (g/bhp-hr) X Max Operating Rate (bhp) X (100 - % Control Eff.) ÷ 453.59 g/lb
All other pollutants calculated as: Emission Factor (lbs/MMBtu) X Max Operating Rate (MMBtu/hr) X (100 - % Control Eff.)

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

Enterprise Field Services LLC
Lindrith Compressor Station
Part 71 Renewal Application Update

Emissions Calculations
Compressor No. 3 Engine
Source ID No.: A-03

Operating Parameters

Annual Operaton:	8,760 hrs/yr			
Mfr Rating	3,550 bhp	=		
Elevation	6,653 ft MSL			
DeRate	3% per 1,000 ft > 4000 ft			
Average Operating Rate:	3,267 bhp	=	6,761 BTU/bhp-hr =	22.09 MMBtu/hr
				0.024 MMscf/hr @905 Btu/scf
				213.83 MMscf/yr
Maximum Operating Rate:	3,267 bhp	=	6,761 BTU/bhp-hr =	22.09 MMBtu/hr
				0.024 MMscf/hr @905 Btu/scf
				213.83 MMscf/yr

Pollutant	CAS No.	Emission Factor[1]	Control Efficiency[2] (%)	Emissions		
				Average[3] (lbs/hr)	Maximum[4] (lbs/hr)	Annual[5] (tons/yr)
Particulate Matter (PM_{10})		9.99E-03 lbs/MMBtu	0%	0.22	0.22	0.97
Particulate Matter ($PM_{2.5}$)		9.99E-03 lbs/MMBtu	0%	0.22	0.22	0.97
Sulfur Dioxide (SO_2)		1.47E-02 lbs/MMBtu	0%	0.32	0.32	1.42
Nitrogen Oxides (NO_x)		0.70 g/bhp-hr	0%	5.04	5.04	22.09
Carbon Monoxide (CO)		2.50 g/bhp-hr	0%	18.01	18.01	78.88
Volatile Organic Compounds (VOC)		0.93 g/bhp-hr	0%	6.70	6.70	29.34
Acetaldehyde	00075-07-0	8.36E-03 lbs/MMBtu	0%	0.18	0.18	0.81
Acrolein	00107-02-8	5.14E-03 lbs/MMBtu	0%	0.11	0.11	0.50
Benzene	00071-43-2	4.40E-04 lbs/MMBtu	0%	0.01	0.01	0.04
Formaldehyde	00050-00-0	0.41 g/bhp-hr	0%	2.95	2.95	12.94
Methanol	00067-56-1	2.50E-03 lbs/MMBtu	0%	0.06	0.06	0.24
n-Hexane	00110-54-3	1.11E-03 lbs/MMBtu	0%	0.02	0.02	0.11
Toluene	00108-88-3	4.08E-04 lbs/MMBtu	0%	0.01	0.01	0.04
Xylene (mixed isomers)		1.84E-04 lbs/MMBtu	0%	0.00	0.00	0.02
Nitrous Oxide (N_2O)		1.00E-04 lbs/MMBtu	0%	0.00	0.00	0.01
Methane		1.00E-03 lbs/MMBtu	30%	0.02	0.02	0.07
Carbon Dioxide		1.17E+02 lbs/MMBtu	0%	2,580	2,580	11,300

(1) Emission factors for NOx, CO, and VOC based on vendor specifications. All other emission factors from AP-42 (7/00); Table 3.2-2.
The AP-42 factor for SO2 is based on 2,000 grains/MMscf. The factor is adjusted to allow for up to 5 grains sulfur per 100 scf.
PM10 and PM2.5 include both condensible and filterable portions.

(2) Control efficiency based on vendor data for CO and VOC. Reduction efficiency for HAP assumed to be same as for VOC.

(3) For NOx, CO, and VOC, calculated as: Emission Factor (g/bhp-hr) X Avg Operating Rate (bhp) X (100 - % Control Eff.) ÷ 453.59 g/lb
All other pollutants calculated as: Emission Factor (lbs/MMBtu) X Avg Operating Rate (MMBtu/hr) X (100 - % Control Eff.)

(4) For NOx, CO, and VOC, calculated as: Emission Factor (g/bhp-hr) X Max Operating Rate (bhp) X (100 - % Control Eff.) ÷ 453.59 g/lb
All other pollutants calculated as: Emission Factor (lbs/MMBtu) X Max Operating Rate (MMBtu/hr) X (100 - % Control Eff.)

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

G3612

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1000	FUEL SYSTEM:	GAV WITH AIR FUEL RATIO CONTROL
COMPRESSION RATIO:	9:1		
AFTERCOOLER WATER INLET (°F):	130	**SITE CONDITIONS:**	
JACKET WATER OUTLET (°F):	190	FUEL:	Field Gas
COOLING SYSTEM:	JW, OC+AC	FUEL PRESSURE RANGE(psig):	42.8-47.0
IGNITION SYSTEM:	CIS/ADEM3	FUEL METHANE NUMBER:	62.2
EXHAUST MANIFOLD:	DRY	FUEL LHV (Btu/scf):	1027
COMBUSTION:	Low Emission	ALTITUDE(ft):	500
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.7	MAXIMUM INLET AIR TEMPERATURE(°F):	77
		NAMEPLATE RATING:	3550 bhp@1000rpm

			MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING	**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(1)	bhp	3550	3527	2645	1775
INLET AIR TEMPERATURE		°F	70	77	77	77
ENGINE DATA						
FUEL CONSUMPTION (LHV)	(2)	Btu/bhp-hr	6761	6769	7063	7650
FUEL CONSUMPTION (HHV)	(2)	Btu/bhp-hr	7471	7479	7804	8453
AIR FLOW	(3)(4)	lb/hr	40343	40097	30764	21174
AIR FLOW WET (77°F, 14.7 psia)	(3)(4)	scfm	9098	9043	6938	4775
INLET MANIFOLD PRESSURE	(5)	in Hg(abs)	71.7	71.2	55.3	38.2
EXHAUST STACK TEMPERATURE	(6)	°F	858	859	897	946
EXHAUST GAS FLOW (@ stack temp, 14.5 psia)	(7)(4)	ft3/min	23743	23617	18656	13344
EXHAUST GAS MASS FLOW	(7)(4)	lb/hr	41500	41247	31664	21828
EMISSIONS DATA						
NOx (as NO2)	(8)	g/bhp-hr	0.70	0.70	0.70	0.70
CO	(8)	g/bhp-hr	2.50	2.50	2.50	2.50
THC (mol. wt. of 15.84)	(8)	g/bhp-hr	6.15	6.15	6.31	6.50
NMHC (mol. wt. of 15.84)	(8)	g/bhp-hr	1.59	1.60	1.64	1.68
NMNEHC (VOCs) (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	1.07	1.07	1.10	1.13
HCHO (Formaldehyde)	(8)	g/bhp-hr	0.40	0.40	0.44	0.48
CO2	(8)	g/bhp-hr	439	439	458	497
EXHAUST OXYGEN	(10)	% DRY	12.5	12.5	11.8	10.7
HEAT REJECTION						
HEAT REJ. TO JACKET WATER (JW)	(11)	Btu/min	36626	36551	31332	29350
HEAT REJ. TO ATMOSPHERE	(11)	Btu/min	14001	13998	13157	12447
HEAT REJ. TO LUBE OIL (OC)	(11)	Btu/min	18001	18008	17247	16974
HEAT REJ. TO AFTERCOOLER (AC)	(11)(12)	Btu/min	26659	26659	14046	1988

HEAT EXCHANGER SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW)	(12)	Btu/min	40289
TOTAL AFTERCOOLER CIRCUIT (OC+AC)	(12)(13)	Btu/min	49602
A cooling system safety factor of 0% has been added to the heat exchanger sizing criteria.			

CONDITIONS AND DEFINITIONS

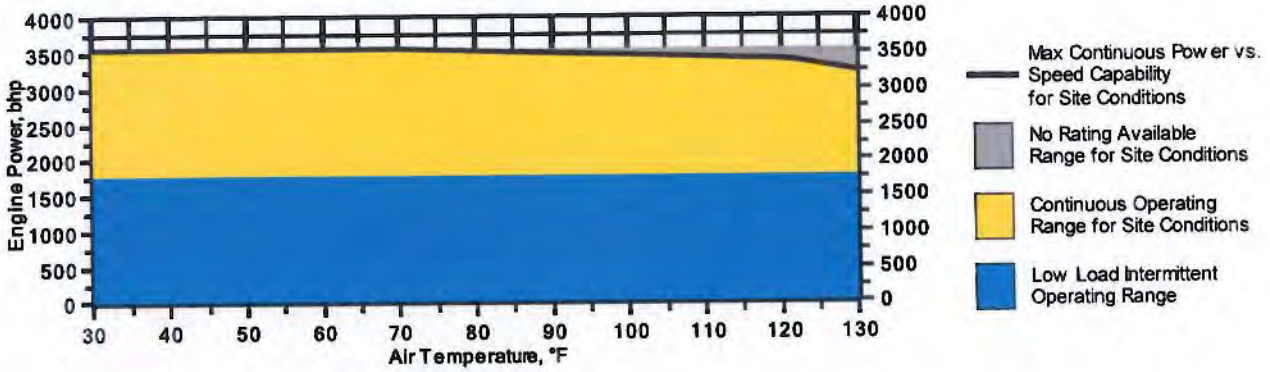
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature.
100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature.
Max. rating is the maximum capability for the specified fuel at site altitude and reduced inlet air temperature.
Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

PREPARED BY:
Data generated by Gas Engine Rating Pro Version 3.03.01
Ref. Data Set DM5310-05-000, Printed 15Jun2010

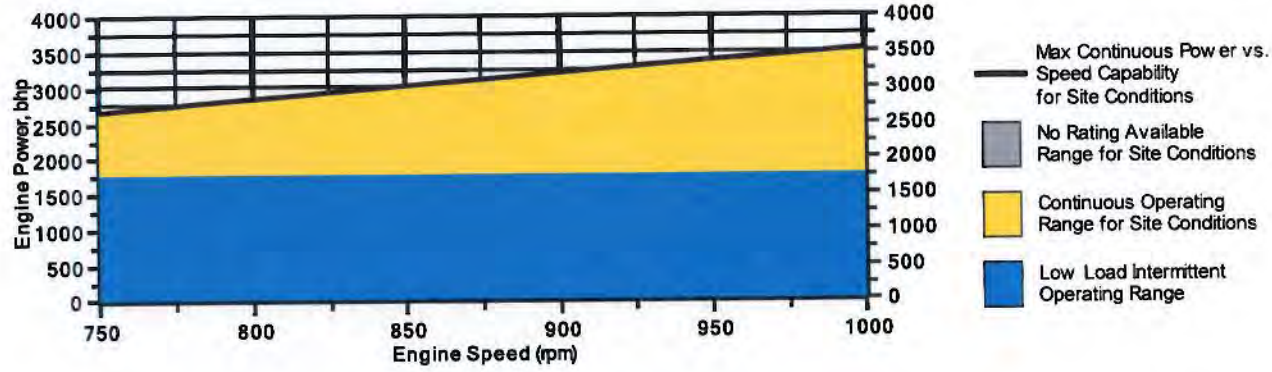
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 500 ft and 1000 rpm



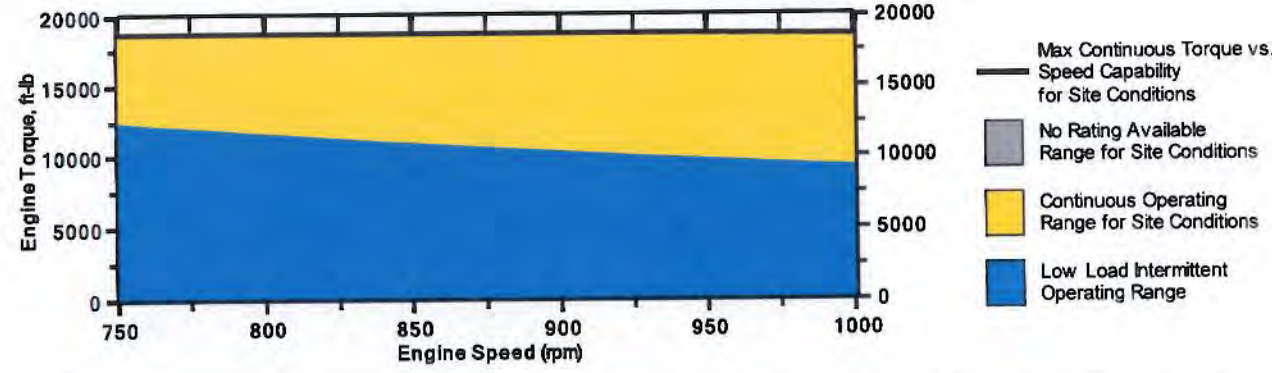
Engine Power vs. Engine Speed

Data represents speed sweep at 500 ft and 77 °F



Engine Torque vs. Engine Speed

Data represents speed sweep at 500 ft and 77 °F



Note: At site conditions of 500 ft and 77°F inlet air temp., constant torque can be maintained down to 750 rpm. The minimum speed for loading at these conditions is 750 rpm.

