Received
April 21, 2021
WV DEP/Div of Air Quality

Division of Air Quality Permit Application Submittal

Please find attached a permit application for : Columbia Gas Transmission, LLC, Walgrove Compressor Station
[Company Name; Facility Location]

- DAQ Facility ID (for existing facilities only): 039-00074
- Current 45CSR13 and 45CSR30 (Title V) permits associated with this process (for existing facilities only): R30-03900074-2016

- Type of NSR Application (check all that apply):
  - ☐ Construction
  - ☐ Modification
  - ☐ Class I Administrative Update
  - ☐ Class II Administrative Update
  - ☐ Relocation
  - ☐ Temporary
  - ☐ Permit Determination

- Type of 45CSR30 (TITLE V) Application:
  - ☐ Title V Initial
  - ☑ Title V Renewal
  - ☐ Administrative Amendment**
  - ☐ Minor Modification**
  - ☐ Significant Modification**
  - ☐ Off Permit Change

****If the box above is checked, include the Title V revision information as ATTACHMENT S to the combined NSR/Title V application.**

- Payment Type:
  - ☐ Credit Card (Instructions to pay by credit card will be sent in the Application Status email.)
  - ☐ Check (Make checks payable to: WVDEP – Division of Air Quality)
    Mail checks to:
    WVDEP – DAQ – Permitting
    Attn: NSR Permitting Secretary
    601 57th Street, SE
    Charleston, WV 25304

Please wait until DAQ emails you the Facility ID Number and Permit Application Number. Please add these identifiers to your check or cover letter with your check.

- If the permit writer has any questions, please contact (all that apply):
  - ☐ Responsible Official/Authorized Representative
    - Name:
    - Email:
    - Phone Number:
  - ☑ Company Contact
    - Name: Trevor Galley
    - Email: trevor_galley@tcenergy.com
    - Phone Number: 304-357-2076
  - ☐ Consultant
    - Name:
    - Email:
    - Phone Number:

Columbia Gas Transmission, LLC
1700 MacCorkle Avenue SE
Charleston, WV 25314

April 21, 2021

Director
WV Department of Environmental Protection (WVDEP)
Division of Air Quality (DAQ)
601 57th Street SE
Charleston, WV 25304

Re: Columbia Gas Transmission, LLC (Columbia)
Walgrove Compressor Station (Facility ID: 039 – 00074)
Title V Operating Permit Renewal Application

Dear Director,

In accordance WV 45CSR30, please find the attached Title V permit renewal application for Columbia's Walgrove Compressor Station, which is located in Kanawha County, West Virginia. Walgrove Compressor Station currently operates under Permit No. R30-03900074-2016 under 45CSR30. The current Title V Permit to Operate expires on November 21, 2021.

This package contains the general application forms along with the required attachments for a Title V renewal permit application. Walgrove Compressor Station's Potential to Emit (PTE) exceeds 100 tons per year for Nitrogen Oxides (NO_x); therefore, Walgrove is considered a Title V source for permitting purposes.

Should you have any questions regarding the application or if additional information is required, please contact me by email at trevor_galley@tcenergy.com.

Sincerely,

Trevor Galley
Environmental Analyst
TC Energy

Columbia Gas Transmission, LLC

Air Permit Application for Renewal
Walgrove Natural Gas Compressor Station

Elkview, West Virginia

Prepared By:

ENVIRONMENTAL RESOURCES MANAGEMENT, Inc.
Hurricane, West Virginia

April 2021

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

601 57th Street SE
Charleston, WV 25304
Phone: (304) 926-0475
www.dep.wv.gov/daq

Received
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WV DEP/Div of Air Quality

INITIAL/RENEWAL TITLE V PERMIT APPLICATION - GENERAL FORMS

Section 1: General Information

1. **Name of Applicant (As registered with the WV Secretary of State's Office):** Columbia Gas Transmission, LLC	**2. Facility Name or Location:** Walgrove Compressor Station
3. DAQ Plant ID No.: 039-00074	**4. Federal Employer ID No. (FEIN):** 31-0802435-30

5. **Permit Application Type:**

- ☐ Initial Permit — When did operations commence? 1958
- ☒ Permit Renewal — What is the expiration date of the existing permit? 11/21/2021
- ☐ Update to Initial/Renewal Permit Application

6. Type of Business Entity:

☐ Corporation ☐ Governmental Agency ☒ LLC
☐ Partnership ☐ Limited Partnership

7. Is the Applicant the:

☐ Owner ☐ Operator ☒ Both

If the Applicant is not both the owner and operator, please provide the name and address of the other party.

_____
_____
_____

8. Number of onsite employees:

Less than ten (10) employees

9. Governmental Code:

- ☒ Privately owned and operated; 0
- ☐ Federally owned and operated; 1
- ☐ State government owned and operated; 2
- ☐ County government owned and operated; 3
- ☐ Municipality government owned and operated; 4
- ☐ District government owned and operated; 5

10. Business Confidentiality Claims

Does this application include confidential information (per 45CSR31)? ☐ Yes ☒ No

If yes, identify each segment of information on each page that is submitted as confidential, and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's *"PRECAUTIONARY NOTICE-CLAIMS OF CONFIDENTIALITY"* guidance.

11. Mailing Address		
Street or P.O. Box: 1700 MacCorkle Avenue, SE		
City: Charleston	**State:** WV	**Zip:** 25314
Telephone Number: (304) 357-2047	**Fax Number:** (304) 357-2770	

12. Facility Location		
Street: 367 Walgrove Rd	**City:** Elkview	**County:** Kanawha
UTM Easting: 461.60 km	**UTM Northing:** 4,257.41 km	**Zone:** ☒ 17 or ☐ 18
Directions: Traveling I-79 N from Charleston, exit at Elkview and turn right. Go a short distance to US Route 119. Turn left and proceed on US Rt. 119 to the town of Blue Creek. Turn right onto Secondary Route 57, travel across the elk river and turn left at the intersection. The station is approximately 1.5 miles from the intersection on the left		
Portable Source? ☐ Yes ☒ No		
Is facility located within a nonattainment area? ☐ Yes ☒ No		**If yes, for what air pollutants?**
Is facility located within 50 miles of another state? ☒ Yes ☐ No		**If yes, name the affected state(s).** Ohio
Is facility located within 100 km of a Class I Area[1]? ☐ Yes ☒ No **If no, do emissions impact a Class I Area[1]?** ☐ Yes ☒ No		**If yes, name the area(s).**

[1] *Class I areas include Dolly Sods and Otter Creek Wilderness Areas in West Virginia, and Shenandoah National Park and James River Face Wilderness Area in Virginia.*

13. Contact Information		
Responsible Official: Timothy Chambers		**Title:** Operations Manager
Street or P.O. Box: 1700 MacCorkle Avenue, SE		
City: Charleston	**State:** WV	**Zip:** 25314
Telephone Number: (681)-230-3005	**Fax Number:**	
E-mail address: timothy_chambers@tcenergy.com		
Environmental Contact: Trevor Galley		**Title:** Environmental Analyst
Street or P.O. Box: 1700 MacCorkle Avenue, SE		
City: Charleston	**State:** WV	**Zip:** 25314
Telephone Number: (304) 357-2076	**Fax Number:**	
E-mail address: trevor_galley@tcenergy.com		
Application Preparer: Grant Morgan		**Title:** Principal Consultant
Company: ERM (Environmental Resources Managment)		
Street or P.O. Box: 204 Chase Drive		
City: Hurricane	**State:** WV	**Zip:** 25526
Telephone Number: (304)-590-6160	**Fax Number:**	
E-mail address: Grant.Morgan@erm.com		

14. Facility Description

List all processes, products, NAICS and SIC codes for normal operation, in order of priority. Also list any process, products, NAICS and SIC codes associated with any alternative operating scenarios if different from those listed for normal operation.

Process	Products	NAICS	SIC
Natural Gas Transmission	Natural Gas	486210	4922

Provide a general description of operations.

Walgrove Compressor Station is a natural gas transmission facility covered by Standard Industrial Classification (SIC) Code 4922. The station has the potential to operate twenty-four (24) hours per day, seven (7) days per week, fifty-two (52) weeks per year. The station consists of one (1) 880 hp, 2SLB reciprocating engine and one (1) 440 hp, 4SRB reciprocating engine/generator.

15. Provide an **Area Map** showing plant location as **ATTACHMENT A**.

16. Provide a **Plot Plan(s)**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is located as **ATTACHMENT B**. For instructions, refer to "Plot Plan - Guidelines."

17. Provide a detailed **Process Flow Diagram(s)** showing each process or emissions unit as **ATTACHMENT C**. Process Flow Diagrams should show all emission units, control equipment, emission points, and their relationships.

Section 2: Applicable Requirements

18. Applicable Requirements Summary	
Instructions: Mark all applicable requirements.	
☒ SIP	☐ FIP
☒ Minor source NSR (45CSR13)	☐ PSD (45CSR14)
☒ NESHAP (45CSR34)	☐ Nonattainment NSR (45CSR19)
☐ Section 111 NSPS	☐ Section 112(d) MACT standards
☐ Section 112(g) Case-by-case MACT	☐ 112(r) RMP
☐ Section 112(i) Early reduction of HAP	☐ Consumer/commercial prod. reqts., section 183(e)
☐ Section 129 Standards/Reqts.	☐ Stratospheric ozone (Title VI)
☐ Tank vessel reqt., section 183(f)	☐ Emissions cap 45CSR§30-2.6.1
☐ NAAQS, increments or visibility (temp. sources)	☐ 45CSR27 State enforceable only rule
☒ 45CSR4 State enforceable only rule	☐ Acid Rain (Title IV, 45CSR33)
☐ Emissions Trading and Banking (45CSR28)	☐ **C**ompliance **A**ssurance **M**onitoring (40CFR64)
☐ CAIR NO_x Annual Trading Program (45CSR39)	☐ CAIR NO_x Ozone Season Trading Program (45CSR40)
☐ CAIR SO_2 Trading Program (45CSR41)	

19. Non Applicability Determinations

List all requirements which the source has determined not applicable and for which a permit shield is requested. The listing shall also include the rule citation and the reason why the shield applies.

45CSR4 – ***To Prevent and Control the Discharge of Air Pollutants into the Open Air Which Causes or Contributes to an Objectionable Odor or Odors:*** According to 45CSR§4-7.1, this rule shall not apply to the following sources of objectionable odor until such time as feasible control methods are developed: Internal Combustion Engines

45CSR10 – ***To Prevent and Control Air Pollution from the Emission of Sulfur Oxides:*** 45CSR10 is not applicable to natural gas fired engines

45CSR21 – ***To Prevent and Control Air Pollution from the Emission of Volatile Organic Compounds:*** All storage tanks at the station, which are listed as insignificant sources, are below 40,000 gallons in capacity which exempts the facility from 45CSR§21-28. The compressor station is not engaged in the extraction or fractionation of natural gas which exempts the facility from 45CSR§21-29

45CSR27 – ***To Prevent and Control the Emissions of Toxic Air Pollutants:*** Natural gas is included as a petroleum product and contains less than 5% benzene by weight. 45CSR§27-2.4 exempts equipment "used in the production and distribution of petroleum products providing that such equipment does not produce or contact materials containing more than 5% benzene by weight."

☒ Permit Shield

19. Non Applicability Determinations *(Continued)* *- Attach additional pages as necessary.*

List all requirements which the source has determined not applicable and for which a permit shield is requested. The listing shall also include the rule citation and the reason why the shield applies.

40 CFR 60 Subpart GG – ***Standards of Performance for Stationary Gas Turbines:*** There are no turbine engines at this facility.

40 CFR 60 Subparts K,Ka – ***Standards of Performance for Storage Vessels for Petroleum Liquids:*** All tanks at the facility are below 40,000 gallons in capacity as specified in 60.110a(a)

40 CFR 60 Subpart Kb – ***Standards of Performance for Volatile Organic Liquid*** S***torage Vessels:*** All tanks at the facility are below 75m^3 (19,813 gallons) in capacity as specified in 60.110b(a)

40 CFR 60 Subpart KKK – ***Standards of Performance for Equipment Leaks of VOC From Onshore Natural Gas Processing Plant:*** This compressor station is not engaged in the extraction or fractionation of natural gas liquids from field gas, the fractionation of mixed natural gas liquids to natural gas products, or both.