NOTES

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

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

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

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

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

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

7. Exhaust flow value is on a "wet" basis. Flow is a nominal value for total flow rate with a tolerance of ±6%. Exhaust gas vented through the wastegate flows only to the right exhaust outlet. The total flow through the wastegate may be as great as 15% of the total value for conditions under which the wastegate is open. For installations that use dual exhaust runs this difference must be taken into account when specifying any items to be connected to the exhaust outlets. The flow in the right exhaust outlet must be sized for at least 65% of the total flow to allow for the wastegate full open condition, while the left outlet must be sized for 50% of the total flow for the wastegate closed condition. Both runs must meet the allowable backpressure requirement as described in the Exhaust Systems A&I Guide.

8. Emission levels are at engine exhaust flange prior to any after treatment. Values are based on engine operating at steady state conditions, adjusted to the specified NOx level at 100% load. Fuel methane number cannot vary more than ± 3. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate "Not to Exceed" values. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

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

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

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

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

13. Heat exchanger sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	2.5211	2.5211
Methane	CH4	86.6340	86.6340
Ethane	C2H6	4.9767	4.9767
Propane	C3H8	3.5670	3.5670
Isobutane	iso-C4H1O	0.0000	0.0000
Norbutane	nor-C4H1O	1.8211	1.8211
Isopentane	iso-C5H12	0.0000	0.0000
Norpentane	nor-C5H12	0.4802	0.4802
Hexane	C6H14	0.0000	0.0000
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	0.0000	0.0000
Carbon Dioxide	CO2	0.0000	0.0000
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0000	0.0000
Helium	HE	0.0000	0.0000
Neopentane	neo-C5H12	0.0000	0.0000
Octane	C8H18	0.0000	0.0000
Nonane	C9H20	0.0000	0.0000
Ethylene	C2H4	0.0000	0.0000
Propylene	C3H6	0.0000	0.0000
TOTAL (Volume %)		100.0000	100.0000

Fuel Makeup:	Field Gas
Unit of Measure:	English
Calculated Fuel Properties	
Caterpillar Methane Number:	62.2
Lower Heating Value (Btu/scf):	1027
Higher Heating Value (Btu/scf):	1135
WOBBE Index (Btu/scf):	1274
THC: Free Inert Ratio:	0
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.997
Stoich A/F Ratio (Vol/Vol):	10.68
Stoich A/F Ratio (Mass/Mass):	16.43
Specific Gravity (Relative to Air):	0.650
Specific Heat Constant (K):	1.297

CONDITIONS AND DEFINITIONS

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

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

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

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

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

FUEL LIQUIDS

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

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

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

Enterprise Field Services LLC
Lindrith Compressor Station
Part 71 Renewal Application Update
Operating Parameters

Emissions Calculations
Compressor No. 1 Engine
Source ID No.: EMERGEN

Operating Parameters			
Parameter	**Value**	**Units**	**Notes**
Fuel Higher Heating Value (HHV)	19,300	BTU/lb	AP-42 Table 3.4.1
Fuel Density	7.10	lb/gal	AP-42 Table 3.4.1
Fuel Sulfur Content	15.00	ppmw	
Power Output: Emergency Generator	192	hp (mech.)	
Operating Hours	52	hrs/yr	Based on 1 hour per week
Heat Rate at HHV	7,000	BTU/hp-hr	

Emission Factors				
SO_2	**NO_x**	**PM/PM10/PM2.5**	**CO**	**VOC**
lb/MMBtu	**g/hp-hr**	**g/hp-hr**	**g/hp-hr**	**g/hp-hr**
0.0016	1.64	0.15	2.6	1.36

EMISSION UNIT	**Description**	**Hourly Emissions (lb/hr)**				
		CO	**NO_x**	**PM/PM10/PM2.5**	**VOC**	**SO_2**
EMERGEN	Emergency Generator	1.10	0.69	0.06	0.58	0.002
		Annual Emissions (tpy)				
EMERGEN	Emergency Generator	0.03	0.02	0.002	0.01	0.0001

Emission Factors		
N_2O	**Methane**	**CO_2**
lb/MMBtu	**lb/MMBtu**	**lb/MMBtu**
0.001322772	0.00661386	163

EMISSION UNIT	**Description**	**Hourly Emissions (lb/hr)**			
		Methane	**N_2O**	**CO_2**	**CO_2e**
EMERGEN	Emergency Generator	0.0089	0.0018	219	220
		Annual Emissions (tpy)			
EMERGEN	Emergency Generator	0.0002	0.0000	5	5

Notes:
1) Emission factors for NO_x, CO, and PM_{10} based on NSPS Subpart IIII, Table 4. Emissions of VOC based on AP-42 factors (5th Edition, 10/96) from Table 3.3-1 *Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines*. Emissions of GHG based on 40 CFR 98, Subpart C, Tables C-1 and C-2. NOx Factor use is NSPS NOx + NMHC factor minus AP-42 VOC factor.
2) Emission factor for SO_2 based on 100% conversion of fuel bound sulfur into SO_2.

Sample Calculations:

CO Hourly Emissions for EP-EMERGEN = $\frac{2.6\ g}{hp\text{-}hr} \times \frac{192\ hp}{} \times \frac{lb}{453.6\ g}$ = 1.10 lb/hr

CO Annual Emissions for EP-EMERGEN = $\frac{1.10\ lb}{hr} \times \frac{52\ hr}{yr} \times \frac{1\ ton}{2000\ lb}$ = 0.03 tpy

Conversion Factors:		
Heat Input	2544	Btu/hr = 1 hp
	453.6	grams/lb
	1.341	hp/kW

Storage Tanks

Enterprise Field Services LLC
Lindrith Compressor Station
Part 71 Renewal Application Update

Emissions Calculations
Condensate Tanks
Source ID No.: TBATTERY

Condensate Storage Tank Battery Operating Parameters

Throughput Estimates (Hysis Model)

	days	gpm	bbl/day	bbl/yr	gal/yr
Summer	90	-	-	-	-
Spring/Fall	155	-	-	-	-
Winter	120	1.55	53.25	6,389	268,358

Proposed Throughput Limit:	20,000	bbl/yr
	55	bbl/day (average)
Number of Tanks in Battery	8	

Estimated Emissions (NonSpeciated)

	Modeled		Proposed
Steam	lb/yr	Data Source	tpy
Flash	18,060.8	Hysis	28.27
Breathing	4,401.1	EPA Tanks	17.60
Working	686.8	EPA Tanks	2.75

Notes

1. The Hysis VOC estimate is for the battery - not per tank.
2. The EPA Tanks estimates are per tank.
3. Flash emissions are prorated by ratio of (Proposed Throughput / Hysis Throughput * Hysis Flash VOC tpy)
4. AspenTech predicts 6.271 lb/hr of flash emissions over the 120 day "Winter" period. This equates to 9.03 tons.

Condensate Storage Tank Battery Operating Parameters *(continued)*

Speciated Tank Emissions (Vapor Phase)

	Aspen Analysis	Normalized Aspen Analysis			
	Flash	Breathing/Working	Flash	Breathing/Working	Total
Component	Mass Fraction	Mass Fraction	tpy	tpy	tpy
Nitrogen	0.0008		0.02	-	0.02
CO2	0.0089		0.25	-	0.25
Methane	0.1857		5.25	-	5.25
Ethane	0.1969		5.57	-	5.57
Propane	0.2589	0.43	7.32	8.74	16.06
i-Butane	0.069	0.11	1.95	2.33	4.28
n-Butane	0.1131	0.19	3.20	3.82	7.02
i-Pentane	0.0481	0.08	1.36	1.62	2.98
n-Pentane	0.0376	0.06	1.06	1.27	2.33
n-Hexane	0.0135	0.02	0.38	0.46	0.84
n-Heptane	0.0142	0.02	0.40	0.48	0.88
n-Octane	0.0027	0.00	0.08	0.09	0.17
Cyclopentane	0.0031	0.01	0.09	0.10	0.19
Benzene	0.002	0.00	0.06	0.07	0.12
Cyclohexane	0.0064	0.01	0.18	0.22	0.40
2-Mhexane	0.0297	0.05	0.84	1.00	1.84
25-Mhexane	0.0028	0.00	0.08	0.09	0.17
Toluene	0.0017	0.00	0.05	0.06	0.11
H2O	0.0047		0.13	-	0.13
Total	1.00	1.00	17.17	20.35	37.52
Total VOC	0.60	1.00	17.04	20.35	37.39
Total HAP	0.02	0.04	0.67	0.80	1.46

Aspen VOC	Normalized Aspen VOC
0.2589	0.43
0.069	0.11
0.1131	0.19
0.0481	0.08
0.0376	0.06
0.0135	0.02
0.0142	0.02
0.0027	0.00
0.0031	0.01
0.002	0.00
0.0064	0.01
0.0297	0.05
0.0028	0.00
0.0017	0.00
0.6028	1.00

Notes:

1. The speciated flash emissions are based on the AspenTech process model results.
2. The speciated breathing/working losses were conservatively based on the AspenTech process model results minus the non-VOC components. The AspenTech VOC mass fraction was normalized to 1.0.