40 CFR 60 Subpart IIII – ***Standards of Performance for Stationary Compression Ignition Internal Combustion Engines***: There are no compression ignition engines at this facility.

40 CFR 60 Subpart JJJJ – ***Standards of Performance for Stationary Spark Ignition Internal Combustion Engines:*** All engines at the facility were constructed, reconstructed, or modified prior to the June 12, 2006 applicability date listed in 60.4230(a)(4).

40 CFR 60 Subpart KKKK – ***Standards of Performance for Stationary Combustion Turbines*** – There are no turbine engines at this facility.

40 CFR 60 Subpart OOOO – ***Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution***: The storage vessel requirement defined for transmission sources is not applicable to this site because all vessels commenced construction, prior to August 23, 2011 in accordance with the applicability criteria defined within [40CFR§60.5365(e)]. No other affected sources were identified at this site.

40 CFR 60 Subpart OOOOa – ***Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification, or Reconstruction Commenced after September 18, 2015***. The GHG and VOC requirements defined by this NSPS are not applicable to this site because all affected sources commenced constructed prior to September 18, 2015 in accordance with [40CFR§60.5365a]

40 CFR 63 Subpart HHH – ***National Emission Standards for Hazardous Air Pollutants from Natural gas Transmission and Storage Facilities:*** This subpart does not apply to the facility since it is not a major source of HAPs as defined in 40CFR§63.1270(a) and does not operate a dehydration process.

40 CFR 63 Subpart YYYY – ***Turbine MACT***: There are no turbine engines at this facility.

40 CFR 64 ***– Compliance Assurance Monitoring (CAM):*** There are no add-on controls at this facility; therefore, in accordance with 40CFR§64.2(b)(1), CAM is not applicable to this facility.

☒ Permit Shield

20. Facility-Wide Applicable Requirements

List all facility-wide applicable requirements. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*).

T5 – 3.1.1 – 45 CSR 6-3.1 – Open burning prohibited
T5 – 3.1.2 – 45 CSR 6-3.2 – Open burning exemption stipulations
T5 – 3.1.3 – 40 CFR Part 61 and 45 CSR 34 – Asbestos inspection and removal
T5 – 3.1.4 – 45 CSR 4 – No objectionable odors
T5 – 3.1.5 – 45 CSR 11-5.2 – Standby plans for emergency episodes
T5 – 3.1.6 – WV Code 22-5-4 (a) (14) – Annual emission inventory reporting
T5 – 3.1.7 – 40 CFR Part 82 Subpart F – Ozone depleting substances
T5 – 3.1.8 – 40 CFR Part 68 – Risk Management Plan
T5 – 3.1.9 – 45 CSR 30-12.7 – Odor Control for Mercaptan
T5 – 3.1.10 – 45 CSR 30-12.7 – Emergency Operating Conditions / unit replacement
T5 – 3.3.1 – 45 CSR 22-5-4(a)(14-15) & 45CSR13 - Stack Testing - Conduct stack testing as required
T5 – 3.4.1 – 45 CSR 30-5.1 - Monitoring information – general monitoring requirements
T5 – 3.4.2 – 45 CSR 30-5.1 - Retention of records - Maintain records for a period of 5 years
T5 – 3.4.3 – 45 CSR 30-5.1 - Odors - Maintain records of odor complaints and corrective actions
T5 – 3.4.4 – 45 CSR 17.3 – Fugitive PM shall not cause statutory Air Pollution
T5 – 3.5.1 – 45 CSR 30-4.4. and 5.1.c.3.D – All documents required by permit shall be certified by a Responsible Official
T5 – 3.5.2 – 45 CSR 30-5.1.c.3.E. - A permittee may request confidential treatment
T5 – 3.5.3 – 45 CSR 30-5 - Communication required or permitted to be made to the DEP and/or USEPA
T5 – 3.5.4 – 45 CSR 30-8 - Certified emissions statement – Operator will Submit a certified emissions statement and pay fees on an annual basis
T5 – 3.5.5 – 45 CSR 30-5.3.e. - Compliance certification. The permittee shall certify compliance with the conditions of this permit on the forms provided by the DAQ
T5 – 3.5.6 – 45 SR§30-5.1.c.3.A - Semi-annual monitoring reports.
T5 – 3.5.7 – 45 CSR 30-5.7.a through e. - Emergencies
T5 – 3.5.8 – 45 CSR 30-5.1.c.3.B. and C. - Deviations
T5 – 3.5.9 – 45 CSR 30-4.3.h.1.B. New applicable requirements. If any requirement is promulgated, the permittee will meet such requirements on a timely basis
T5 – 3.5.10 – 45 CSR 30-5.1.c.3.C. Natural Gas Use certification during Compliance Certification

☒ Permit Shield

For all facility-wide applicable requirements listed above, provide monitoring/testing / recordkeeping / reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number and/or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

T5 – 3.1.3 – 40 CFR Part 61 and 45 CSR 34 – Prior to demolition/construction buildings will be inspected for asbestos and documented accordingly
T5 – 3.1.4 – 45 CSR 4 – Permittee shall maintain records of all odor complaints received
T5 – 3.1.5 – 45 CSR 11 – Upon request by the Secretary, the permittee shall prepare a standby plan
T5 – 3.1.6 – WV 22-5-4 – The permittee shall submit annual emission inventory reports
T5 – 3.1.7 – 40 CFR Part 82 Subpart F – The permittee will prohibit maintenance, service, or repair of appliances containing ozone depleting substances without persons certified pursuant to 40 CFR 82.161
T5 – 3.1.8 – 40 CFR Part 68 – Should the permittee become subject to 40 CFR Part 68, a RMP shall be submitted
T5 – 3.1.10 – 45CSR§30-12.7 For emergency situations which interrupt the critical supply of natural gas to the public, and which pose a life threatening circumstance to the customer, the permittee is allowed to temporarily replace failed engine(s). Proper notice will be provided to the WVDAQ
T5 – 3.3.1 – 45 CSR 22-5-4 Stack Testing – All protocols and reports will be submitted to the WVDAQ
T5 – 3.4.1 & 3.4.2 – 45 CSR 30-5.1 Retention of Records - Maintain records of all information required by permit for 5 yrs.
T5 – 3.4.3 – 45 CSR 30-5.1 Odors - Maintain records of all odor complaints and responses.
T5 – 3.5.1 – 45 CSR 30-4.4 ***and*** 5.1 Responsible Official - Reports, certifications, etc. shall contain a certification by the responsible official.

T5 – 3.5.4 – 45 CSR 30-8 Certified emissions statement – Operator will Submit a certified emissions statement and pay fees on an annual basis
T5 – 3.5.5 – 45 SR§30-5.3.e Compliance Certification - Prepare and submit an emission inventory as requested

T5 – 3.5.6 – 45 CSR§30-5.1.c.3.A. Semi-annual monitoring reports.
T5 – 3.5.7 – 45 CSR30-5.7.a through e. - For reporting emergency situations, refer to Section 2.17 of this permit
T5 – 3.5.8 – 45 CSR 30-5.1.c.3.B. and C. – Deviations, In addition to required monitoring reports, the permittee shall promptly submit supplemental reports and notices of deviations / include upset conditions, cause of deviation (s) and corrective actions.
T5 – 3.5.9 – 45 CSR 30-4.3.h.1.B. New applicable requirements. If any requirement is promulgated, the permittee will meet such requirements on a timely basis
T5 – 3.5.10 – 45 CSR 30-5.1.c.3.C. During compliance certification, the facility shall certify that the facility burns natural gas in all stationary equipment except, when applicable, for emergency equipment.

Are you in compliance with all facility-wide applicable requirements? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

21. Active Permits/Consent Orders		
Permit or Consent Order Number	Date of Issuance MM/DD/YYYY	List any Permit Determinations that Affect the Permit *(if any)*
R30-03900074-2016	11/21/2016	
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22. Inactive Permits/Obsolete Permit Conditions		
Permit Number	Date of Issuance	Permit Condition Number
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Section 3: Facility-Wide Emissions

23. Facility-Wide Emissions Summary [Tons per Year]	
Criteria Pollutants	Potential Emissions
Carbon Monoxide (CO)	25.25
Nitrogen Oxides (NO_X)	240.85
Lead (Pb)	-
Particulate Matter ($PM_{2.5}$)[1]	0.39
Particulate Matter (PM_{10})[1]	0.39
Total Particulate Matter (TSP)	
Sulfur Dioxide (SO_2)	0.03
Volatile Organic Compounds (VOC)	4.84
Hazardous Air Pollutants[2]	Potential Emissions
Benzene	0.10
Toluene	0.04
Ethylbenzene	<0.01
Xylene	<0.01
n-Hexane	0.02
Formaldehyde	2.29
Acetaldehyde	
Total HAPs	3.38
Regulated Pollutants other than Criteria and HAP	Potential Emissions
$CO2_e$	6,822.81

[1]$PM_{2.5}$ and PM_{10} are components of TSP.
[2]For HAPs that are also considered PM or VOCs, emissions should be included in both the HAPs section and the Criteria Pollutants section.

Section 4: Insignificant Activities

24. Insignificant Activities (Check all that apply)		
☒	1.	Air compressors and pneumatically operated equipment, including hand tools.
☐	2.	Air contaminant detectors or recorders, combustion controllers or shutoffs.
☒	3.	Any consumer product used in the same manner as in normal consumer use, provided the use results in a duration and frequency of exposure which are not greater than those experienced by consumer, and which may include, but not be limited to, personal use items; janitorial cleaning supplies, office supplies and supplies to maintain copying equipment.
☒	4.	Bathroom/toilet vent emissions.
☒	5.	Batteries and battery charging stations, except at battery manufacturing plants.
☐	6.	Bench-scale laboratory equipment used for physical or chemical analysis, but not lab fume hoods or vents. Many lab fume hoods or vents might qualify for treatment as insignificant (depending on the applicable SIP) or be grouped together for purposes of description.
☐	7.	Blacksmith forges.
☐	8.	Boiler water treatment operations, not including cooling towers.
☒	9.	Brazing, soldering or welding equipment used as an auxiliary to the principal equipment at the source.
☐	10.	CO_2 lasers, used only on metals and other materials which do not emit HAP in the process.
☒	11.	Combustion emissions from propulsion of mobile sources, except for vessel emissions from Outer Continental Shelf sources.
☒	12.	Combustion units designed and used exclusively for comfort heating that use liquid petroleum gas or natural gas as fuel.
☒	13.	Comfort air conditioning or ventilation systems not used to remove air contaminants generated by or released from specific units of equipment.
☐	14.	Demineralized water tanks and demineralizer vents.
☐	15.	Drop hammers or hydraulic presses for forging or metalworking.
☐	16.	Electric or steam-heated drying ovens and autoclaves, but not the emissions from the articles or substances being processed in the ovens or autoclaves or the boilers delivering the steam.
☐	17.	Emergency (backup) electrical generators at residential locations.

24. Insignificant Activities (Check all that apply)		
☐	18.	Emergency road flares.
☒	19.	Emission units which do not have any applicable requirements and which emit criteria pollutants (CO, NO_x, SO_2, VOC and PM) into the atmosphere at a rate of less than 1 pound per hour and less than 10,000 pounds per year aggregate total for each criteria pollutant from all emission units. Please specify all emission units for which this exemption applies along with the quantity of criteria pollutants emitted on an hourly and annual basis: SEE APPENDIX A
☐	20.	Emission units which do not have any applicable requirements and which emit hazardous air pollutants into the atmosphere at a rate of less than 0.1 pounds per hour and less than 1,000 pounds per year aggregate total for all HAPs from all emission sources. This limitation cannot be used for any source which emits dioxin/furans nor for toxic air pollutants as per 45CSR27. Please specify all emission units for which this exemption applies along with the quantity of hazardous air pollutants emitted on an hourly and annual basis: SEE APPENDIX A
☐	21.	Environmental chambers not using hazardous air pollutant (HAP) gases.
☒	22.	Equipment on the premises of industrial and manufacturing operations used solely for the purpose of preparing food for human consumption.
☐	23.	Equipment used exclusively to slaughter animals, but not including other equipment at slaughterhouses, such as rendering cookers, boilers, heating plants, incinerators, and electrical power generating equipment.
☒	24.	Equipment used for quality control/assurance or inspection purposes, including sampling equipment used to withdraw materials for analysis.
☐	25.	Equipment used for surface coating, painting, dipping or spray operations, except those that will emit VOC or HAP.
☒	26.	Fire suppression systems.
☒	27.	Firefighting equipment and the equipment used to train firefighters.
☒	28.	Flares used solely to indicate danger to the public.
☒	29.	Fugitive emission related to movement of passenger vehicle provided the emissions are not counted for applicability purposes and any required fugitive dust control plan or its equivalent is submitted.
☐	30.	Hand-held applicator equipment for hot melt adhesives with no VOC in the adhesive formulation.
☒	31.	Hand-held equipment for buffing, polishing, cutting, drilling, sawing, grinding, turning or machining wood, metal or plastic.
☐	32.	Humidity chambers.

24. Insignificant Activities (Check all that apply)		
☒	33.	Hydraulic and hydrostatic testing equipment.
☒	34.	Indoor or outdoor kerosene heaters.
☒	35.	Internal combustion engines used for landscaping purposes.
☐	36.	Laser trimmers using dust collection to prevent fugitive emissions.
☐	37.	Laundry activities, except for dry-cleaning and steam boilers.
☒	38.	Natural gas pressure regulator vents, excluding venting at oil and gas production facilities.
☐	39.	Oxygen scavenging (de-aeration) of water.
☐	40.	Ozone generators.
☒	41.	Plant maintenance and upkeep activities (e.g., grounds-keeping, general repairs, cleaning, painting, welding, plumbing, re-tarring roofs, installing insulation, and paving parking lots) provided these activities are not conducted as part of a manufacturing process, are not related to the source's primary business activity, and not otherwise triggering a permit modification. (Cleaning and painting activities qualify if they are not subject to VOC or HAP control requirements. Asphalt batch plant owners/operators must still get a permit if otherwise requested.)
☒	42.	Portable electrical generators that can be moved by hand from one location to another. "Moved by Hand" means that it can be moved without the assistance of any motorized or non-motorized vehicle, conveyance, or device.
☐	43.	Process water filtration systems and demineralizers.
☒	44.	Repair or maintenance shop activities not related to the source's primary business activity, not including emissions from surface coating or de-greasing (solvent metal cleaning) activities, and not otherwise triggering a permit modification.
☐	45.	Repairs or maintenance where no structural repairs are made and where no new air pollutant emitting facilities are installed or modified.
☐	46.	Routing calibration and maintenance of laboratory equipment or other analytical instruments.
☐	47.	Salt baths using nonvolatile salts that do not result in emissions of any regulated air pollutants. Shock chambers.
☐	48.	Shock chambers.
☐	49.	Solar simulators.
☒	50.	Space heaters operating by direct heat transfer.
☐	51.	Steam cleaning operations.
☐	52.	Steam leaks.
☐	53.	Steam sterilizers.
☒	54.	Steam vents and safety relief valves.
☐	55.	Storage tanks, reservoirs, and pumping and handling equipment of any size containing soaps, vegetable oil, grease, animal fat, and nonvolatile aqueous salt solutions, provided appropriate lids and covers are utilized.
☐	56.	Storage tanks, vessels, and containers holding or storing liquid substances that will not emit any VOC or HAP. Exemptions for storage tanks containing petroleum liquids or other volatile organic liquids should be based on size limits such as storage tank capacity and vapor pressure of liquids stored and are not appropriate for this list.
☐	57.	Such other sources or activities as the Director may determine.
☒	58.	Tobacco smoking rooms and areas.
☒	59.	Vents from continuous emissions monitors and other analyzers.

Section 5: Emission Units, Control Devices, and Emission Points

25. Equipment Table
Fill out the **Title V Equipment Table** and provide it as **ATTACHMENT D**.
26. Emission Units
For each emission unit listed in the **Title V Equipment Table**, fill out and provide an **Emission Unit Form** as **ATTACHMENT E**.
For each emission unit not in compliance with an applicable requirement, fill out a **Schedule of Compliance Form** as **ATTACHMENT F**.
27. Control Devices
For each control device listed in the **Title V Equipment Table**, fill out and provide an **Air Pollution Control Device Form** as **ATTACHMENT G**.
For any control device that is required on an emission unit in order to meet a standard or limitation for which the potential pre-control device emissions of an applicable regulated air pollutant is greater than or equal to the Title V Major Source Threshold Level, refer to the **Compliance Assurance Monitoring (CAM) Form(s)** for CAM applicability. Fill out and provide these forms, if applicable, for each Pollutant Specific Emission Unit (PSEU) as **ATTACHMENT H**.

Section 6: Certification of Information

28. Certification of Truth, Accuracy and Completeness and Certification of Compliance

*Note: This Certification must be signed by a responsible official. The **original**, signed in **blue ink**, must be submitted with the application. Applications without an **original** signed certification will be considered as incomplete.*

a. Certification of Truth, Accuracy and Completeness

I certify that I am a responsible official (as defined at 45CSR§30-2.38) and am accordingly authorized to make this submission on behalf of the owners or operators of the source described in this document and its attachments. I certify under penalty of law that I have personally examined and am familiar with the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine and/or imprisonment.

b. Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

Responsible official (type or print)

Name: Timothy Chambers	Title: Operations Manager

Responsible official's signature:

Signature: _____ Signature Date: 4-20-2021
(Must be signed and dated in blue ink)

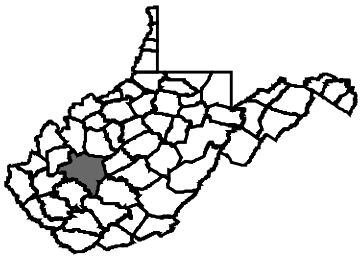
Received
April 21, 2021
WV DEP/Div of Air Quality

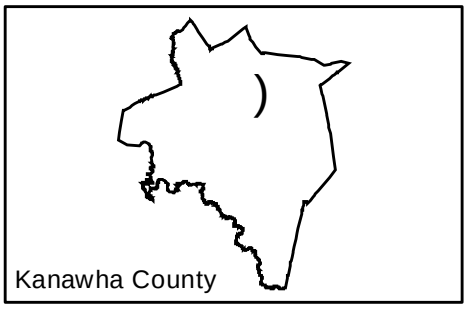
Note: Please check all applicable attachments included with this permit application:

☑	ATTACHMENT A: Area Map
☑	ATTACHMENT B: Plot Plan(s)
☑	ATTACHMENT C: Process Flow Diagram(s)
☑	ATTACHMENT D: Equipment Table
☑	ATTACHMENT E: Emission Unit Form(s)
☐	ATTACHMENT F: Schedule of Compliance Form(s)
☐	ATTACHMENT G: Air Pollution Control Device Form(s)
☐	ATTACHMENT H: Compliance Assurance Monitoring (CAM) Form(s)

All of the required forms and additional information can be found and downloaded from, the DEP website at www.dep.wv.gov/daq, requested by phone (304) 926-0475, and/or obtained through the mail.