EPCO HOLDINGS, INC.
Burlington, MA
USA

Case Name:	LINDRITH LIQUIDS WEATHERING WINTER CASE REV 5.hsc
Unit Set:	USField3
Date/Time:	Wed May 12 08:13:01 2010

Material Stream: VENT1

Fluid Package: Basis-1
Property Package: Peng-Robinson

CONDITIONS

		Overall	Vapour Phase	Liquid Phase	Aqueous Phase
Vapour / Phase Fraction		1.0000	1.0000	0.0000	0.0000
Temperature:	(F)	36.62	36.62	36.62	36.62
Pressure:	(psig*)	0.0000	0.0000	0.0000	0.0000
Molar Flow	(MMSCFD)	1.691e-003	1.691e-003	0.0000	0.0000
Mass Flow	(lb/hr)	6.271	6.271	0.0000	0.0000
Std Ideal Liq Vol Flow	(USGPM)	2.836e-002	2.836e-002	0.0000	0.0000
Molar Enthalpy	(Btu/lbmole)	-4.255e+004	-4.255e+004	-8.874e+004	-1.235e+005
Molar Entropy	(Btu/lbmole-F)	44.25	44.25	17.78	11.38
Heat Flow	(Btu/hr)	-7903	-7903	0.0000	0.0000
Liq Vol Flow @Std Cond	(USGPM)	3.343e-002 *	3.343e-002	0.0000	0.0000

PROPERTIES

		Overall	Vapour Phase	Liquid Phase	Aqueous Phase
Molecular Weight		33.76	33.76	92.61	18.02
Molar Density	(lbmole/ft3)	2.238e-003	2.238e-003	0.4697	3.548
Mass Density	(lb/ft3)	7.555e-002	7.555e-002	43.50	63.93
Act. Volume Flow	(USGPM)	10.35	10.35	0.0000	0.0000
Mass Enthalpy	(Btu/lb)	-1260	-1260	-958.3	-6853
Mass Entropy	(Btu/lb-F)	1.311	1.311	0.1920	0.6314
Heat Capacity	(Btu/lbmole-F)	13.79	13.79	44.45	18.60
Mass Heat Capacity	(Btu/lb-F)	0.4083	0.4083	0.4800	1.033
Lower Heating Value	(Btu/lbmole)	6.716e+005	6.716e+005	1.783e+006	1.342e-004
Mass Lower Heating Value	(Btu/lb)	1.989e+004	1.989e+004	1.926e+004	7.447e-006
Phase Fraction [Vol. Basis]		—	1.000	—	—
Phase Fraction [Mass Basis]		2.122e-314	1.000	0.0000	0.0000
Partial Pressure of CO2	(psig*)	-11.72	—	—	—
Cost Based on Flow	(Cost/s)	0.0000	0.0000	0.0000	0.0000
Act. Gas Flow	(ACFM)	1.383	1.383	—	—
Avg. Liq. Density	(lbmole/ft3)	0.8166	0.8166	0.4582	3.458
Specific Heat	(Btu/lbmole-F)	13.79	13.79	44.45	18.60
Std. Gas Flow	(MMSCFD)	1.692e-003	1.692e-003	0.0000	0.0000
Std. Ideal Liq. Mass Density	(lb/ft3)	27.57	27.57	42.44	62.30
Act. Liq. Flow	(USGPM)	0.0000	—	—	0.0000
Z Factor		—	0.9904	4.718e-003	6.245e-004
Watson K		15.81	15.81	12.62	8.520
User Property		—	—	—	—
Cp/(Cp - R)		1.168	1.168	1.047	1.120
Cp/Cv		1.175	1.175	1.047	1.130
Heat of Vap.	(Btu/lbmole)	1.060e+004	—	—	—
Kinematic Viscosity	(cSt)	7.446	7.446	0.6690	1.579
Liq. Mass Density (Std. Cond)	(lb/ft3)	23.39	23.39	42.78	63.33
Liq. Vol. Flow (Std. Cond)	(USGPM)	3.343e-002	3.343e-002	0.0000	0.0000
Liquid Fraction		0.0000	0.0000	1.000	1.000
Molar Volume	(ft3/lbmole)	446.9	446.9	2.129	0.2818
Mass Heat of Vap.	(Btu/lb)	314.1	—	—	—
Phase Fraction [Molar Basis]		1.0000	1.0000	0.0000	0.0000
Surface Tension	(dyne/cm)	—	—	20.63	75.96
Thermal Conductivity	(Btu/hr-ft-F)	1.175e-002	1.175e-002	7.013e-002	0.3314
Viscosity	(cP)	9.011e-003	9.011e-003	0.4661	1.616
Cv (Semi-Ideal)	(Btu/lbmole-F)	11.80	11.80	42.46	16.62
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.3495	0.3495	0.4585	0.9223

* Specified by user.

Material Stream: VENT1 (continued)

Fluid Package: Basis-1
Property Package: Peng-Robinson

PROPERTIES

		Overall	Vapour Phase	Liquid Phase	Aqueous Phase	
Cv	(Btu/lbmole-F)	11.73	11.73	42.46	16.46	
Mass Cv	(Btu/lb-F)	0.3475	0.3475	0.4585	0.9136	
Cv (Ent. Method)	(Btu/lbmole-F)	—	—	—	16.11	
Mass Cv (Ent. Method)	(Btu/lb-F)	—	—	—	0.8944	
Cp/Cv (Ent. Method)		—	—	—	1.155	
Liq. Vol. Flow - Sum(Std. Cond)	(USGPM)	3.343e-002	3.343e-002	0.0000	0.0000	
Reid VP at 37.8 C	(psig*)	—	—	3.010	—	
True VP at 37.8 C	(psig*)	1309	1309	11.46	-10.00	
Partial Pressure of H2S	(psig*)	-11.80	—	—	—	
Viscosity Index		—	—	-2.140	-0.1073	

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Nitrogen	0.0002	0.0009	0.0048	0.0008	0.0000	0.0004
CO2	0.0013	0.0069	0.0560	0.0089	0.0001	0.0048
Methane	0.0726	0.3909	1.1647	0.1857	0.0078	0.2740
Ethane	0.0411	0.2211	1.2348	0.1969	0.0069	0.2445
Propane	0.0368	0.1982	1.6236	0.2589	0.0064	0.2257
i-Butane	0.0074	0.0401	0.4330	0.0690	0.0015	0.0543
n-Butane	0.0122	0.0657	0.7091	0.1131	0.0024	0.0856
i-Pentane	0.0042	0.0225	0.3016	0.0481	0.0010	0.0341
n-Pentane	0.0033	0.0176	0.2360	0.0376	0.0007	0.0264
n-Hexane	0.0010	0.0053	0.0847	0.0135	0.0003	0.0090
n-Heptane	0.0009	0.0048	0.0891	0.0142	0.0003	0.0091
n-Octane	0.0002	0.0008	0.0171	0.0027	0.0000	0.0017
n-Nonane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-C11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mbutane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclopentane	0.0003	0.0015	0.0195	0.0031	0.0001	0.0018
2-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclopentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
24-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Benzene	0.0002	0.0009	0.0129	0.0020	0.0000	0.0010
33-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclohexane	0.0005	0.0026	0.0401	0.0064	0.0001	0.0036
2-Mhexane	0.0019	0.0100	0.1863	0.0297	0.0005	0.0193
23-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11Mcycpentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-tr3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-ci3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
113-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25-Mhexane	0.0002	0.0008	0.0177	0.0028	0.0001	0.0018
MCC5==	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Toluene	0.0001	0.0006	0.0106	0.0017	0.0000	0.0009

Material Stream: VENT1 (continued)

Fluid Package: Basis-1
Property Package: Peng-Robinson

COMPOSITION

Overall Phase (continued)

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Naphthalene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ecyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
p-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
m-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Moctane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
o-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0016	0.0088	0.0293	0.0047	0.0001	0.0021
Methanol	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.1857	1.0000	6.2711	1.0000	0.0284	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Nitrogen	0.0002	0.0009	0.0048	0.0008	0.0000	0.0004
CO2	0.0013	0.0069	0.0560	0.0089	0.0001	0.0048
Methane	0.0726	0.3909	1.1647	0.1857	0.0078	0.2740
Ethane	0.0411	0.2211	1.2348	0.1969	0.0069	0.2445
Propane	0.0368	0.1982	1.6236	0.2589	0.0064	0.2257
i-Butane	0.0074	0.0401	0.4330	0.0690	0.0015	0.0543
n-Butane	0.0122	0.0657	0.7091	0.1131	0.0024	0.0856
i-Pentane	0.0042	0.0225	0.3016	0.0481	0.0010	0.0341
n-Pentane	0.0033	0.0176	0.2360	0.0376	0.0007	0.0264
n-Hexane	0.0010	0.0053	0.0847	0.0135	0.0003	0.0090
n-Heptane	0.0009	0.0048	0.0891	0.0142	0.0003	0.0091
n-Octane	0.0002	0.0008	0.0171	0.0027	0.0000	0.0017
n-Nonane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-C11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mbutane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclopentane	0.0003	0.0015	0.0195	0.0031	0.0001	0.0018
2-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclopentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
24-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Benzene	0.0002	0.0009	0.0129	0.0020	0.0000	0.0010
33-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclohexane	0.0005	0.0026	0.0401	0.0064	0.0001	0.0036
2-Mhexane	0.0019	0.0100	0.1863	0.0297	0.0005	0.0193
23-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11Mcycpentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-tr3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-ci3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
113-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25-Mhexane	0.0002	0.0008	0.0177	0.0028	0.0001	0.0018
MCC5==	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Toluene	0.0001	0.0006	0.0106	0.0017	0.0000	0.0009

Material Stream: VENT1 (continued)

Fluid Package: Basis-1
Property Package: Peng-Robinson

COMPOSITION

Vapour Phase (continued)

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Naphthalene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ecyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
p-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
m-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Moctane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
o-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0016	0.0088	0.0293	0.0047	0.0001	0.0021
Methanol	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.1857	1.0000	6.2711	1.0000	0.0284	1.0000

Liquid Phase

Phase Fraction 0.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0001	0.0000	0.0001	0.0000	0.0000
Methane	0.0000	0.0019	0.0000	0.0003	0.0000	0.0008
Ethane	0.0000	0.0080	0.0000	0.0026	0.0000	0.0050
Propane	0.0000	0.0315	0.0000	0.0150	0.0000	0.0201
i-Butane	0.0000	0.0188	0.0000	0.0118	0.0000	0.0143
n-Butane	0.0000	0.0461	0.0000	0.0289	0.0000	0.0337
i-Pentane	0.0000	0.0454	0.0000	0.0354	0.0000	0.0386
n-Pentane	0.0000	0.0503	0.0000	0.0392	0.0000	0.0423
n-Hexane	0.0000	0.0588	0.0000	0.0547	0.0000	0.0562
n-Heptane	0.0000	0.1967	0.0000	0.2128	0.0000	0.2107
n-Octane	0.0000	0.1217	0.0000	0.1501	0.0000	0.1446
n-Nonane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-C11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mbutane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclopentane	0.0000	0.0059	0.0000	0.0045	0.0000	0.0041
2-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclopentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
24-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Benzene	0.0000	0.0104	0.0000	0.0088	0.0000	0.0068
33-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclohexane	0.0000	0.0368	0.0000	0.0335	0.0000	0.0291
2-Mhexane	0.0000	0.2908	0.0000	0.3146	0.0000	0.3138
23-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11Mcycpentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-tr3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-ci3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
113-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25-Mhexane	0.0000	0.0481	0.0000	0.0594	0.0000	0.0579
MCC5==	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Toluene	0.0000	0.0285	0.0000	0.0283	0.0000	0.0221

Material Stream: VENT1 (continued)

Fluid Package: Basis-1
Property Package: Peng-Robinson

COMPOSITION

Liquid Phase (continued)

Phase Fraction 0.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Naphthalene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ecyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
p-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
m-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Moctane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
o-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
Methanol	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Aqueous Phase

Phase Fraction 0.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Heptane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Octane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Nonane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-C11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mbutane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclopentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclopentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
24-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Benzene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
33-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Mhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
23-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11Mcycpentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-tr3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-ci3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
113-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25-Mhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MCC5==	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Toluene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Material Stream: VENT1 (continued)

Fluid Package: Basis-1
Property Package: Peng-Robinson

COMPOSITION

Aqueous Phase (continued)