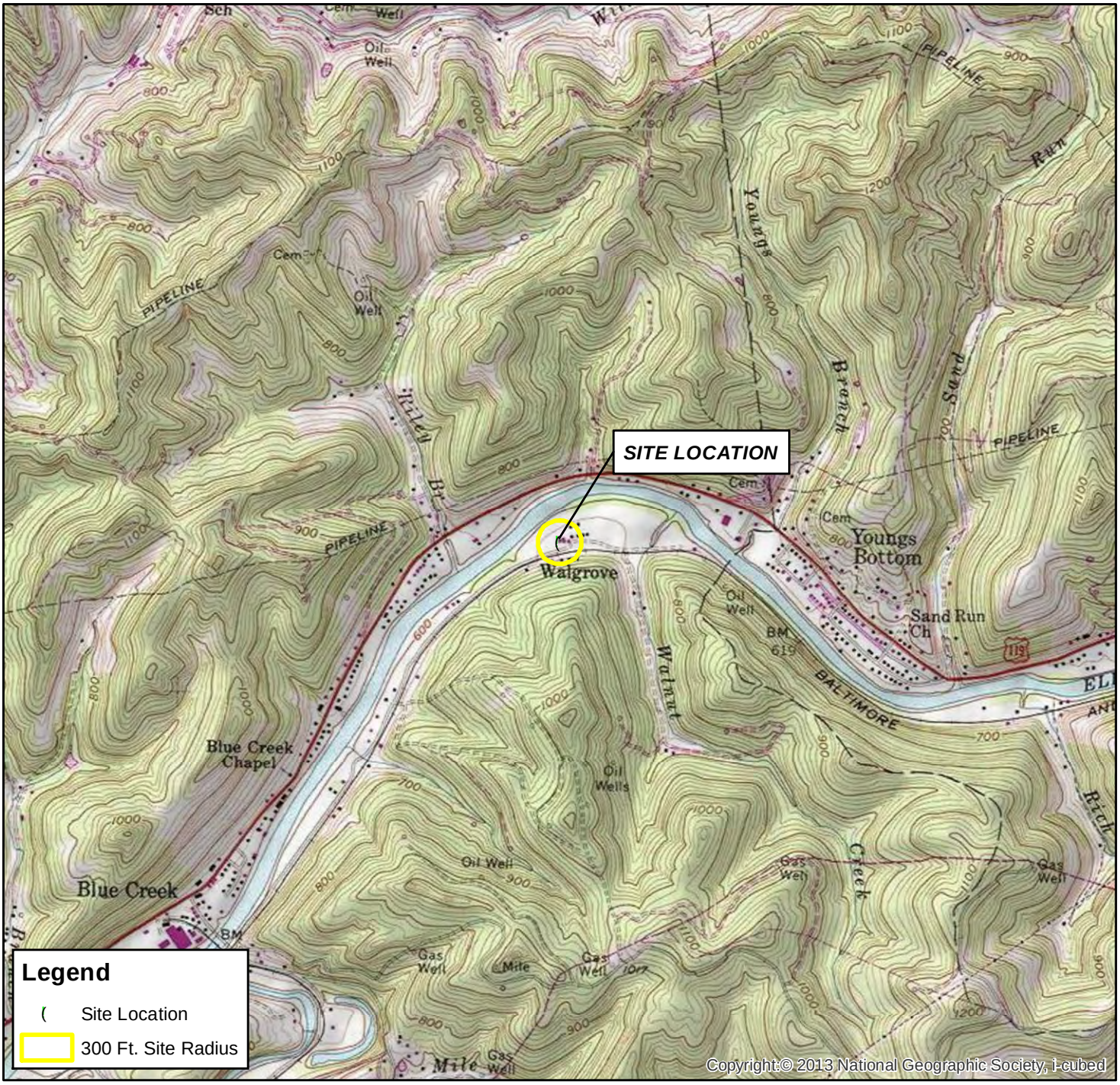
Attachment A





0 1,000 2,000 4,000 Feet

LAT. 38.46424 LON. -81.44009
KANAWHA COUNTY
WEST VIRGINIA



USGS 1:24K 7.5' Quadrangle:
Blue Creek, WV

SITE LOCATION MAP

Columbia Gas Transmission, LLC

Walgrove Compressor Station
367 Walgrove Rd
Elktown, West Virginia

ERM

GIS Review: MD

CHK'D: MD

0570976

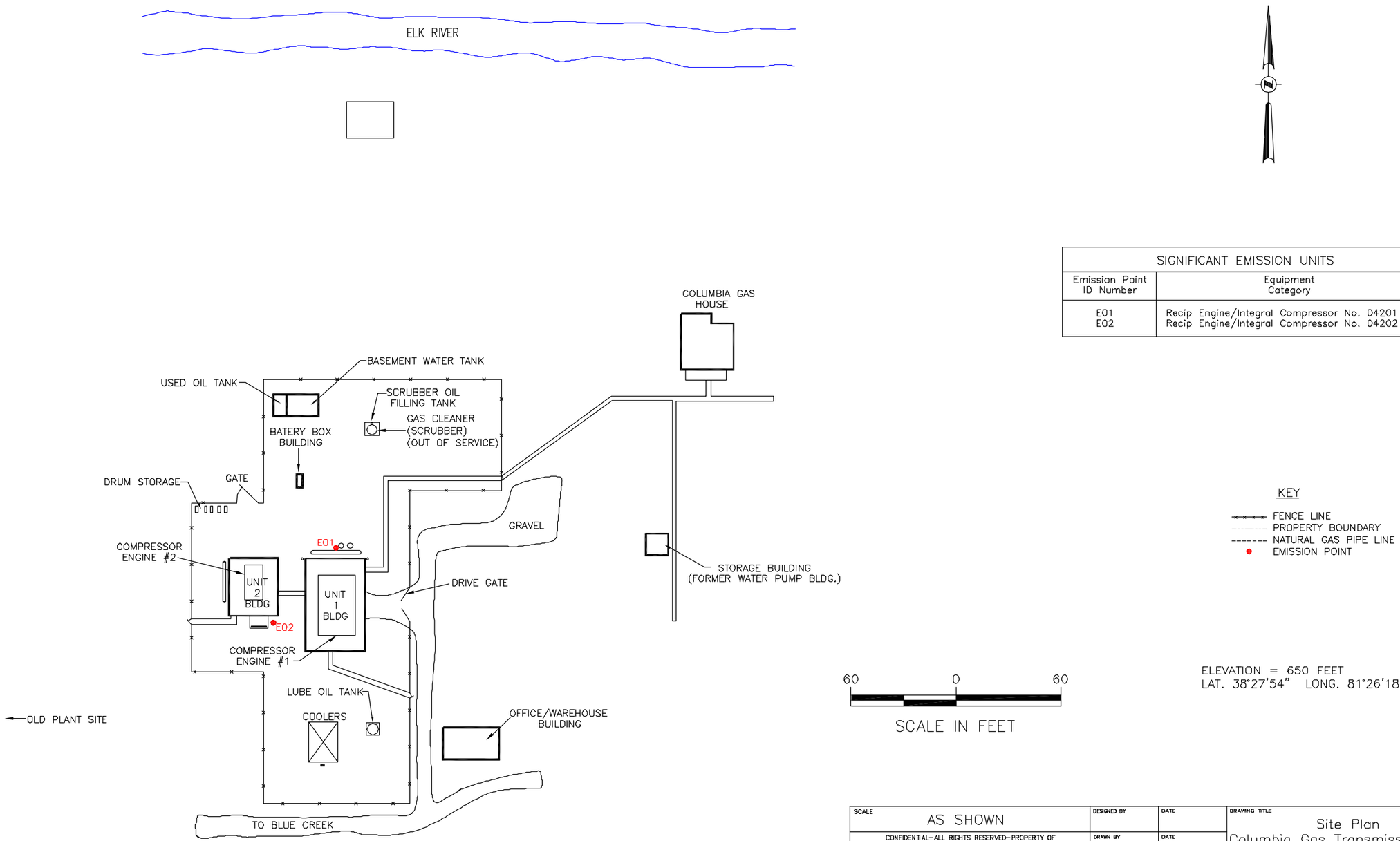
Drawn By:
SRV-4/2/21

Environmental Resources Management

ATT A

J:\Projects\SiteLocationMaps\Columbia Gas Transmission, LLC_MXD\Figure1-SiteLocationMap_WalgroveCompressorStation_20210402.mxd - 3/24/2021|SRV

Attachment B



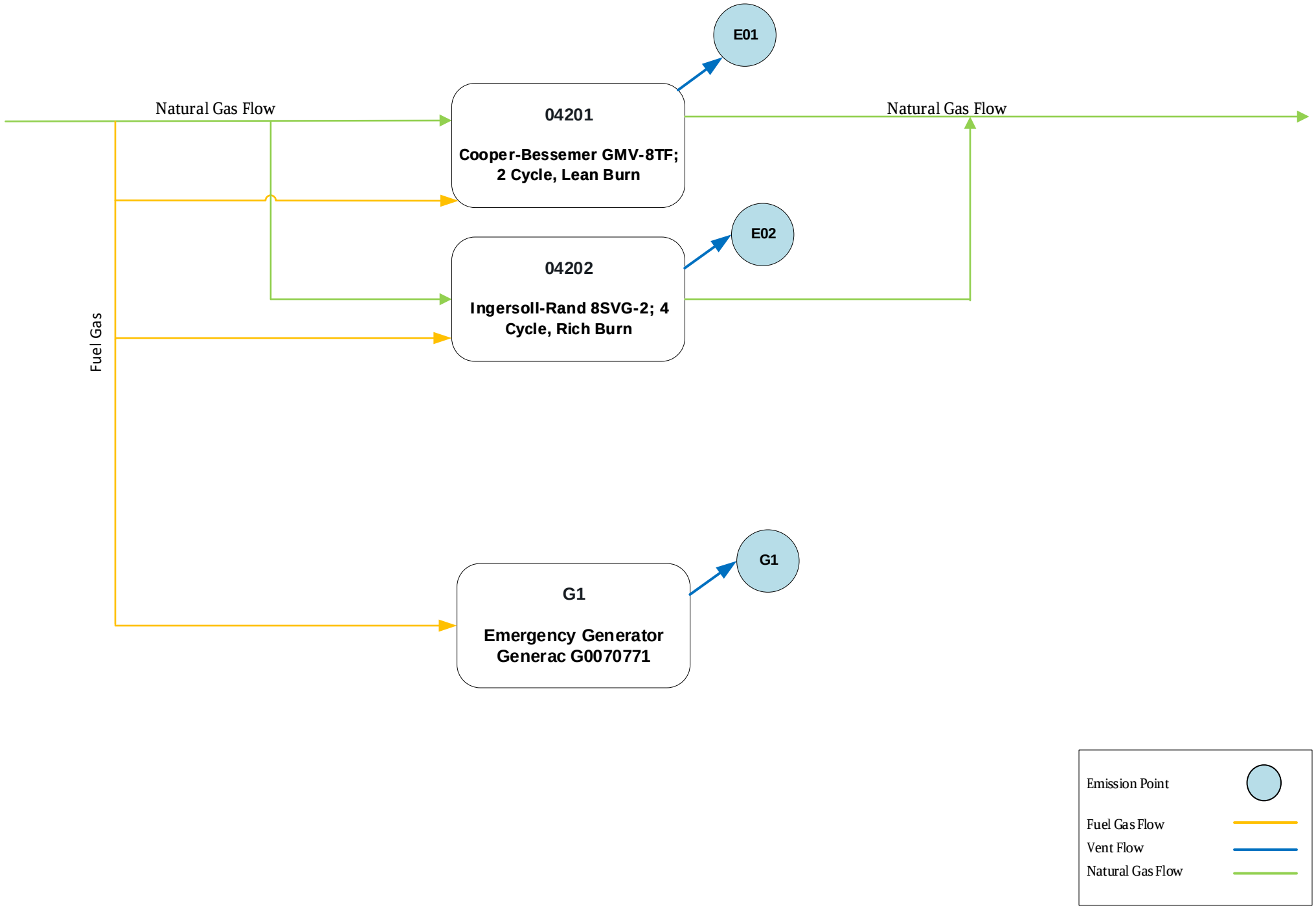
SIGNIFICANT EMISSION UNITS	
Emission Point ID Number	Equipment Category
E01	Recip Engine/Integral Compressor No. 04201
E02	Recip Engine/Integral Compressor No. 04202

SCALE: AS SHOWN	DESIGNED BY	DATE	DRAWING TITLE: Site Plan Columbia Gas Transmission Corp. Walgrove Station
CONFIDENTIAL–ALL RIGHTS RESERVED–PROPERTY OF URS RDU, NORTH CAROLINA 27560	DRAWN BY: TSH	DATE: 29NOV10	CAD DRAWING FILE:
	CHECKED BY: DW	DATE: 29NOV10	CONTRACT NO.: 31827062 / DRAWING NO.: WAL–BM3 / REV.: 0
	APPROVED BY: DW	DATE: 29NOV10	

P:\Common_Projects\COLUMBIA\GENERAL\CADD\Wal-bm3.dwg November 29, 2010 – 11:01 AM

Attachment C

Attachment C – Walgrove Compressor Station



Attachment D

ATTACHMENT D - Title V Equipment Table

(includes all emission units at the facility except those designated as insignificant activities in Section 4, Item 24 of the General Forms)

Emission Point ID[1]	Control Device[1]	Emission Unit ID[1]	Emission Unit Description	Design Capacity	Year Installed/ Modified
E01	**N/A**	**04201***	**Reciprocating Engine/Integral Compressor; Cooper-Bessemer GMV-8TF; 2 Cycle, Lean Burn**	**880 hp**	**1958**
E02	**N/A**	**04202***	**Reciprocating Engine/Integral Compressor; Ingersoll-Rand 8SVG-2; 4 Cycle, Rich Burn**	**440 hp**	**1963**
G1	**N/A**	**G1**	**Reciprocating Engine/Emergency Generator Generac G0070771**	**60 HP**	**2020**

[1]For 45CSR13 permitted sources, the numbering system used for the emission points, control devices, and emission units should be consistent with the numbering system used in the 45CSR13 permit. For grandfathered sources, the numbering system should be consistent with registrations or emissions inventory previously submitted to DAQ. For emission points, control devices, and emissions units which have not been previously labeled, use the following 45CSR13 numbering system: 1S, 2S, 3S,... or other appropriate description for emission units; 1C, 2C, 3C,... or other appropriate designation for control devices; 1E, 2E, 3E, ... or other appropriate designation for emission points.

***This equipment burns pipeline quality natural gas only.**

Attachment E

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number	**Emission unit name:**	**List any control devices associated with this emission unit:**
04201	Reciprocating Engine/Integral Compressor	NA

Provide a description of the emission unit (type, method of operation, design parameters, etc.):

2-cycle, lean burn

Manufacturer:	**Model number:**	**Serial number:**
Cooper-Bessemer	GMV-8TF	NA
Construction date:	**Installation date:**	**Modification date(s):**
NA	1958	NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 880 hp

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
NA	NA	8,760

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? X Yes ___ No	**If yes, is it?** __ Indirect Fired X Direct Fired
Maximum design heat input and/or maximum horsepower rating: 880 hp	**Type and Btu/hr rating of burners:** 8,800 Btu/hp-hr

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
7,592 scf/hr / 66,505,920 scf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	Pipeline Quality		1,020 Btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	See Appendix A	
Nitrogen Oxides (NO_X)		
Lead (Pb)		
Particulate Matter ($PM_{2.5}$)		
Particulate Matter (PM_{10})		
Total Particulate Matter (TSP)		
Sulfur Dioxide (SO_2)		
Volatile Organic Compounds (VOC)		
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
	See Appendix A	
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

See Appendix A

Applicable Requirements
List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included. 40 C.F.R. § 63.6603(a) and Table 2d (Line 6) – Maintenance Requirements 40 C.F.R. § 63.6605 – Operating Requirements 40 C.F.R. § 63.6625(e)(5), (h), and (j) – Monitoring Requirements 40 C.F.R. § 63.6640(a) and Table 6 (Line 9) – Continuous Compliance Requirements 40 C.F.R. § 63.6660 – Recordkeeping Requirements 40 C.F.R. § 63.6665 – General Requirements/Provisions
X Permit Shield
For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.) 40 C.F.R. § 63.6603 (a) and Table 2d (Line 6) – Change oil and oil filter, and inspect spark plugs, hoses, and belts every 4,320 hours of operation, or annually, whichever occurs first, and replace as necessary 40 C.F.R. § 63.6605 – Must comply with all emission, operating, and work practice standards at all times. 40 C.F.R. § 63.6625(e)(5), 63.6640 and Table 6 (Line 9) – Work or Management Practices: Operate and Maintain the RICE according to the manufacturer's instructions OR develop and follow your own maintenance plan 40 C.F.R. § 63.6625 (h) – Minimize Idle Time during Startup to not exceed 30 Minutes 40 C.F.R. § 63.6625 (j) – Oil Analysis Program in lieu of Oil change requirement in Table 2d (Line 6) 40 C.F.R. § 63.6655 (d), and (e)(3) – Keep records of maintenance conducted and operating schedule on the RICE 40 C.F.R. § 63.6660 – Records retained for five (5) years and readily available for expeditious review
Are you in compliance with all applicable requirements for this emission unit? X Yes ___No If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number	**Emission unit name:**	**List any control devices associated with this emission unit:**
04202	Reciprocating Engine/Integral Compressor	NA

Provide a description of the emission unit (type, method of operation, design parameters, etc.):

4-cycle, rich burn

Manufacturer:	**Model number:**	**Serial number:**
Ingersoll Rand	8 SVG-2	NA
Construction date:	**Installation date:**	**Modification date(s):**
NA	1963	NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 440 hp