Phase Fraction 0.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Naphthalene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ecyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
p-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
m-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Moctane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
o-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
Methanol	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Nitrogen	786.2	786.2	6.176e+004
CO2	62.97	62.97	1389
Methane	203.2	203.2	1.017e+009
Ethane	27.66	27.66	9.300e+010
Propane	6.292	6.292	—
i-Butane	2.136	2.136	—
n-Butane	1.424	1.424	—
i-Pentane	0.4954	0.4954	—
n-Pentane	0.3499	0.3499	—
n-Hexane	8.992e-002	8.992e-002	—
n-Heptane	2.435e-002	2.435e-002	—
n-Octane	6.639e-003	6.639e-003	—
n-Nonane	—	—	—
n-C11	—	—	—
22-Mbutane	—	—	—
Cyclopentane	0.2536	0.2536	—
2-Mpentane	—	—	—
3-Mpentane	—	—	—
22-Mpentane	—	—	—
Mcyclopentan	—	—	—
24-Mpentane	—	—	—
Benzene	8.516e-002	8.516e-002	—
33-Mpentane	—	—	—
Cyclohexane	6.962e-002	6.962e-002	—
2-Mhexane	3.444e-002	3.444e-002	—
23-Mpentane	—	—	—
11Mcycpentan	—	—	—
3-Mhexane	—	—	—
1-tr3-MCC5	—	—	—
1-ci3-MCC5	—	—	—
Mcyclohexane	—	—	—
113-MCC5	—	—	—
25-Mhexane	1.734e-002	1.734e-002	—
MCC5==	—	—	—
Toluene	2.172e-002	2.172e-002	—
Naphthalene	—	—	—

Material Stream: VENT1 (continued)

Fluid Package: Basis-1
Property Package: Peng-Robinson

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Ecyclohexane	—	—	—
p-Xylene	—	—	—
m-Xylene	—	—	—
2-Moctane	—	—	—
o-Xylene	—	—	—
H2O	60.45	60.45	8.766e-003
Methanol	—	—	—

Material Stream: CONDENSATE1

Fluid Package: Basis-1
Property Package: Peng-Robinson

CONDITIONS

		Overall	Vapour Phase	Liquid Phase	Aqueous Phase
Vapour / Phase Fraction		0.0000	0.0000	0.1928	0.8072
Temperature:	(F)	36.62	36.62	36.62	36.62
Pressure:	(psig*)	0.0000	0.0000	0.0000	0.0000
Molar Flow	(MMSCFD)	0.1286	0.0000	2.479e-002	0.1038
Mass Flow	(lb/hr)	457.5	0.0000	252.1	205.3
Std Ideal Liq Vol Flow	(USGPM)	1.152	0.0000	0.7407	0.4109
Molar Enthalpy	(Btu/lbmole)	-1.168e+005	-4.255e+004	-8.874e+004	-1.235e+005
Molar Entropy	(Btu/lbmole-F)	12.61	44.25	17.78	11.38
Heat Flow	(Btu/hr)	-1.649e+006	0.0000	-2.416e+005	-1.407e+006
Liq Vol Flow @Std Cond	(USGPM)	1.069 *	0.0000	0.7349	0.4043

PROPERTIES

		Overall	Vapour Phase	Liquid Phase	Aqueous Phase
Molecular Weight		32.40	33.76	92.61	18.02
Molar Density	(lbmole/ft3)	1.568	2.238e-003	0.4697	3.548
Mass Density	(lb/ft3)	50.78	7.555e-002	43.50	63.93
Act. Volume Flow	(USGPM)	1.123	0.0000	0.7226	0.4005
Mass Enthalpy	(Btu/lb)	-3604	-1260	-958.3	-6853
Mass Entropy	(Btu/lb-F)	0.3893	1.311	0.1920	0.6314
Heat Capacity	(Btu/lbmole-F)	23.58	13.79	44.45	18.60
Mass Heat Capacity	(Btu/lb-F)	0.7280	0.4083	0.4800	1.033
Lower Heating Value	(Btu/lbmole)	3.438e+005	6.716e+005	1.783e+006	1.342e-004
Mass Lower Heating Value	(Btu/lb)	1.061e+004	1.989e+004	1.926e+004	7.447e-006
Phase Fraction [Vol. Basis]		—	—	0.6432	0.3568
Phase Fraction [Mass Basis]		2.122e-314	0.0000	0.5511	0.4489
Partial Pressure of CO2	(psig*)	-11.80	—	—	—
Cost Based on Flow	(Cost/s)	0.0000	0.0000	0.0000	0.0000
Act. Gas Flow	(ACFM)	—	—	—	—
Avg. Liq. Density	(lbmole/ft3)	1.529	0.8166	0.4582	3.458
Specific Heat	(Btu/lbmole-F)	23.58	13.79	44.45	18.60
Std. Gas Flow	(MMSCFD)	0.1286	0.0000	2.480e-002	0.1038
Std. Ideal Liq. Mass Density	(lb/ft3)	49.52	27.57	42.44	62.30
Act. Liq. Flow	(USGPM)	1.123	—	0.7226	0.4005
Z Factor		—	0.9904	4.718e-003	6.245e-004
Watson K		12.62	15.81	12.62	8.520
User Property		—	—	—	—
Cp/(Cp - R)		1.092	1.168	1.047	1.120
Cp/Cv		1.092	1.175	1.047	1.130
Heat of Vap.	(Btu/lbmole)	2.068e+004	—	—	—
Kinematic Viscosity	(cSt)	2.069	7.446	0.6690	1.579
Liq. Mass Density (Std. Cond)	(lb/ft3)	53.36	23.39	42.78	63.33
Liq. Vol. Flow (Std. Cond)	(USGPM)	1.069	0.0000	0.7349	0.4043
Liquid Fraction		1.000	0.0000	1.000	1.000
Molar Volume	(ft3/lbmole)	0.6379	446.9	2.129	0.2818
Mass Heat of Vap.	(Btu/lb)	638.2	—	—	—
Phase Fraction [Molar Basis]		0.0000	0.0000	0.1928	0.8072
Surface Tension	(dyne/cm)	—	—	20.63	75.96
Thermal Conductivity	(Btu/hr-ft-F)	0.1243	1.175e-002	7.013e-002	0.3314
Viscosity	(cP)	1.683	9.011e-003	0.4661	1.616
Cv (Semi-Ideal)	(Btu/lbmole-F)	21.60	11.80	42.46	16.62
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.6667	0.3495	0.4585	0.9223

* Specified by user.

Material Stream: CONDENSATE1 (continued)

Fluid Package: Basis-1
Property Package: Peng-Robinson

PROPERTIES

		Overall	Vapour Phase	Liquid Phase	Aqueous Phase	
Cv	(Btu/lbmole-F)	21.60	11.73	42.46	16.46	
Mass Cv	(Btu/lb-F)	0.6667	0.3475	0.4585	0.9136	
Cv (Ent. Method)	(Btu/lbmole-F)	—	—	—	16.11	
Mass Cv (Ent. Method)	(Btu/lb-F)	—	—	—	0.8944	
Cp/Cv (Ent. Method)		—	—	—	1.155	
Liq. Vol. Flow - Sum(Std. Cond)	(USGPM)	1.139	0.0000	0.7349	0.4043	
Reid VP at 37.8 C	(psig*)	3.019	—	3.010	—	
True VP at 37.8 C	(psig*)	12.14	1309	11.46	-10.00	
Partial Pressure of H2S	(psig*)	-11.80	—	—	—	
Viscosity Index		-0.2559	—	-2.140	-0.1073	

COMPOSITION

Overall Phase

Vapour Fraction 0.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Nitrogen	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000
CO2	0.0004	0.0000	0.0155	0.0000	0.0000	0.0000
Methane	0.0052	0.0004	0.0840	0.0002	0.0006	0.0005
Ethane	0.0218	0.0015	0.6545	0.0014	0.0037	0.0032
Propane	0.0858	0.0061	3.7827	0.0083	0.0149	0.0129
i-Butane	0.0511	0.0036	2.9721	0.0065	0.0106	0.0092
n-Butane	0.1255	0.0089	7.2974	0.0160	0.0250	0.0217
i-Pentane	0.1237	0.0088	8.9238	0.0195	0.0286	0.0248
n-Pentane	0.1370	0.0097	9.8877	0.0216	0.0314	0.0272
n-Hexane	0.1602	0.0113	13.8017	0.0302	0.0416	0.0361
n-Heptane	0.5355	0.0379	53.6629	0.1173	0.1560	0.1355
n-Octane	0.3312	0.0235	37.8337	0.0827	0.1071	0.0930
n-Nonane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-C11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mbutane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclopentane	0.0161	0.0011	1.1269	0.0025	0.0030	0.0026
2-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclopentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
24-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Benzene	0.0283	0.0020	2.2124	0.0048	0.0050	0.0043
33-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclohexane	0.1002	0.0071	8.4361	0.0184	0.0215	0.0187
2-Mhexane	0.7916	0.0561	79.3196	0.1734	0.2324	0.2018
23-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11Mcycpentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-tr3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-ci3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
113-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25-Mhexane	0.1310	0.0093	14.9641	0.0327	0.0429	0.0372
MCC5==	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Toluene	0.0775	0.0055	7.1431	0.0156	0.0164	0.0142

Material Stream: CONDENSATE1 (continued)

Fluid Package: Basis-1
Property Package: Peng-Robinson

COMPOSITION

Overall Phase (continued)

Vapour Fraction 0.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Naphthalene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ecyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
p-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
m-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Moctane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
o-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	11.3985	0.8072	205.3451	0.4489	0.4109	0.3568
Methanol	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	14.1207	1.0000	457.4633	1.0000	1.1516	1.0000

Vapour Phase

Phase Fraction 0.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Nitrogen	0.0000	0.0009	0.0000	0.0008	0.0000	0.0004
CO2	0.0000	0.0069	0.0000	0.0089	0.0000	0.0048
Methane	0.0000	0.3909	0.0000	0.1857	0.0000	0.2740
Ethane	0.0000	0.2211	0.0000	0.1969	0.0000	0.2445
Propane	0.0000	0.1982	0.0000	0.2589	0.0000	0.2257
i-Butane	0.0000	0.0401	0.0000	0.0690	0.0000	0.0543
n-Butane	0.0000	0.0657	0.0000	0.1131	0.0000	0.0856
i-Pentane	0.0000	0.0225	0.0000	0.0481	0.0000	0.0341
n-Pentane	0.0000	0.0176	0.0000	0.0376	0.0000	0.0264
n-Hexane	0.0000	0.0053	0.0000	0.0135	0.0000	0.0090
n-Heptane	0.0000	0.0048	0.0000	0.0142	0.0000	0.0091
n-Octane	0.0000	0.0008	0.0000	0.0027	0.0000	0.0017
n-Nonane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-C11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mbutane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclopentane	0.0000	0.0015	0.0000	0.0031	0.0000	0.0018
2-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclopentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
24-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Benzene	0.0000	0.0009	0.0000	0.0020	0.0000	0.0010
33-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclohexane	0.0000	0.0026	0.0000	0.0064	0.0000	0.0036
2-Mhexane	0.0000	0.0100	0.0000	0.0297	0.0000	0.0193
23-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11Mcycpentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-tr3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-ci3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
113-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25-Mhexane	0.0000	0.0008	0.0000	0.0028	0.0000	0.0018
MCC5==	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Toluene	0.0000	0.0006	0.0000	0.0017	0.0000	0.0009

Material Stream: CONDENSATE1 (continued)

Fluid Package: Basis-1
Property Package: Peng-Robinson

COMPOSITION

Vapour Phase (continued)

Phase Fraction 0.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Naphthalene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ecyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
p-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
m-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Moctane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
o-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0088	0.0000	0.0047	0.0000	0.0021
Methanol	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Liquid Phase

Phase Fraction 0.1928

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Nitrogen	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000
CO2	0.0003	0.0001	0.0130	0.0001	0.0000	0.0000
Methane	0.0052	0.0019	0.0840	0.0003	0.0006	0.0008
Ethane	0.0218	0.0080	0.6545	0.0026	0.0037	0.0050
Propane	0.0858	0.0315	3.7827	0.0150	0.0149	0.0201
i-Butane	0.0511	0.0188	2.9721	0.0118	0.0106	0.0143
n-Butane	0.1255	0.0461	7.2974	0.0289	0.0250	0.0337
i-Pentane	0.1237	0.0454	8.9238	0.0354	0.0286	0.0386
n-Pentane	0.1370	0.0503	9.8877	0.0392	0.0314	0.0423
n-Hexane	0.1602	0.0588	13.8017	0.0547	0.0416	0.0562
n-Heptane	0.5355	0.1967	53.6629	0.2128	0.1560	0.2107
n-Octane	0.3312	0.1217	37.8337	0.1501	0.1071	0.1446
n-Nonane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-C11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mbutane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclopentane	0.0161	0.0059	1.1269	0.0045	0.0030	0.0041
2-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclopentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
24-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Benzene	0.0283	0.0104	2.2124	0.0088	0.0050	0.0068
33-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclohexane	0.1002	0.0368	8.4361	0.0335	0.0215	0.0291
2-Mhexane	0.7916	0.2908	79.3196	0.3146	0.2324	0.3138
23-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11Mcycpentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-tr3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-ci3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
113-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25-Mhexane	0.1310	0.0481	14.9641	0.0594	0.0429	0.0579
MCC5==	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Toluene	0.0775	0.0285	7.1431	0.0283	0.0164	0.0221

Material Stream: CONDENSATE1 (continued)

Fluid Package: Basis-1
Property Package: Peng-Robinson

COMPOSITION

Liquid Phase (continued)

Phase Fraction 0.1928

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Naphthalene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ecyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
p-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
m-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Moctane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
o-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0004	0.0001	0.0071	0.0000	0.0000	0.0000
Methanol	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	2.7225	1.0000	252.1228	1.0000	0.7407	1.0000

Aqueous Phase

Phase Fraction 0.8072

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0001	0.0000	0.0025	0.0000	0.0000	0.0000
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Heptane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Octane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Nonane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-C11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mbutane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclopentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclopentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
24-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Benzene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
33-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Mhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
23-Mpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11Mcycpentan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Mhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-tr3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-ci3-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mcyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
113-MCC5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25-Mhexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MCC5==	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Toluene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Material Stream: CONDENSATE1 (continued)

Fluid Package: Basis-1
Property Package: Peng-Robinson

COMPOSITION

Aqueous Phase (continued)

Phase Fraction 0.8072

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (USGPM)	LIQUID VOLUME FRACTION
Naphthalene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ecyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
p-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
m-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Moctane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
o-Xylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	11.3981	1.0000	205.3380	1.0000	0.4109	1.0000
Methanol	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	11.3982	1.0000	205.3405	1.0000	0.4109	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Nitrogen	3872	786.2	6.176e+004
CO2	274.5	62.97	1389
Methane	1054	203.2	1.017e+009
Ethane	143.4	27.66	9.300e+010
Propane	32.63	6.292	—
i-Butane	11.08	2.136	—
n-Butane	7.388	1.424	—
i-Pentane	2.570	0.4954	—
n-Pentane	1.815	0.3499	—
n-Hexane	0.4664	8.992e-002	—
n-Heptane	0.1263	2.435e-002	—
n-Octane	3.444e-002	6.639e-003	—
n-Nonane	—	—	—
n-C11	—	—	—
22-Mbutane	—	—	—
Cyclopentane	1.315	0.2536	—
2-Mpentane	—	—	—
3-Mpentane	—	—	—
22-Mpentane	—	—	—
Mcyclopentan	—	—	—
24-Mpentane	—	—	—
Benzene	0.4417	8.516e-002	—
33-Mpentane	—	—	—
Cyclohexane	0.3611	6.962e-002	—
2-Mhexane	0.1786	3.444e-002	—
23-Mpentane	—	—	—
11Mcycpentan	—	—	—
3-Mhexane	—	—	—
1-tr3-MCC5	—	—	—
1-cl3-MCC5	—	—	—
Mcyclohexane	—	—	—
113-MCC5	—	—	—
25-Mhexane	8.995e-002	1.734e-002	—
MCC5==	—	—	—
Toluene	0.1126	2.172e-002	—
Naphthalene	—	—	—

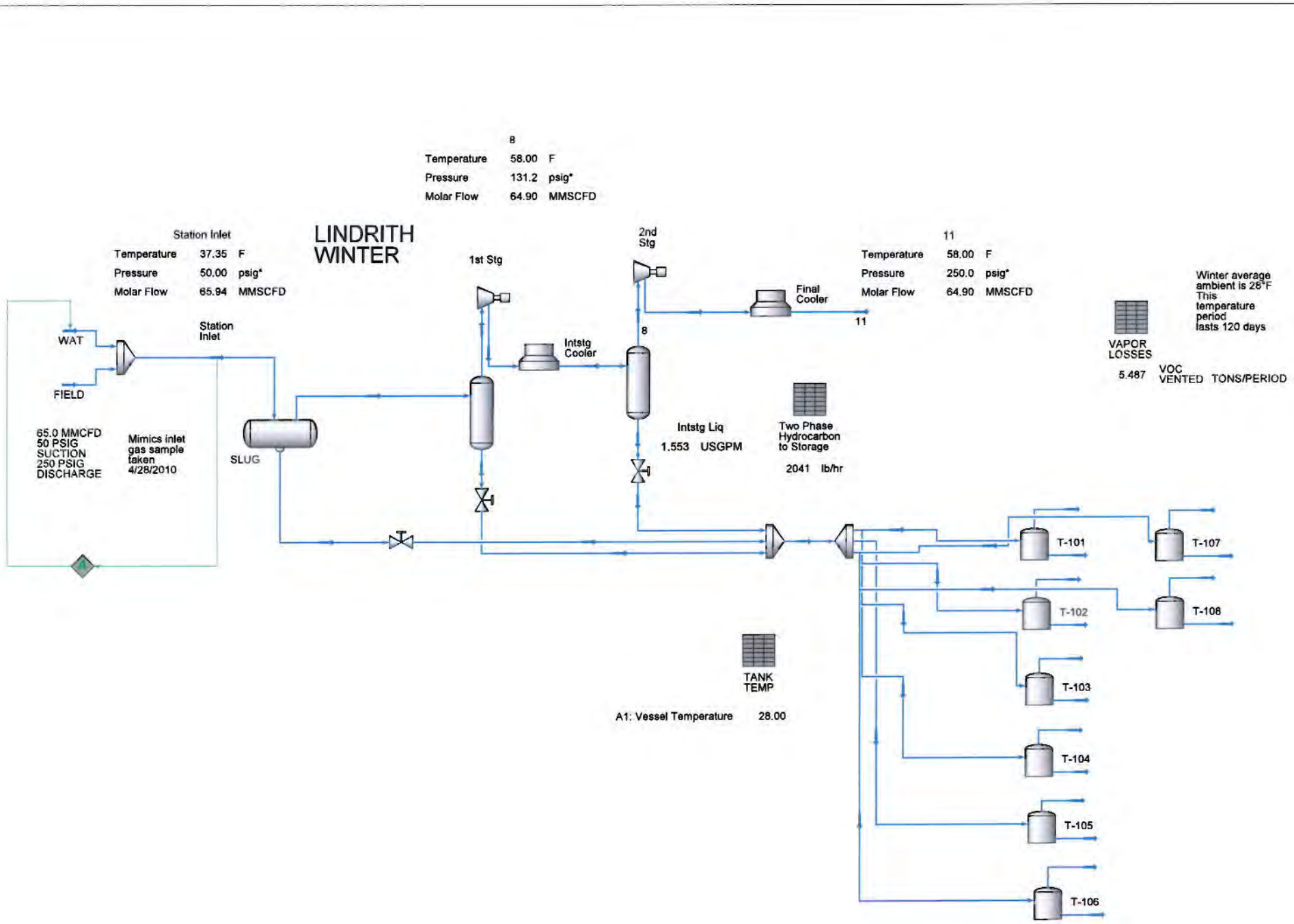
Material Stream: CONDENSATE1 (continued)

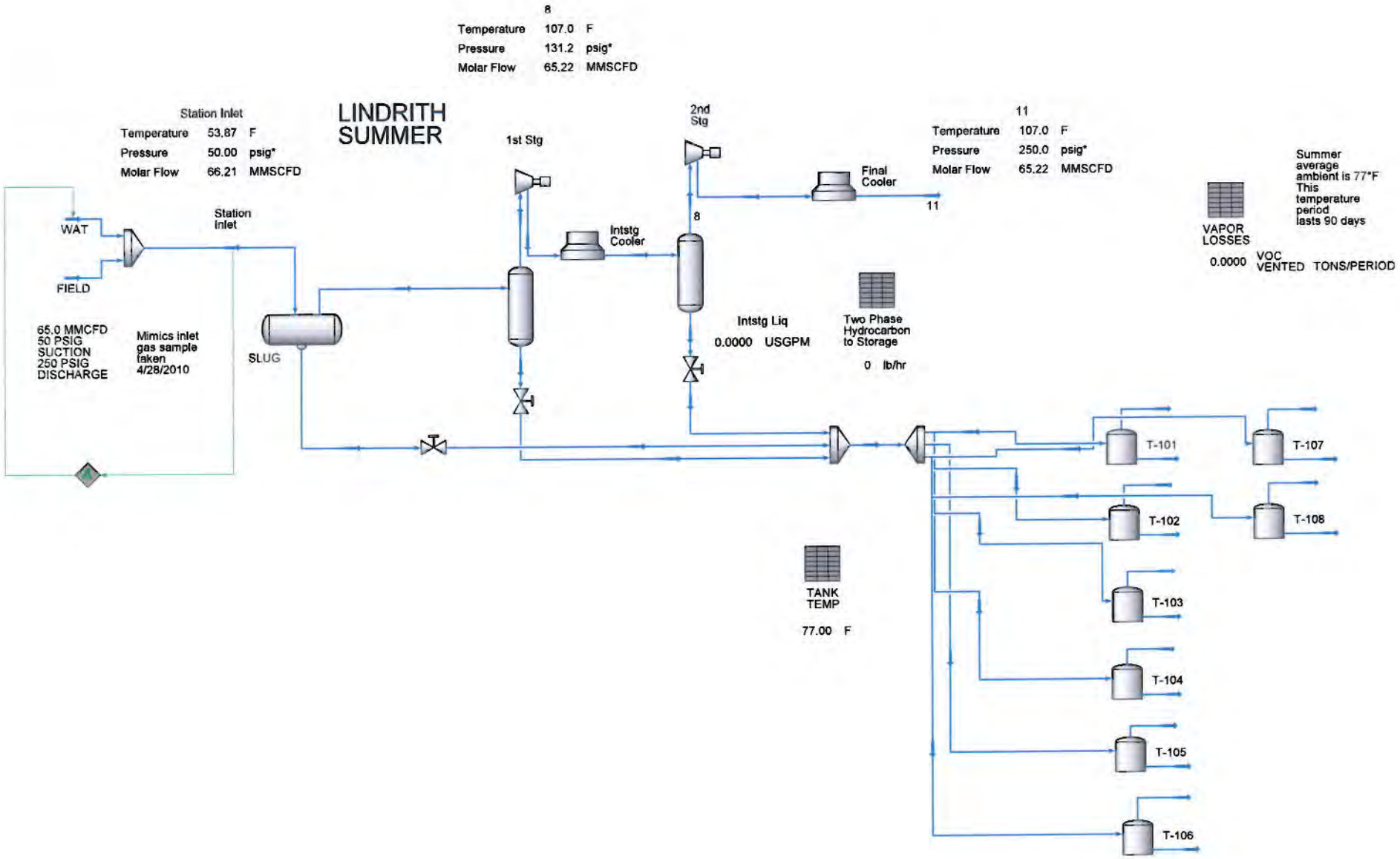
Fluid Package: Basis-1
Property Package: Peng-Robinson