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
NA	NA	8,760

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? X Yes ___ No	**If yes, is it?** __ Indirect Fired X Direct Fired
Maximum design heat input and/or maximum horsepower rating: 440 hp	**Type and Btu/hr rating of burners:** 10,600 Btu/hp-hr

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
4,573 scf/hr / 40,059,480 scf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	Pipeline Quality		1,020 Btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	See Appendix A	
Nitrogen Oxides (NO_X)		
Lead (Pb)		
Particulate Matter ($PM_{2.5}$)		
Particulate Matter (PM_{10})		
Total Particulate Matter (TSP)		
Sulfur Dioxide (SO_2)		
Volatile Organic Compounds (VOC)		
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
	See Appendix A	
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

See Appendix A

Applicable Requirements
List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included. 40 C.F.R. § 63.6603(a) and Table 2d (Line 10) – Maintenance Requirements 40 C.F.R. § 63.6605 – Operating Requirements 40 C.F.R. § 63.6625(e)(5), (h), and (j) – Monitoring Requirements 40 C.F.R. § 63.6640(a) and Table 6 (Line 9) – Continuous Compliance Requirements 40 C.F.R. § 63.6660 – Recordkeeping Requirements 40 C.F.R. § 63.6665 – General Requirements/Provisions
X Permit Shield
For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.) 40 C.F.R. § 63.6603 (a) and Table 2d (Line 10) – Change oil and oil filter, and inspect spark plugs, hoses, and belts every 1,440 hours of operation, or annually, whichever occurs first, and replace as necessary 40 C.F.R. § 63.6605 – Must comply with all emission, operating, and work practice standards at all times. 40 C.F.R. § 63.6625(e)(5), 63.6640 and Table 6 (Line 9) – Work or Management Practices: Operate and Maintain the RICE according to the manufacturer's instructions OR develop and follow your own maintenance plan 40 C.F.R. § 63.6625 (h) – Minimize Idle Time during Startup to not exceed 30 Minutes 40 C.F.R. § 63.6625 (j) – Oil Analysis Program in lieu of Oil change requirement in Table 2d (Line 10) 40 C.F.R. § 63.6655 (d), and (e)(3) – Keep records of maintenance conducted and operating schedule on the RICE 40 C.F.R. § 63.6660 – Records retained for five (5) years and readily available for expeditious review
Are you in compliance with all applicable requirements for this emission unit? X Yes ___No If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number	**Emission unit name:**	**List any control devices associated with this emission unit:**
G1	Reciprocating Engine/Emergency Generator Generac G0070771	NA

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
4-cycle, rich burn

Manufacturer:	**Model number:**	**Serial number:**
Generac	G0070771	NA
Construction date: NA	**Installation date:** 2020	**Modification date(s):** NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 60 hp

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
NA	NA	500

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? X Yes ___ No	**If yes, is it?** __ Indirect Fired X Direct Fired
Maximum design heat input and/or maximum horsepower rating: 440 hp	**Type and Btu/hr rating of burners:** 10,600 Btu/hp-hr

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Natural Gas
149.5 scf/hr / 74.779.12 scf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	Pipeline Quality		1,020 Btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	See Appendix A	
Nitrogen Oxides (NO_X)		
Lead (Pb)		
Particulate Matter ($PM_{2.5}$)		
Particulate Matter (PM_{10})		
Total Particulate Matter (TSP)		
Sulfur Dioxide (SO_2)		
Volatile Organic Compounds (VOC)		
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
	See Appendix A	
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

See Appendix A

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

40 C.F.R. § 63.6603(a) and Table 2d (Line 10) – Maintenance Requirements
40 C.F.R. § 63.6605 – Operating Requirements
40 C.F.R. § 63.6625(e)(5), (h), and (j) – Monitoring Requirements
40 C.F.R. § 63.6640(a) and Table 6 (Line 9) – Continuous Compliance Requirements
40 C.F.R. § 63.6660 – Recordkeeping Requirements
40 C.F.R. § 63.6665 – General Requirements/Provisions
40 C.F.R. § 60 Subpart JJJJ Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE)

X Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

40 C.F.R. § 63.6603 (a) and Table 2d (Line 10) – Change oil and oil filter, and inspect spark plugs, hoses, and belts every 1,440 hours of operation, or annually, whichever occurs first, and replace as necessary

40 C.F.R. § 63.6605 – Must comply with all emission, operating, and work practice standards at all times.

40 C.F.R. § 63.6625(e)(5), 63.6640 and Table 6 (Line 9) – Work or Management Practices: Operate and Maintain the RICE according to the manufacturer's instructions OR develop and follow your own maintenance plan

40 C.F.R. § 63.6625 (h) – Minimize Idle Time during Startup to not exceed 30 Minutes

40 C.F.R. § 63.6625 (j) – Oil Analysis Program in lieu of Oil change requirement in Table 2d (Line 10)

40 C.F.R. § 63.6655 (d), and (e)(3) – Keep records of maintenance conducted and operating schedule on the RICE

40 C.F.R. § 63.6660 – Records retained for five (5) years and readily available for expeditious review

40 C.F.R. § 60 Subpart JJJJ establishes emission standards for applicable SI ICE. The emergency generator (G1) is subject to the emission limits for emergency engines greater than 25 hp but less than 130 hp as required under 40CFR60§4233(e).

The emission limits are 10 g/hp-hr (1.33 lb/hr) for NOx and 387 g/hp (51.49 lb/hr) for CO. The emergency generator meets these emission limits.

The engine is not certified by the manufacturer to meet the emission standards listed in 40CFR60 Subpart JJJJ. Therefore, CGT will be required to conduct performance testing.

Are you in compliance with all applicable requirements for this emission unit? X Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

Appendix A

Walgrove Compressor Station - Total Emissions

	VOCs		HAPs		CO		NO_x		PM - 10/2.5		SO_2		CO_2		CH_4		N_2O		CO_2e	
Emission Sources	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
CB-GMV8TF - 04201	0.93	4.07	0.62	2.70	1.79	7.82	26.40	115.63	0.30	0.19	<0.01	0.014	905.62	3,966.60	0.02	0.07	<0.01	<0.01	906.55	3,970.70
IR 8 SVG-2 - 04202	0.14	0.60	0.16	0.68	1.06	4.63	28.51	124.88	0.04	0.19	<0.01	0.014	545.43	2,388.97	0.01	0.05	<0.01	<0.01	545.99	2,391.44
Emegency Generator - G1	<0.01	<0.01	<0.01	<0.01	51.19	12.80	1.32	0.33	<0.01	<0.01	<0.01	<0.01	17.84	4.46	<0.01	<0.01	<0.01	<0.01	17.86	4.46
Facility Blowdowns	--	0.14	--	<0.01	--	--	--	--	--	--	--	--	--	0.11	--	15.70	--	--	--	392.53
Pneumatic Emissions	<0.01	0.02	<0.01	<0.01	--	--	--	--	--	--	--	--	<0.01	0.02	0.58	2.55	--	--	14.54	63.68
Fugitive Emissions *	0.10	0.43	<0.01	<0.01	--	--	--	--	--	--	--	--	0.08	0.33	10.98	48.08	--	--	274.52	1,202.40
Wastewater Tank - B03	<0.01	<0.01	<0.01	<0.01																
Used Oil Tank - B04	<0.01	<0.01	<0.01	<0.01																
Lube Oil Tank - A02	<0.01	<0.01	<0.01	<0.01																
Totals	**1.08**	**4.84**	**0.78**	**3.38**	**54.03**	**25.25**	**56.23**	**240.85**	**0.34**	**0.39**	**<0.01**	**0.03**	**1,468.89**	**6,360.16**	**0.61**	**18.36**	**<0.01**	**0.01**	**1,484.94**	**6,822.81**

Notes:

1. Excludes fugitive emissions (compressor stations are not one of the named source categories that include fugitive emissions).

Walgrove Compressor Station - HAP Total Emissions

	Total HAPs		Methanol		Formaldehyde		Hexane		Benzene		Toluene		Ethylbenzene		Xylene		2,2,4-Trimethylpentane	
Emission Sources	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
CB-GMV8TF - 04201	0.62	2.70	0.02	0.08	0.43	1.87	<0.01	0.02	0.02	0.07	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	0.03
IR 8 SVG-2 - 04202	0.16	0.68	0.01	0.06	0.10	0.42	<0.01	<0.01	<0.01	0.03	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Emegency Generator - G1	<0.01	<0.01	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Facility Blowdowns	--	<0.01	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pneumatic Emissions	<0.01	<0.01	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fugitive Emissions	<0.01	<0.01	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Wastewater Tank - B03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Used Oil Tank - B04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lube Oil Tank - A02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Totals	**0.78**	**3.38**	**0.03**	**0.15**	**0.53**	**2.29**	**<0.01**	**0.02**	**0.02**	**0.10**	**0.01**	**0.04**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**0.01**	**0.03**

Walgrove Compressor Station - Insignificant Sources

	VOCs		HAPs	
Emission Sources	**lb/hr**	**lb/year**	**lb/hr**	**lb/year**
Facility Blowdowns	--	0.14	--	<0.01
Pneumatic Emissions	<0.01	0.02	<0.01	<0.01
Wastewater Tank - B03	<0.01	<0.01	<0.01	<0.01
Used Oil Tank - B04	<0.01	<0.01	<0.01	<0.01
Lube Oil Tank - A02	<0.01	<0.01	<0.01	<0.01
Totals	**<0.01**	**0.16**	**<0.01**	**<0.01**

Compressor Engine Cooper-Bessermer GMV-8TF (04201)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heat Value of Natural Gas (Btu/scf)	Rated bhp	BSFC (Btu/hp-hr)	Annual Operating Hours	Max. Hourly Emissions. (lb/hr)	Max. Annual Emissions. (tpy)
VOCs	1.20E-01	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	0.93	4.07
Formaldehyde	5.52E-02	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	0.43	1.87
Benzene	1.94E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	0.02	0.07
Toluene	9.63E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	0.03
Ethylbenzene	1.08E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
Xylenes	2.68E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
n-Hexane	4.45E-04	lb/MMBtu	AP-42 Chapter 3.2	1,088	880	8,800	8,760	<0.01	0.02
CO	2.03E-03	lb/hp-hr	Stack Test Data	1,020	880	8,800	8,760	1.79	7.82
NOx	3.00E-02	lb/hp-hr	Stack Test Data	1,020	880	8,800	8,760	26.40	115.63
PMFil-10/2.5	3.84E-02	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	0.30	1.30
PMCondensable	9.91E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	0.08	0.34
SO_2	2.50E-01	grains S / 100 ft3	AP-42 Chapter 5.3	1,020	880	8,800	8,760	<0.01	0.02
CO_2	53.06	kg CO_2 / MMBtu	40 CFR Subpart C	1,020	880	8,800	8,760	906	3,967
CH_4	1.00E-03	kg CH_4 / MMBtu	40 CFR Subpart C	1,020	880	8,800	8,760	0.017	0.07
N_2O	1.00E-04	kg N_2O / MMBtu	40 CFR Subpart C	1,020	880	8,800	8,760	<0.01	<0.01
1,1,2,2-Tetrachloroethane	6.63E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
1,1,2-Trichloroethane	5.27E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
1,3-Butadiene	8.20E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	0.028
1,3-Dichloropropene	4.38E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
2-Methylnapthalene	2.14E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
2,2,4-Trimethylpentane	8.46E-04	lb/MMBtu	AP-42 Chapter 3.2	1,088	880	8,800	8,760	<0.01	0.03
Acetaldehyde	7.76E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	0.06	0.26
Acrolein	7.78E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	0.06	0.26
Biphenyl	3.95E-06	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
Carbon Tetrachloride	6.07E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
Chlorobenzene	4.44E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
Chloroform	4.71E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
Ethylene Dibromide	7.34E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
Methanol	2.48E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	0.02	0.08
Methylene Chloride	1.47E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
Naphthalene	9.63E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
PAH (POM)	1.34E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
Phenol	4.21E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
Styrene	5.48E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
Vinyl Chloride	2.47E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	880	8,800	8,760	<0.01	<0.01
Total HAPs								0.62	2.70
Total CO_2e								907	3,971

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for one 2SLB Cooper-Bessemer GMV-8TF compression engine.
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 3.2 Table 3.2 - 1 references are from the August 2000 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298
- AP-42, Chapter 5.3, Section 5.3.1

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x BSFC **(Btu/hp-hr)** ÷ 1,000,000 x Engine Rating **(bhp)**

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(g/bhp-hr)** x Engine Rating **(hp)** x (1 **lb**/453.6 **g**)

Maximum Hourly Emissions SO2 Caclulation (lb/hr) = (0.25 grain S/100ft3) * Fuel throughput (ft3/hr) * (1lb/7000 grains) * (lbmol S/32.06 lb S) * (lbmol SO2/ lbmol S) *(64.07 lb SO2/lbmol SO2)

Engine Ingersoll-Rand 8SVG-2 (04202)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heat Value of Natural Gas (Btu/scf)	Rated bhp	BSFC (Btu/hp-hr)	Annual Operating Hours	Max. Hourly Emissions. (lb/hr)	Max. Annual Emissions. (tpy)
VOCs	2.96E-02	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	0.14	0.60
Formaldehyde	2.05E-02	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	0.10	0.42
Benzene	1.58E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	0.03
Toluene	5.58E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	0.01
Ethylbenzene	2.48E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	<0.01
Xylenes	1.95E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	<0.01
n-Hexane	4.45E-04	lb/MMBtu	AP-42 Chapter 3.3	1,020	440	10,600	8,760	<0.01	<0.01
CO	2.40E-03	lb/hp-hr	AP-42 Chapter 3.2	1,020	440	10,600	8,760	1.06	4.63
NOx	6.48E-02	lb/hp-hr	AP-42 Chapter 3.2	1,020	440	10,600	8,760	28.51	124.88
PMFil-10/2.5	9.50E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	0.04	0.19
PMCondensable	9.91E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	0.05	0.20
SO_2	2.50E-01	grains S / 100 ft3	AP-42 Chapter 5.3	1,020	440	10,600	8,760	<0.01	0.01
CO_2	53.06	kg CO_2 / MMBtu	40 CFR Subpart C	1,020	440	10,600	8,760	545.43	2388.97
CH_4	1.00E-03	kg CH_4 / MMBtu	40 CFR Subpart C	1,020	440	10,600	8,760	0.010	0.05
N_2O	1.00E-04	kg N_2O / MMBtu	40 CFR Subpart C	1,020	440	10,600	8,760	<0.01	<0.01
1,1,2,2-Tetrachloroethane	2.53E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	<0.01
1,1,2-Trichloroethane	1.53E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	<0.01
1,3-Butadiene	6.63E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	0.014
1,3-Dichloropropene	1.27E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	<0.01
2,2,4-Trimethylpentane	8.46E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	0.02
Acetaldehyde	2.79E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	0.013	0.057
Acrolein	2.63E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	0.012	0.054
Carbon Tetrachloride	1.77E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	<0.01
Chlorobenzene	1.29E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	<0.01
Chloroform	1.37E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	<0.01
Ethylene Dibromide	2.13E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	<0.01
Methanol	3.06E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	0.014	0.063
Methylene Chloride	4.12E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	<0.01
Naphthalene	9.71E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	<0.01
PAH (POM)	1.41E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	<0.01
Styrene	1.19E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	<0.01
Vinyl Chloride	7.16E-06	lb/MMBtu	AP-42 Chapter 3.2	1,020	440	10,600	8,760	<0.01	<0.01
Total HAPs								0.16	0.68
Total CO_2e								545.99	2391.44

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for one Ingersoll-Rand 8 SVG-2; 4SRB
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 3.2 Table 3.2 - 3 references are from the August 2000 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298
- AP-42, Chapter 5.3, Section 5.3.1

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x BSFC **(Btu/hp-hr)** ÷ 1,000,000 x Engine Rating **(bhp)**

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(g/bhp-hr)** x Engine Rating **(hp)** x (1 **lb**/453.6 **g**)

Maximum Hourly Emissions SO2 Caclulation (lb/hr) = (0.25 grain S/100ft3) * Fuel throughput (ft3/hr) * (1lb/7000 grains) * (lbmol S/32.06 lb S) * (lbmol SO2/ lbmol S) *(64.07 lb SO2/lbmol SO2)

Generator G0070771 Emergency Generator - G1

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heat Value of Natural Gas (Btu/scf)	Rated bhp	BSFC (Btu/hp-hr)	Annual Operating Hours	Max. Hourly Emissions. (lb/hr)	Max. Annual Emissions. (tpy)
VOCs	2.96E-02	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Formaldehyde	2.05E-02	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Benzene	1.58E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Toluene	5.58E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Ethylbenzene	2.48E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Xylenes	1.95E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
n-Hexane	4.45E-04	lb/MMBtu	AP-42 Chapter 3.3	1,020	60	2,542	500	<0.01	<0.01
CO	3.87E+02	g/bhp-hr	AP-42 Chapter 3.2	1,020	60	2,542	500	51.19	12.80
NOx	1.00E+01	g/bhp-hr	AP-42 Chapter 3.2	1,020	60	2,542	500	1.32	0.33
PMFil-10/2.5	9.50E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
PMCondensable	9.91E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
SO_2	2.50E-01	grains S / 100 ft3	AP-42 Chapter 5.3	1,020	60	2,542	500	<0.01	<0.01
CO_2	53.06	kg CO_2 / MMBtu	40 CFR Subpart C	1,020	60	2,542	500	17.84	4.46
CH_4	1.00E-03	kg CH_4 / MMBtu	40 CFR Subpart C	1,020	60	2,542	500	<0.01	<0.01
N_2O	1.00E-04	kg N_2O / MMBtu	40 CFR Subpart C	1,020	60	2,542	500	<0.01	<0.01
1,1,2,2-Tetrachloroethane	2.53E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
1,1,2-Trichloroethane	1.53E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
1,3-Butadiene	6.63E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
1,3-Dichloropropene	1.27E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
2,2,4-Trimethylpentane	8.46E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Acetaldehyde	2.79E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Acrolein	2.63E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Carbon Tetrachloride	1.77E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Chlorobenzene	1.29E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Chloroform	1.37E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Ethylene Dibromide	2.13E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Methanol	3.06E-03	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Methylene Chloride	4.12E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Naphthalene	9.71E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
PAH (POM)	1.41E-04	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Styrene	1.19E-05	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Vinyl Chloride	7.16E-06	lb/MMBtu	AP-42 Chapter 3.2	1,020	60	2,542	500	<0.01	<0.01
Total HAPs								<0.01	<0.01
Total CO_2e								17.86	4.46

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for one Generac G0070771; 4SRB
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 3.2 Table 3.2 - 3 references are from the August 2000 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298
- AP-42, Chapter 5.3, Section 5.3.1

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x BSFC **(Btu/hp-hr)** ÷ 1,000,000 x Engine Rating **(bhp)**

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(g/bhp-hr)** x Engine Rating **(hp)** x (1 **lb**/453.6 **g**)

Maximum Hourly Emissions SO2 Caclulation (lb/hr) = (0.25 grain S/100ft3) * Fuel throughput (ft3/hr) * (1lb/7000 grains) * (lbmol S/32.06 lb S) * (lbmol SO2/ lbmol S) *(64.07 lb SO2/lbmol SO2)

Columbia Gas Transmission, LLC
Walgrove Compressor Station
Blowdown Emissions

Component	Emission Rate (ton/yr)				
	CH_4 [1]	CO_2	CO_2e	VOC [2]	HAPs [3]
Equipment Blowdowns	15.67	0.11	391.80	0.14	0.00
Station Emergency Shutdown	0.03	0.00	0.72	0.00	0.00
Blowdown, Total	15.70	0.11	392.53	0.14	0.00

1. CH_4 emission rates based on 91.15 vol% CH_4 in annualized Walgrove natural gas data
2. Based on a 0.00893 ratio of VOC to methane as calculated from Walgrove gas composition data
3. Based on a 0.00006 ratio of HAPs to methane as calculated from Walgrove gas composition data

Frametown Facility Wide Emergency Shutdown (ESD) PTE Emission Calculations
Blowdown Emissions per Event (mscf/event): 1.5
Blowdown Events per Year: 1

Parameter	Gas Loss from ESD (mscf/yr)	CH_4 Gas Loss (mscf/yr)	CO_2 Gas Loss (mscf/yr)	CH_4 Emissions (ton/yr)	CO_2 Emissions (ton/yr)	CO_2e Emissions (ton/yr)	VOC Emissions (ton/yr)	HAPs Emissions (ton/yr)
ESD Emissions	1.5	1.37	0.00	0.03	0.00	0.72	0.00	0.000

Notes:
- Gas loss volume based on TC Energy Engineering Department calculations using estimated facility piping volume, the average suction pressure, and discharge at MAOP. This volume would also be used

Compressor Startup/Shutdown PTE Emission Calculations

Unit	Blowdown Count	Average Gas Loss per Event for Unit (mscf/event)	Annual Gas Loss from Unit (mscf/yr)	CH_4 Gas Loss (mscf/yr)	CO_2 Gas Loss (mscf/yr)	CH_4 Emissions (ton/yr)	CO_2 Emissions (ton/yr)	CO_2e Emissions (ton/yr)	VOC Emissions (ton/yr)	HAPs Emissions (ton/yr)
~~4201~~	~~50~~	~~8.1~~	~~406~~	~~370~~	~~0.94~~	~~7.83~~	~~0.05~~	~~195.90~~	~~0.07~~	~~0.00~~
~~4202~~	~~50~~	~~8.1~~	~~406~~	~~370~~	~~0.94~~	~~7.83~~	~~0.05~~	~~195.90~~	~~0.07~~	~~0.00~~
~~**Total**~~	~~--~~	~~--~~	~~812~~	~~740~~	~~1.87~~	~~15.67~~	~~0.11~~	~~391.80~~	~~0.14~~	~~0.00~~

Notes:

Densities per 40 CFR 98.233(v):
CH_4 0.0192 kg/scf
CO_2 0.0526 kg/scf

Weight Conversion Factor
2.20462 lb/kg

Global Warming Potential per 40 CFR 98 Subpart A:
25 lb CO_2e/lb CH_4

Walgrove Station Pneumatic Devices

Type of Natural Gas Pneumatic Device	Count	EF scf/hr	Hours	CO2 Concentration	CH4 Concentration	SCF CO2	SCF CH4	CO2 lb/hr	CH4 lb/hr	VOC lb/hr	HAPS lb/hr	CO2e lb/hr	CO2 TPY	CH4 TPY	VOC TPY	HAPS TPY
High-Bleed Pneumatic Devices	0	18.2	8760	0.002	0.911	0.00	0.00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Intermittent Bleed Pneumatic Devices	0	2.35	8760	0.002	0.911	0.00	0.00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Low-Bleed Pneumatic Devices	11	1.37	8760	0.002	0.911	304.69	120,325.35	<0.01	0.58	<0.01	<0.01	14.54	0.02	2.55	0.02	<0.01
					Totals:	304.69	120,325.35	<0.01	0.58	<0.01	<0.01	14.54	0.02	2.55	0.02	<0.01

Densities per 40 CFR 98.233(v):	
Density of CO_2 at standard conditions in lb/ft^3	0.11596315
Density of CH_4 at standard conditions in lb/ft^3	0.042328754

- Emission factors from 40 CFR 98 Subpart W Table W-3
- CH4 and CO2 emission rates based on 91.15 vol% CH4 and 0.23 vol% CO2 in Walgrove natural gas data
- Conversion based on densities of GHG as provided in 40 CFR 98.233(v)
- Based on 40 CFR 98 Subpart A Global Warming Potentials
- Based on a 0.028456 ratio of VOC to methane as calculated from Lanham gas composition data
- Based on a 0.000547 ratio of HAPs to methane as calculated from Lanham gas composition data