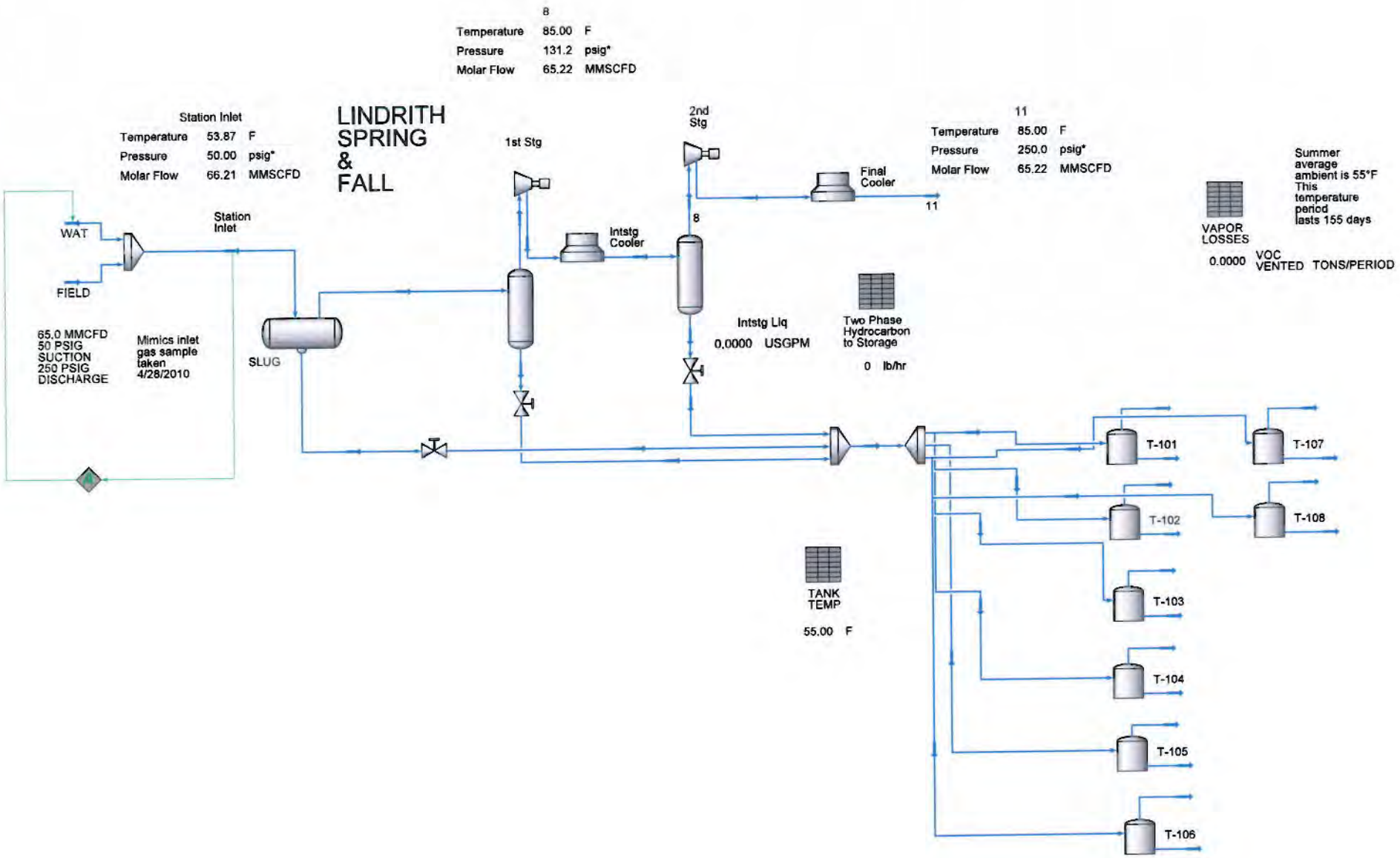
K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Ecyclohexane	---	---	---
p-Xylene	---	---	---
m-Xylene	---	---	---
2-Moctane	---	---	---
o-Xylene	---	---	---
H2O	1.086e-002	60.45	8.766e-003
Methanol	---	---	---

* Specified by user.


8
Temperature 58.00 F
Pressure 131.2 psig*
Molar Flow 64.90 MMSCFD
LINDRITH
WINTER
Station Inlet
Temperature 37.35 F
Pressure 50.00 psig*
Molar Flow 65.94 MMSCFD
Station Inlet
WAT
FIELD
65.0 MMCFD
50 PSIG
SUCTION
250 PSIG
DISCHARGE
Mimics inlet gas sample taken 4/28/2010
SLUG
1st Stg
Intstg Cooler
2nd Stg
8
Intstg Liq
1.553 USGPM
Two Phase Hydrocarbon to Storage
2041 lb/hr
Final Cooler
11
11
Temperature 58.00 F
Pressure 250.0 psig*
Molar Flow 64.90 MMSCFD
VAPOR LOSSES
5.487 VOC VENTED TONS/PERIOD
Winter average ambient is 28°F This temperature period lasts 120 days
TANK TEMP
A1: Vessel Temperature 28.00
T-101
T-102
T-103
T-104
T-105
T-106
T-107
T-108


8
Temperature 107.0 F
Pressure 131.2 psig*
Molar Flow 65.22 MMSCFD
Station Inlet
Temperature 53.87 F
Pressure 50.00 psig*
Molar Flow 66.21 MMSCFD
LINDRITH
SUMMER
1st Stg
2nd
Stg
11
Temperature 107.0 F
Pressure 250.0 psig*
Molar Flow 65.22 MMSCFD
Final
Cooler
Summer
average
ambient is 77°F
This
temperature
period
lasts 90 days
WAT
FIELD
Station
Inlet
Intstg
Cooler
8
11
VAPOR
LOSSES
0.0000 VOC
VENTED TONS/PERIOD
65.0 MMCFD
50 PSIG
SUCTION
250 PSIG
DISCHARGE
Mimics inlet
gas sample
taken
4/28/2010
SLUG
Intstg Liq
0.0000 USGPM
Two Phase
Hydrocarbon
to Storage
0 lb/hr
T-101
T-107
T-102
T-108
T-103
TANK
TEMP
77.00 F
T-104
T-105
T-106


8
Temperature 85.00 F
Pressure 131.2 psig*
Molar Flow 65.22 MMSCFD
Station Inlet
Temperature 53.87 F
Pressure 50.00 psig*
Molar Flow 66.21 MMSCFD
LINDRITH SPRING & FALL
1st Stg
2nd Stg
11
Temperature 85.00 F
Pressure 250.0 psig*
Molar Flow 65.22 MMSCFD
Final Cooler
Intstg Cooler
Station Inlet
WAT
FIELD
65.0 MMCFD
50 PSIG SUCTION
250 PSIG DISCHARGE
Mimics inlet gas sample taken 4/28/2010
SLUG
Intstg Liq
0.0000 USGPM
Two Phase Hydrocarbon to Storage
0 lb/hr
VAPOR LOSSES
0.0000 VOC VENTED TONS/PERIOD
Summer average ambient is 55°F This temperature period lasts 155 days
TANK TEMP
55.00 F
T-101
T-102
T-103
T-104
T-105
T-106
T-107
T-108

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Lindrith CS
City:	
State:	NM
Company:	Enterprise
Type of Tank:	Horizontal Tank
Description:	Lindrith CS TK- / 450 bbl tank 12.75' diameter x 20' tall

Tank Dimensions

Shell Length (ft):	20.00
Diameter (ft):	12.75
Volume (gallons):	18,900.00
Turnovers:	5.56
Net Throughput(gal/yr):	105,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Medium
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Albuquerque, New Mexico (Avg Atmospheric Pressure = 12.15 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Lindrith CS - Horizontal Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 7)	All	67.36	53.93	80.79	59.23	4.0400	3.0751	5.2361	68.0000			92.00	Option 4: RVP=7, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Lindrith CS - Horizontal Tank

Annual Emission Calculations

Standing Losses (lb):	4,401.0851
Vapor Space Volume (cu ft):	1,626.4495
Vapor Density (lb/cu ft):	0.0486
Vapor Space Expansion Factor:	0.3610
Vented Vapor Saturation Factor:	0.4226
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,626.4495
Tank Diameter (ft):	12.7500
Effective Diameter (ft):	18.0233
Vapor Space Outage (ft):	6.3750
Tank Shell Length (ft):	20.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0486
Vapor Molecular Weight (lb/lb-mole):	68.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	4.0400
Daily Avg. Liquid Surface Temp. (deg. R):	527.0322
Daily Average Ambient Temp. (deg. F):	56.1542
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	518.9042
Tank Paint Solar Absorptance (Shell):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,765.3167
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.3610
Daily Vapor Temperature Range (deg. R):	53.7178
Daily Vapor Pressure Range (psia):	2.1810
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	4.0400
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	3.0751
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	5.2561
Daily Avg. Liquid Surface Temp. (deg R):	527.0322
Daily Min. Liquid Surface Temp. (deg R):	513.6028
Daily Max. Liquid Surface Temp. (deg R):	540.4617
Daily Ambient Temp. Range (deg. R):	27.9250
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.4226
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	4.0400
Vapor Space Outage (ft):	6.3750
Working Losses (lb):	686.7932
Vapor Molecular Weight (lb/lb-mole):	68.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	4.0400
Annual Net Throughput (gal/yr.):	105,000.0000
Annual Turnovers:	5.5556
Turnover Factor:	1.0000
Tank Diameter (ft):	12.7500
Working Loss Product Factor:	1.0000
Total Losses (lb):	5,087.8783

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Lindrith CS - Horizontal Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 7)	686.79	4,401.09	5,087.88

Truck Loading

Enterprise Field Services LLC

Lindrith Compressor Station
Part 71 Renewal Application Update

Emissions Calculations
Truck Loading
Source ID No.: TLOAD

Operating Parameters

Loading Rate	20,000	bbls/yr	
	840,000	gallon/yr	
	16,800	gal/hr	(Assume one 400 tank per hour)
Vapor MW	33.76		AspenTech Condensate Analysis
Temp	85	F	Assumed Average
	544	R	
TVP	11.46	psia	@37.8C
Saturation factor	0.6		
Loading Loss	5.32	lb/Mgal	

AP-42 Calculation:	L= 12.46*S*P*M/T
L	Loading Losses (lb/1000)
S	Saturation Factor
P	True Vapor Pressure
M	Molecular weight of vapor
T	Temperature

Estimated Emissions (NonSpeciated)

89.32	lb/hr	Gal/hr / 1000 x L
2.23	tpy	Gal/yr / 1000 x L / 2000 lb/ton

Speciated Truck Loading Emissions (Vapor Phase)

Component	Aspen Analysis Mass Fraction	VOC Aspen Analysis Mass Fraction	VOC Normalized Mass Fraction	lb/hr	tpy
Nitrogen	0.0008				
CO2	0.0089				
Methane	0.1857				
Ethane	0.1969				
Propane	0.2589	0.2589	0.43	38.36	0.96
i-Butane	0.069	0.069	0.11	10.22	0.26
n-Butane	0.1131	0.1131	0.19	16.76	0.42
i-Pentane	0.0481	0.0481	0.08	7.13	0.18
n-Pentane	0.0376	0.0376	0.06	5.57	0.14
n-Hexane	0.0135	0.0135	0.02	2.00	0.05
n-Heptane	0.0142	0.0142	0.02	2.10	0.05
n-Octane	0.0027	0.0027	0.00	0.40	0.01
Cyclopentane	0.0031	0.0031	0.01	0.46	0.01
Benzene	0.002	0.002	0.00	0.30	0.01
Cyclohexane	0.0064	0.0064	0.01	0.95	0.02
2-Mhexane	0.0297	0.0297	0.05	4.40	0.11
25-Mhexane	0.0028	0.0028	0.00	0.41	0.01
Toluene	0.0017	0.0017	0.00	0.25	0.01
H2O	0.0047				
Total	1.00	0.60	1.00	89.32	2.23
Total VOC	0.60	0.60	1.00	89.32	2.23
Total HAP	0.02	0.02	0.04	3.50	0.09

Notes:

1. The speciated truck emissions are based on the AspenTech Condensate analysis (vapor phase) mass fractions. The vapor mass fraction analysis was normalized by deleting all non-VOC components.

loading operation, resulting in high levels of vapor generation and loss. If the turbulence is great enough, liquid droplets will be entrained in the vented vapors.