Columbia Gas Transmission, LLC
Walgrove Compressor Station
Equipment Leaks

Component	Number of Components[1]	Estimated Number of Leaking Components[2]	Emission Factor[3]	Fugitive Emissions							
				Total	CH_4[4]	CO_2[4]	CH_4[5]	CO_2[5]	CO_2e[6]	VOC[7]	HAPs[8]
			scf/hr / component	scf/yr	scf/yr	scf/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
Compressor Service											
Valve	212	5	14.84	651,773	594,068	1,504	12.57	0.09	314.41	0.11	0.00
Connector	841	17	5.59	834,744	760,839	1,927	16.10	0.11	402.68	0.14	0.00
Open-Ended Line	4	1	17.27	151,700	138,269	350	2.93	0.02	73.18	0.03	0.00
Pressure Relief Valve	8		39.66	348,373	317,530	804	6.72	0.05	168.05	0.06	0.00
Meter	0	0	19.33	0	0	0	0.00	0.00	0.00	0.00	0.00
Other	0	0	4.1	0	0	0	0.00	0.00	0.00	0.00	0.00
Non-Compressor Service											
Valve	99	2	6.42	112,787	102,801	260	2.18	0.02	54.41	0.02	0.00
Connector	232	5	5.71	250,783	228,580	579	4.84	0.03	120.98	0.04	0.00
Open-Ended Line	1	1	11.27	98,996	90,231	228	1.91	0.01	47.76	0.02	0.00
Pressure Relief Valve		1	1.11	17,656	16,093	41	0.34	0.00	8.52	0.00	0.00
Meter	5	1	2.93	25,737	23,458	59	0.50	0.00	12.42	0.00	0.00
Other	1	1	4.1	36,014	32,826	83	0.00	0.00	0.00	0.00	0.00
						Total:	48.08	0.33	1202.40	0.43	0.00

Notes:

1. Number of fugitive components per Columbia Gas Transmission facility inventory data.
2. Estimated number of leaking components at Walgrove utilizing a 2% component leak rate factor throughout the Columbia pipeline system obtained from fugitive leak survey results at Columbia facilities.
3. Emission factors from 40 CFR 98 Subpart W Table W-3
4. CH4 and CO2 emission rates based on 91.15 vol% CH4 and 0.23 vol% CO2 in Walgrove natural gas data
5. Conversion based on densities of GHG as provided in 40 CFR 98.233(v)
6. Based on 40 CFR 98 Subpart A Global Warming Potentials
7. Based on a 0.028456 ratio of VOC to methane as calculated from Lanham gas composition data
8. Based on a 0.000547 ratio of HAPs to methane as calculated from Lanham gas composition data

Densities per 40 CFR 98.233(v):

CH_4 0.0192 kg/scf

CO_2 0.0526 kg/scf

Weight Conversion Factor

2.20462 lb/kg

Global Warming Potential per 40 CFR 98 Subpart A:

25 lb CO_2e/lb CH_4

Hours/year (leap year) 8784

Columbia Gas Transmission, LLC
Walgrove Compressor Station
B03 - Wastewater Tank
Insignificant Source

A02 - Lube Oil Tank

Pollutant	Max. Uncontrolled Hourly Emissions using ProMax (lb/hr)	Max. Uncontrolled Annual Emissions using ProMax (tons/yr)
VOCs	<0.01	<0.01
Total HAPs	<0.01	<0.01

Notes:

Tank emission rates were calculated using Promax software. Promax output emissions are attached.

Columbia Gas Transmission, LLC
Walgrove Compressor Station
B04 - Used Oil Tank
Insignificant Source

B04 - Used Oil Tank

Pollutant	Max. Uncontrolled Hourly Emissions using ProMax (lb/hr)	Max. Uncontrolled Annual Emissions using ProMax (tons/yr)
VOCs	<0.01	<0.01
Total HAPs	<0.01	<0.01

Notes:

Tank emission rates were calculated using Promax software. Promax output emissions are attached.

Columbia Gas Transmission, LLC
Walgrove Compressor Station
A02 - Lube Oil Tank
Insignificant Source

A02 - Lube Oil Tank

Pollutant	Max. Uncontrolled Hourly Emissions using ProMax (lb/hr)	Max. Uncontrolled Annual Emissions using ProMax (tons/yr)
VOCs	<0.01	<0.01
Total HAPs	<0.01	<0.01

Notes:

Tank emission rates were calculated using Promax software. Promax output emissions are attached.

Columbia Gas Transmission, LLC
Walgrove Compressor Station
Natural Gas Composition

Representative Composition of Natural Gas

Natural Gas Composition	Molar Fraction[1] (mole %)	Molecular Weight (lb/lb-mole)	Weighted Sum (lb/lb-mole)	Weight Fraction (weight %)
Nitrogen	0.40	28.01	0.1115	0.6423
Carbon Dioxide	0.23	44.01	0.1016	0.5852
Methane	91.15	16.04	14.6226	84.2516
Ethane	7.95	30.07	2.3905	13.7732
Propane	0.23	44.10	0.1031	0.5940
i-Butane	0.01	58.12	0.0074	0.0425
n-Butane	0.02	58.12	0.0093	0.0535
i-Pentane	0.00	72.15	0.0032	0.0185
n-Pentane	0.00	72.15	0.0022	0.0128
C_{6+} Components	0.01	89.09	0.0046	0.0264
Total	100.00	-	17.36	100.00

C_{6+} HAP Composition[2]	Molar Fraction (mole %)	Molecular Weight (lb/lb-mole)	Weighted Sum (lb/lb-mole)	Weight Fraction (weight %)
2,2,4-Trimethylpentane	5.70E-05	114.23	6.51E-05	3.75E-04
Benzene	6.22E-05	78.11	4.86E-05	2.80E-04
Ethylbenzene	2.57E-06	106.17	2.73E-06	1.57E-05
n-Hexane	9.67E-04	86.18	8.34E-04	4.80E-03
Toluene	4.16E-05	92.14	3.83E-05	2.21E-04
Xylenes	2.05E-05	106.17	2.18E-05	1.26E-04
Total HAPs	1.15E-03	-	1.01E-03	5.82E-03

Totals	Mol %	Weight %
Total VOCs	0.28	0.75
Total HAPs	1.15E-03	5.82E-03

Ratios	Mol	Weight
VOC/Methane Ratio	3.02E-03	8.93E-03
HAPs/Methane Ratio	1.26E-05	6.91E-05

Mass Fraction Conversion Data

Compound	Mol Weight (g/mol)	Mass in Gas Sample (g)	Mass Fraction	Mass %
CO2	44.01	10.16	0.0059	0.5853
N2	28.02	11.15	0.0064	0.6425
Methane	16.04	1461.99	0.8424	84.2449
Ethane	30.07	239.05	0.1377	13.7747
Propane	44.09	10.31	0.0059	0.5940
I-Butane	58.12	0.74	0.0004	0.0425
N-Butane	58.12	0.93	0.0005	0.0535
I-Pentane	72.15	0.32	0.0002	0.0185
N-Pentane	72.15	0.22	0.0001	0.0128
Other hexanes	86.18	0.44	0.0003	0.0255
n-hexane	86.18	0.08	0.0000	0.0048
2,2,4 - Trimethylpentane	114.23	0.01	0.0000	0.0004
Benzene	78.11	0.00	0.0000	0.0003
Toluene	92.14	0.00	0.0000	0.0002
Ethylbenzene	106.17	0.000	0.0000	0.0000
Xylenes	106.17	0.00	0.0000	0.0001

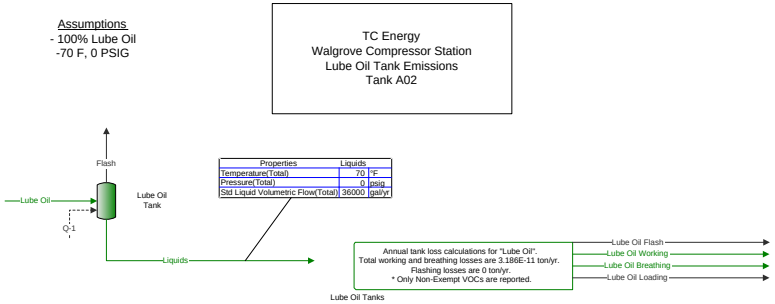
Notes:

[1] Natural gas analysis obtained from gas chromatograph readings from the Frametown CS.

[2] C_{6+} HAP composition molar fractions were derived from the GRI-GLYCALC v4.0 C_{6+} analysis multipliers for the Natural Gas Transmission Industry Segment.

Lube Oil
Plant Schematic

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	



"Lube Oil Flash" VOCs = 0 ton/yr

"Lube Oil Breathing" VOCs = 1.486E-11 ton/yr

"Lube Oil Loading" VOCs = 0 ton/yr

"Lube Oil Working" VOCs = 1.701E-11 ton/yr

"Lube Oil Flash" VOCs = 0 lb/h

"Lube Oil Breathing" VOCs = 3.392E-12 lb/h

"Lube Oil Loading" VOCs = 0 lb/h

"Lube Oil Working" VOCs = 3.883E-12 lb/h

"Lube Oil Flash" HAPs = 0 ton/yr

"Lube Oil Breathing" HAPs = 0 ton/yr

"Lube Oil Loading" HAPs = 0 ton/yr

"Lube Oil Working" HAPs = 0 ton/yr

"Lube Oil Flash" HAPs = 0 lb/h

"Lube Oil Breathing" HAPs = 0 lb/h

"Lube Oil Loading" HAPs = 0 lb/h

"Lube Oil Working" HAPs = 0 lb/h

ProMax 5.0.19263.0
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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Connections

	Flash	Liquids	Lube Oil	Lube Oil Breathing	Lube Oil Flash
From Block	Lube Oil Tank	Lube Oil Tank	--	--	--
To Block	--	--	Lube Oil Tank	--	--

Stream Composition

Mole Fraction	Flash %	Liquids %	Lube Oil %	Lube Oil Breathing %	Lube Oil Flash %
Carbon Dioxide	0	0	0 *	0 *	
Nitrogen	0	0	0 *	0 *	
Methane	0	0	0 *	0 *	
Ethane	0	0	0 *	0 *	
Propane	0	0	0 *	0 *	
i-Butane	0	0	0 *	0 *	
n-Butane	0	0	0 *	0 *	
i-Pentane	0	0	0 *	0 *	
n-Pentane	0	0	0 *	0 *	
i-Hexane	0	0	0 *	0 *	
Heptane	0	0	0 *	0 *	
Octane	0	0	0 *	0 *	
Nonane	0	0	0 *	0 *	
Benzene	0	0	0 *	0 *	
Toluene	0	0	0 *	0 *	
Ethylbenzene	0	0	0 *	0 *	
m-Xylene	0	0	0 *	0 *	
n-Hexane	0	0	0 *	0 *	
2,2,4-Trimethylpentane	0	0	0 *	0 *	
Neopentane	0	0	0 *	0 *	
Decanes Plus	0	0	0 *	0 *	
Water	0	0	0 *	0 *	
Helium	0	0	0 *	0 *	
Hydrogen	0	0	0 *	0 *	
Oxygen	0	0	0 *	0 *	
Lube Oil	100	100	100 *	100 *	
Propylene Glycol	0	0	0 *	0 *	

Molar Flow	Flash lbmol/h	Liquids lbmol/h	Lube Oil lbmol/h	Lube Oil Breathing lbmol/h	Lube Oil Flash lbmol/h
Carbon Dioxide	0	0	0 *	0 *	0
Nitrogen	0	0	0 *	0 *	0
Methane	0	0	0 *	0 *	0
Ethane	0	0	0 *	0 *	0
Propane	0	0	0 *	0 *	0
i-Butane	0	0	0 *	0 *	0
n-Butane	0	0	0 *	0 *	0
i-Pentane	0	0	0 *	0 *	0
n-Pentane	0	0	0 *	0 *	0
i-Hexane	0	0	0 *	0 *	0
Heptane	0	0	0 *	0 *	0
Octane	0	0	0 *	0 *	0
Nonane	0	0	0 *	0 *	0
Benzene	0	0	0 *	0 *	0
Toluene	0	0	0 *	0 *	0
Ethylbenzene	0	0	0 *	0 *	0
m-Xylene	0	0	0 *	0 *	0
n-Hexane	0	0	0 *	0 *	0
2,2,4-Trimethylpentane	0	0	0 *	0 *	0
Neopentane	0	0	0 *	0 *	0
Decanes Plus	0	0	0 *	0 *	0

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Molar Flow	Flash lbmol/h	Liquids lbmol/h	Lube Oil lbmol/h	Lube Oil Breathing lbmol/h	Lube Oil Flash lbmol/h
Water	0	0	0 *	0 *	0
Helium	0	0	0 *	0 *	0
Hydrogen	0	0	0 *	0 *	0
Oxygen	0	0	0 *	0 *	0
Lube Oil	0	0.0811507	0.0811507 *	8.92538E-15 *	0
Propylene Glycol	0	0	0 *	0 *	0