A second method of loading is submerged loading. Two types are the submerged fill pipe method and the bottom loading method. In the submerged fill pipe method, the fill pipe extends almost to the bottom of the cargo tank. In the bottom loading method, a permanent fill pipe is attached to the cargo tank bottom. During most of submerged loading by both methods, the fill pipe opening is below the liquid surface level. Liquid turbulence is controlled significantly during submerged loading, resulting in much lower vapor generation than encountered during splash loading.

The recent loading history of a cargo carrier is just as important a factor in loading losses as the method of loading. If the carrier has carried a nonvolatile liquid such as fuel oil, or has just been cleaned, it will contain vapor-free air. If it has just carried gasoline and has not been vented, the air in the carrier tank will contain volatile organic vapors, which will be expelled during the loading operation along with newly generated vapors.

Cargo carriers are sometimes designated to transport only one product, and in such cases are practicing "dedicated service". Dedicated gasoline cargo tanks return to a loading terminal containing air fully or partially saturated with vapor from the previous load. Cargo tanks may also be "switch loaded" with various products, so that a nonvolatile product being loaded may expel the vapors remaining from a previous load of a volatile product such as gasoline. These circumstances vary with the type of cargo tank and with the ownership of the carrier, the petroleum liquids being transported, geographic location, and season of the year.

One control measure for vapors displaced during liquid loading is called "vapor balance service", in which the cargo tank retrieves the vapors displaced during product unloading at bulk plants or service stations and transports the vapors back to the loading terminal. Figure 5.2-5 shows a tank truck in vapor balance service filling a service station underground tank and taking on displaced gasoline vapors for return to the terminal. A cargo tank returning to a bulk terminal in vapor balance service normally is saturated with organic vapors, and the presence of these vapors at the start of submerged loading of the tanker truck results in greater loading losses than encountered during nonvapor balance, or "normal", service. Vapor balance service is usually not practiced with marine vessels, although some vessels practice emission control by means of vapor transfer within their own cargo tanks during ballasting operations, discussed below.

Emissions from loading petroleum liquid can be estimated (with a probable error of ±30 percent)[1] using the following expression:

$$L_L = 12.46 \frac{SPM}{T} \quad (1)$$

where:

L_L = loading loss, pounds per 1000 gallons ($lb/10^3$ gal) of liquid loaded

S = a saturation factor (see Table 5.2-1)
P = true vapor pressure of liquid loaded, pounds per square inch absolute (psia) (see Figure 7.1-5, Figure 7.1-6, and Table 7.1-2)
M = molecular weight of vapors, pounds per pound-mole (lb/lb-mole) (see Table 7.1-2)
T = temperature of bulk liquid loaded, °R (°F + 460)

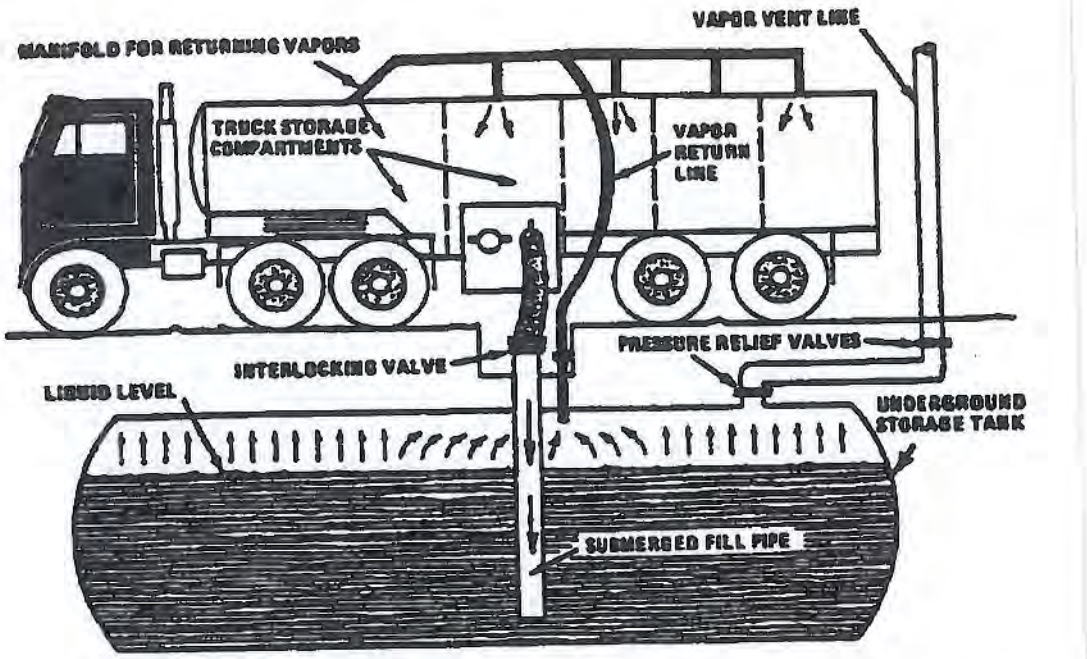


Figure 5.2-5. Tank truck unloading into a service station underground storage tank and practicing "vapor balance" form of emission control.

Table 5.2-1. SATURATION (S) FACTORS FOR CALCULATING PETROLEUM LIQUID LOADING LOSSES

Cargo Carrier	Mode Of Operation	S Factor
Tank trucks and rail tank cars	Submerged loading of a clean cargo tank	0.50
	Submerged loading: dedicated normal service	0.60
	Submerged loading: dedicated vapor balance service	1.00
	Splash loading of a clean cargo tank	1.45
	Splash loading: dedicated normal service	1.45
	Splash loading: dedicated vapor balance service	1.00
Marine vessels[a]	Submerged loading: ships	0.2
	Submerged loading: barges	0.5

[a] For products other than gasoline and crude oil. For marine loading of gasoline, use factors from Table 5.2-2. For marine loading of crude oil, use Equations 2 and 3 and Table 5.2-3.

Fugitives

Enterprise Field Services LLC

Lindrith Compressor Station

Part 71 Renewal Application Update

Operating Parameters

Annual Operation: 8,760 hrs/yr

Emissions Calculations
Fugitive Emissions
Source ID No.: FUGVOC

Pollutant	CAS No.	Stream Composition (Wt%)		Emissions	
		Gas	Light Oil	Average[1] (lbs/hr)	Annual[2] (tons/yr)
Volatile Organic Compounds (VOC)		21.71%	100.00%	0.756	3.310
Benzene	00071-43-2	0.065%		0.001	0.004
n-Hexane	00110-54-3	0.498%		0.007	0.031

(1) Calculated as:
Gas Comp. (wt%) **X** Total Gas Service Emissions (lbs/hr) + Lt Oil Composition (wt%) X Total Lt Oil Service Emisisons (lbs/hr)

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

Component Type	Service	Number of Components[1]	Emission Factors[2]		Hourly Emissions[3] (lbs/hr)
			(kg/hr/source)	(lbs/hr/source)	
Valves	Gas	100	4.5E-03	9.9E-03	0.992
	Light Oil	50	2.5E-03	5.5E-03	0.276
Pump Seals	Gas	0	2.4E-03	5.3E-03	0.000
	Light Oil	2	1.3E-02	2.9E-02	0.057
Other Equipment	Gas	10	8.8E-03	1.9E-02	0.194
	Light Oil	5	7.5E-03	1.7E-02	0.083
Connectors	Gas	50	2.0E-04	4.4E-04	0.022
	Light Oil	25	2.1E-04	4.6E-04	0.012
Flanges	Gas	200	3.9E-04	8.6E-04	0.172
	Light Oil	100	1.1E-04	2.4E-04	0.024
Open-Ended Lines	Gas	5	2.0E-03	4.4E-03	0.022
	Light Oil	0	1.4E-03	3.1E-03	0.000
Totals	Gas	365			1.40
	Light Oil	182			0.45

(1) Number of components is a conservative estimate based on similar installations.

(2) Source: 1995 Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017); Table 2-4. Oil and Gas Production Operations Average Emission Factors (kg/hr/source factors converted to lbs/hr/source by multiplying by 2.20462 lbs/kg)

(3) Calculated as: Number of components **X** Emission Factor (lbs/hr/source)

Enterprise Field Services LLC
Lindrith Compressor Station
Part 71 Renewal Application Update

April 2010 Gas Analysis

Meter Number:	--	**Flow Pressure:**	57
Meter Name:	Lindrith Inlet	**Flow Temp:**	57
Location:		**H20, Lb/MMCF:**	--
Sample Date:	4/28/2010	**H2S, ppmmol:**	--
File name, TCD	Lindrith Inlet.run	**Type:**	Spot
File name, FID	Lindrith Inlet.run	**Pulled by:**	Dennis Bird

Component	Mol%	MolWt	Mol% x MW	Wt%
Carbon Dioxide	0.4879	44.0	0.21	1.03%
Hydrogen Sulfide	0.0000	34.0	0.00	0.00%
Nitrogen	0.6416	28.0	0.18	0.86%
Methane	80.7843	16.0	12.96	62.25%
Ethane	9.7943	30.1	2.95	14.15%
Propane	4.6660	44.1	2.06	9.88%
Isobutane	0.8009	58.1	0.47	2.24%
n-Butane	1.2840	58.1	0.75	3.58%
Isopentane	0.4379	72.2	0.32	1.52%
n-Pentane	0.3499	72.2	0.25	1.21%
Cyclopentane	0.0259	70.1	0.02	0.09%
n-Hexane	0.1203	86.2	0.10	0.50%
Cyclohexane	0.0564	84.2	0.05	0.23%
Other Hexanes	0.2785	86.2000	0.24	1.15%
Heptanes	0.1469	100.2000	0.15	0.71%
Methylcyclohexane	0.0415	98.2	0.04	0.20%
2,2,4 Trimethylpentane	0.0000	114.2	0.00	0.00%
Benzene	0.0172	78.1	0.01	0.06%
Toluene	0.0199	92.1	0.02	0.09%
Ethylbenzene	0.0007	106.2	0.00	0.00%
Xylenes	0.0009	106.2	0.00	0.00%
C8+ Heavies	0.0450	114.2300	0.05	0.25%
Total	**100.0000**		20.82	**100.00%**
	VOC Wt%			21.71%

Maintenance, Startup, and Shutdown

Enterprise Field Services LLC
Lindrith Compressor Station
Part 71 Renewal Application Update

Emissions Calculations
Start Up and Blowdown
Source ID No.: MSS

Maintanence, Startup, and Shutdown Emissions

Pollutant	CAS No.	Stream Composition (Wt%)	Emissions	
		Gas	Hourly (lb/hr)	Annual (tons/yr)
Volatile Organic Compounds (VOC)		21.71%	119.25	23.85
Benzene	00071-43-2	0.06%	0.35	0.07
n-Hexane	00110-54-3	0.50%	2.74	0.55

Gas Molecular Weight: 20.82 lb/lb/mol
Gas Constant 379 scf/lb-mol

Component Type	Blowdown		Hourly lb/hr	Annual tpy
	scf/hr	MMscf/yr		
Total Natural Gas Blown Down for MSS	10,000	4.0	549.26	109.85

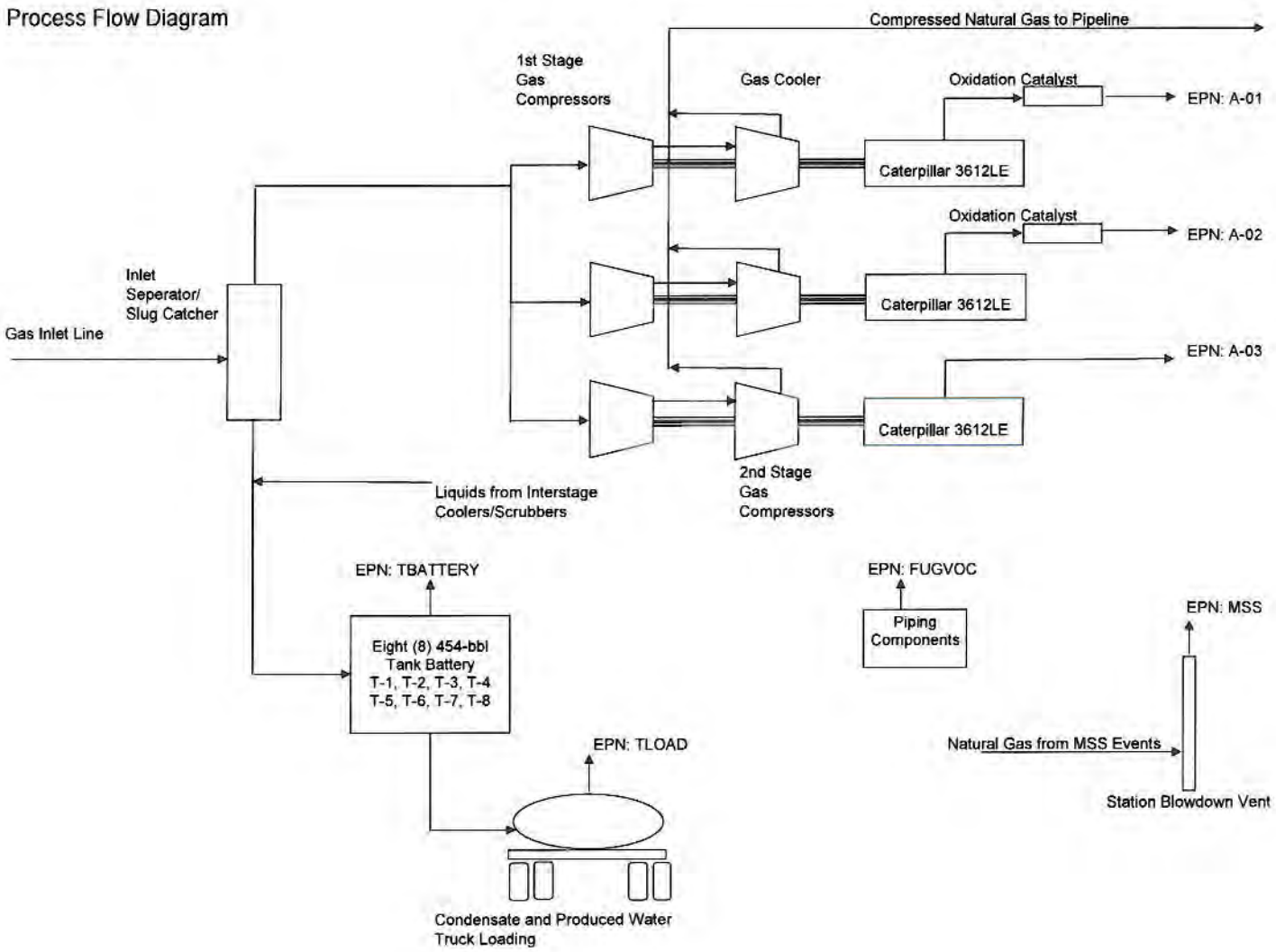
Notes
(1) MSS emissions include gas blowdown for maintenance, startups, and shutdowns.

APPENDIX B

Process Flow Diagram

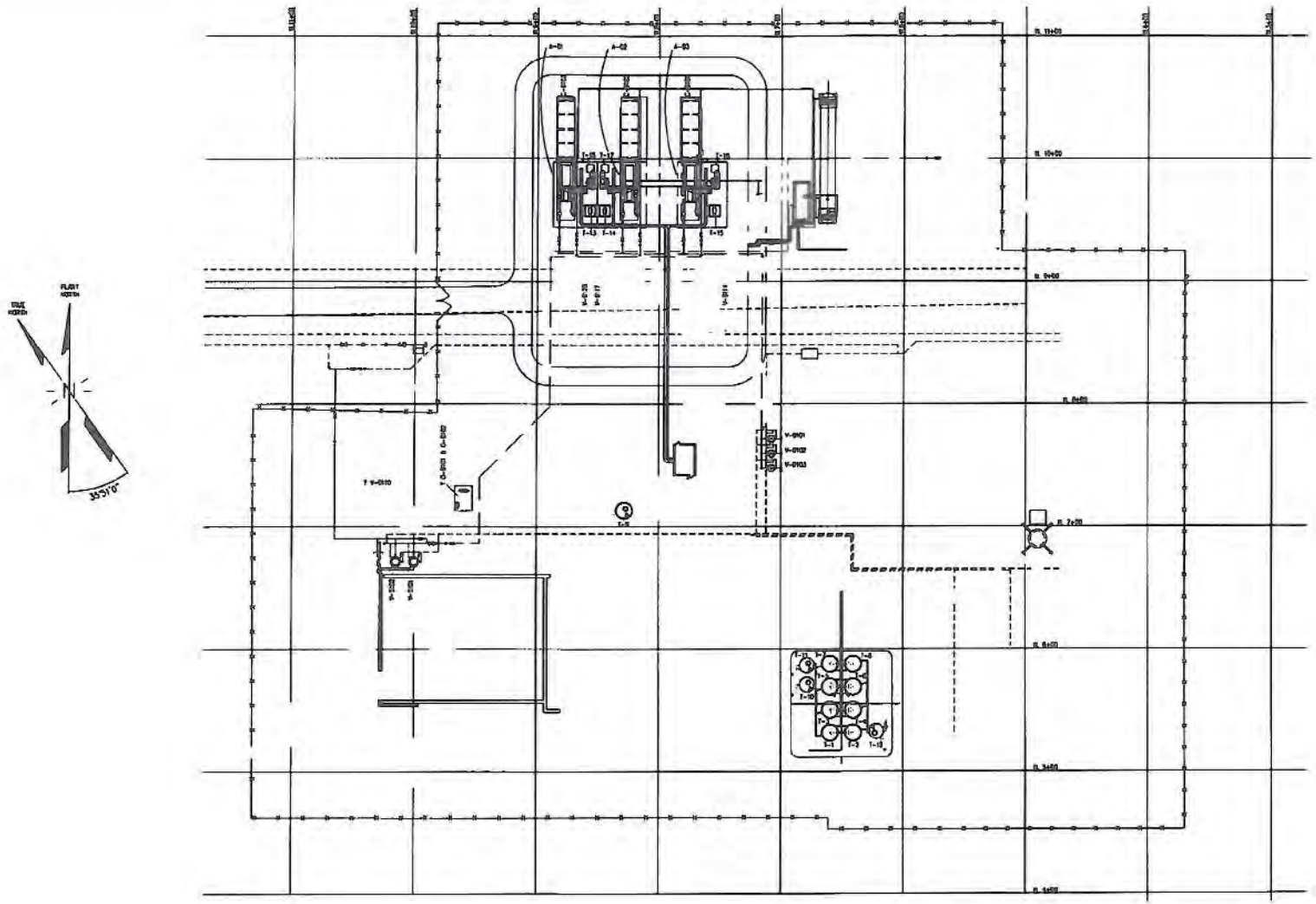
Enterprise Field Services
Lindrith Compressor Station
Part 71 Renewal Application Update

Process Flow Diagram



APPENDIX C

Plot Plan



Lindrith Compressor Station

Equipment Environmental Identification

Permit ID	Optional ID	Description	Size	Emission Controls
A-01	Unit 0103	Caterpillar 3612	3267 hp	Catalytic Oxidation System
A-02	Unit 0102	Caterpillar 3612	3267 hp	Catalytic Oxidation System
A-03	Unit 0101	Caterpillar 3612	3267 hp	None
T-1	T-1	Water Storage	454 bbl	None
T-2	T-2	Water Storage	454 bbl	None
T-3	T-3	Water Storage	454 bbl	None
T-4	T-4	Condensate / Produced Water Storage	454 bbl	None
T-5	T-5	Produced Water Storage	454 bbl	None
T-6	T-6	Produced Water Storage	454 bbl	None
T-7	T-7	Produced Water Storage	454 bbl	None
T-8	T-8	Produced Water Storage	454 bbl	None
T-9	T-9	Compressor Skid Drain Sump Tank	120 bbl	None
T-10	T-10	Water Separation Tank	120 bbl	None
T-11	T-11	Water Separation Tank	120 bbl	None
T-12	T-12	Water Separation Tank	120 bbl	None
T-13	T-13	Lube Oil Storage	500 gal	None
T-14	T-14	Lube Oil Storage	500 gal	None
T-15	T-15	Lube Oil Storage	500 gal	None
T-16	T-16	Ambitrol Storage	500 gal	None
T-17	T-17	Ambitrol Storage	500 gal	None
T-18	T-18	Ambitrol Storage	500 gal	None

REV	DATE	REVISION	BY	CHK'D	ENGR.
8	05/03/16	REVISED DESIGNS FOR ENVIRONMENTAL DEPT	GS		
8	04/19/16	REVISED LINES AND LEGEND	LB		
7	12/11/03	ADDED EQUIPMENT & CHED STATUS - ISSUED FOR CONSTRUCTION	KS		KS
6	01/17/03	REVISED LAYOUT PER VEU	FJP		KS
5		REVISED FOR EXPANSION CONSTRUCTION	JMF		
4	05/01/02	REVISED FOR CONSTRUCTION	mbb	LBH	
3	03/14/02	REVISED FOR CONSTRUCTION	JMF	LBH	
2	02/21/02	REVISED FOR CONSTRUCTION	JMF	LBH	
1	02/05/02	REVISED FOR CONSTRUCTION	JMF	CDM	
0	02/11/02	ISSUED FOR CONSTRUCTION	CDM		

NOTES:

ENTERPRISE FIELD SERVICES LLC

LINDRITH STATION
PLOT PLAN

LINDRITH STATION — RIO ARRIBA, NM

DRAWN: JMF — DATE: 08/17/01

JA NO. 8357.040 — FILE NAME LD-01-P0011

A/E NO. — SCALE 1"=40'

BASE NO. 15403

DWG NO. LD-01-P0011 — 0