Mass Fraction	Flash %	Liquids %	Lube Oil %	Lube Oil Breathing %	Lube Oil Flash %
Carbon Dioxide	0	0	0 *	0	
Nitrogen	0	0	0 *	0	
Methane	0	0	0 *	0	
Ethane	0	0	0 *	0	
Propane	0	0	0 *	0	
i-Butane	0	0	0 *	0	
n-Butane	0	0	0 *	0	
i-Pentane	0	0	0 *	0	
n-Pentane	0	0	0 *	0	
i-Hexane	0	0	0 *	0	
Heptane	0	0	0 *	0	
Octane	0	0	0 *	0	
Nonane	0	0	0 *	0	
Benzene	0	0	0 *	0	
Toluene	0	0	0 *	0	
Ethylbenzene	0	0	0 *	0	
m-Xylene	0	0	0 *	0	
n-Hexane	0	0	0 *	0	
2,2,4-Trimethylpentane	0	0	0 *	0	
Neopentane	0	0	0 *	0	
DecanesPlus	0	0	0 *	0	
Water	0	0	0 *	0	
Helium	0	0	0 *	0	
Hydrogen	0	0	0 *	0	
Oxygen	0	0	0 *	0	
Lube Oil	100	100	100 *	100	
Propylene Glycol	0	0	0 *	0	

Mass Flow	Flash lb/h	Liquids lb/h	Lube Oil lb/h	Lube Oil Breathing lb/h	Lube Oil Flash lb/h
Carbon Dioxide	0	0	0 *	0 *	0
Nitrogen	0	0	0 *	0 *	0
Methane	0	0	0 *	0 *	0
Ethane	0	0	0 *	0 *	0
Propane	0	0	0 *	0 *	0
i-Butane	0	0	0 *	0 *	0
n-Butane	0	0	0 *	0 *	0
i-Pentane	0	0	0 *	0 *	0
n-Pentane	0	0	0 *	0 *	0
i-Hexane	0	0	0 *	0 *	0
Heptane	0	0	0 *	0 *	0
Octane	0	0	0 *	0 *	0
Nonane	0	0	0 *	0 *	0
Benzene	0	0	0 *	0 *	0
Toluene	0	0	0 *	0 *	0
Ethylbenzene	0	0	0 *	0 *	0
m-Xylene	0	0	0 *	0 *	0
n-Hexane	0	0	0 *	0 *	0
2,2,4-Trimethylpentane	0	0	0 *	0 *	0

* User Specified Values
? Extrapolated or Approximate Values

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Mass Flow	Flash lb/h	Liquids lb/h	Lube Oil lb/h	Lube Oil Breathing lb/h	Lube Oil Flash lb/h
Neopentane	0	0	0 *	0 *	0
Decanes Plus	0	0	0 *	0 *	0
Water	0	0	0 *	0 *	0
Helium	0	0	0 *	0 *	0
Hydrogen	0	0	0 *	0 *	0
Oxygen	0	0	0 *	0 *	0
Lube Oil	0	30.8373	30.8373 *	3.39164E-12 *	0
Propylene Glycol	0	0	0 *	0 *	0

Stream Properties

Property	Units	Flash	Liquids	Lube Oil	Lube Oil Breathing	Lube Oil Flash
Temperature	°F	70 *	70	70 *	63.0651	63.0651
Pressure	psia	14.6959 *	14.6959	14.6959 *	2.01051E-10	
Mole Fraction Vapor	%	0	0	0	100	100
Mole Fraction Light Liquid	%	100	100	100	0	
Mole Fraction Heavy Liquid	%	0	0	0	0	
Molecular Weight	lb/lbmol	380	380	380	380	
Mass Density	lb/ft^3	55.8932	55.8932	55.8932	1.3619E-11	
Molar Flow	lbmol/h	0	0.0811507	0.0811507	8.92538E-15	0
Mass Flow	lb/h	0	30.8373	30.8373	3.39164E-12	0
Vapor Volumetric Flow	ft^3/h	0	0.551718	0.551718	0.249037	0
Liquid Volumetric Flow	gpm	0	0.0687856	0.0687856	0.0310488	0
Std Vapor Volumetric Flow	MMSCFD	0	0.00073909	0.00073909	8.12889E-17	0
Std Liquid Volumetric Flow	sgpm	0	0.0684932	0.0684932 *	7.53323E-15	0
Compressibility		0.0175773	0.0175773	0.0175773	1	
Specific Gravity		0.896174	0.896174	0.896174	13.1204	
API Gravity		25.713	25.713	25.713		
Enthalpy	Btu/h	0	-24037.6	-24037.6	-2.18787E-09	0
Mass Enthalpy	Btu/lb	-779.496	-779.496	-779.496	-645.076	
Mass Cp	Btu/(lb*°F)	0.441559	0.441559	0.441559	0.352695	
Ideal Gas CpCv Ratio		1.01486	1.01486	1.01486	1.01504	
Dynamic Viscosity	cP	79.7422	79.7422	79.7422	0.00357043	
Kinematic Viscosity	cSt	89.0653	89.0653	89.0653	1.63664E+10	
Thermal Conductivity	Btu/(h*ft*°F)	0.0760457	0.0760457	0.0760457	0.00196339	
Surface Tension	lbf/ft	0.00229143	0.00229143	0.00229143		
Net Ideal Gas Heating Value	Btu/ft^3	18191.1	18191.1	18191.1	18191.1	
Net Liquid Heating Value	Btu/lb	18022	18022	18022	18022	
Gross Ideal Gas Heating Value	Btu/ft^3	19322.8	19322.8	19322.8	19322.8	
Gross Liquid Heating Value	Btu/lb	19152.2	19152.2	19152.2	19152.2	

Remarks

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Connections

	Lube Oil Loading	Lube Oil Working			
From Block	--	--			
To Block	--	--			

Stream Composition

Mole Fraction	Lube Oil Loading %	Lube Oil Working %			
Carbon Dioxide	0 *	0 *			
Nitrogen	0 *	0 *			
Methane	0 *	0 *			
Ethane	0 *	0 *			
Propane	0 *	0 *			
i-Butane	0 *	0 *			
n-Butane	0 *	0 *			
i-Pentane	0 *	0 *			
n-Pentane	0 *	0 *			
i-Hexane	0 *	0 *			
Heptane	0 *	0 *			
Octane	0 *	0 *			
Nonane	0 *	0 *			
Benzene	0 *	0 *			
Toluene	0 *	0 *			
Ethylbenzene	0 *	0 *			
m-Xylene	0 *	0 *			
n-Hexane	0 *	0 *			
2,2,4-Trimethylpentane	0 *	0 *			
Neopentane	0 *	0 *			
DecanesPlus	0 *	0 *			
Water	0 *	0 *			
Helium	0 *	0 *			
Hydrogen	0 *	0 *			
Oxygen	0 *	0 *			
Lube Oil	100 *	100 *			
Propylene Glycol	0 *	0 *			

Molar Flow	Lube Oil Loading lbmol/h	Lube Oil Working lbmol/h			
Carbon Dioxide	0	0 *			
Nitrogen	0	0 *			
Methane	0	0 *			
Ethane	0	0 *			
Propane	0	0 *			
i-Butane	0	0 *			
n-Butane	0	0 *			
i-Pentane	0	0 *			
n-Pentane	0	0 *			
i-Hexane	0	0 *			
Heptane	0	0 *			
Octane	0	0 *			
Nonane	0	0 *			
Benzene	0	0 *			
Toluene	0	0 *			
Ethylbenzene	0	0 *			
m-Xylene	0	0 *			
n-Hexane	0	0 *			
2,2,4-Trimethylpentane	0	0 *			
Neopentane	0	0 *			
DecanesPlus	0	0 *			

* User Specified Values
? Extrapolated or Approximate Values

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Molar Flow	Lube Oil Loading lbmol/h	Lube Oil Working lbmol/h			
Water	0	0 *			
Helium	0	0 *			
Hydrogen	0	0 *			
Oxygen	0	0 *			
Lube Oil	0	1.0218E-14 *			
Propylene Glycol	0	0 *			

Mass Fraction	Lube Oil Loading %	Lube Oil Working %			
Carbon Dioxide	0	0			
Nitrogen	0	0			
Methane	0	0			
Ethane	0	0			
Propane	0	0			
i-Butane	0	0			
n-Butane	0	0			
i-Pentane	0	0			
n-Pentane	0	0			
i-Hexane	0	0			
Heptane	0	0			
Octane	0	0			
Nonane	0	0			
Benzene	0	0			
Toluene	0	0			
Ethylbenzene	0	0			
m-Xylene	0	0			
n-Hexane	0	0			
2,2,4-Trimethylpentane	0	0			
Neopentane	0	0			
DecanesPlus	0	0			
Water	0	0			
Helium	0	0			
Hydrogen	0	0			
Oxygen	0	0			
Lube Oil	100	100			
Propylene Glycol	0	0			

Mass Flow	Lube Oil Loading lb/h	Lube Oil Working lb/h			
Carbon Dioxide	0	0 *			
Nitrogen	0	0 *			
Methane	0	0 *			
Ethane	0	0 *			
Propane	0	0 *			
i-Butane	0	0 *			
n-Butane	0	0 *			
i-Pentane	0	0 *			
n-Pentane	0	0 *			
i-Hexane	0	0 *			
Heptane	0	0 *			
Octane	0	0 *			
Nonane	0	0 *			
Benzene	0	0 *			
Toluene	0	0 *			
Ethylbenzene	0	0 *			
m-Xylene	0	0 *			
n-Hexane	0	0 *			
2,2,4-Trimethylpentane	0	0 *			

* User Specified Values
? Extrapolated or Approximate Values

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Mass Flow	Lube Oil Loading lb/h	Lube Oil Working lb/h			
Neopentane	0	0 *			
Decanes Plus	0	0 *			
Water	0	0 *			
Helium	0	0 *			
Hydrogen	0	0 *			
Oxygen	0	0 *			
Lube Oil	0	3.88284E-12 *			
Propylene Glycol	0	0 *			

Stream Properties

Property	Units	Lube Oil Loading	Lube Oil Working			
Temperature	°F	63.0651	63.0651			
Pressure	psia		2.01051E-10			
Mole Fraction Vapor	%	100	100			
Mole Fraction Light Liquid	%		0			
Mole Fraction Heavy Liquid	%		0			
Molecular Weight	lb/lbmol	380	380			
Mass Density	lb/ft^3		1.3619E-11			
Molar Flow	lbmol/h	0	1.0218E-14			
Mass Flow	lb/h	0	3.88284E-12			
Vapor Volumetric Flow	ft^3/h	0	0.285104			
Liquid Volumetric Flow	gpm	0	0.0355455			
Std Vapor Volumetric Flow	MMSCFD	0	9.30616E-17			
Std Liquid Volumetric Flow	sgpm	0	8.62423E-15			
Compressibility			1			
Specific Gravity			13.1204			
API Gravity						
Enthalpy	Btu/h	0	-2.50472E-09			
Mass Enthalpy	Btu/lb		-645.076			
Mass Cp	Btu/(lb*°F)		0.352695			
Ideal Gas CpCv Ratio		1.01504	1.01504			
Dynamic Viscosity	cP		0.00357043			
Kinematic Viscosity	cSt		1.63664E+10			
Thermal Conductivity	Btu/(h*ft*°F)		0.00196339			
Surface Tension	lbf/ft					
Net Ideal Gas Heating Value	Btu/ft^3	18191.1	18191.1			
Net Liquid Heating Value	Btu/lb	18022	18022			
Gross Ideal Gas Heating Value	Btu/ft^3	19322.8	19322.8			
Gross Liquid Heating Value	Btu/lb	19152.2	19152.2			

Remarks

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Energy Stream Report

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Energy Streams

Energy Stream	Energy Rate	Power	From Block	To Block
Q-1	0 Btu/h	0 hp	--	Lube Oil Tank

Remarks

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Blocks
Lube Oil Tank
Separator Report

Client Name:	TC Energy	Job:	Lube Oil A02
Location:	Walgrove Compressor Station	Modified:	9:40 AM, 9/11/2020
Flowsheet:	Lube Oil	Status:	Solved 11:54 AM, 4/8/2021

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Lube Oil	Inlet		Flash	Vapor Outlet	
Liquids	Light Liquid Outlet		Q-1	Energy	

Block Parameters

Pressure Drop	0	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	0	%	Heat Duty	0	Btu/h
Mole Fraction Light Liquid	100	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	0	%	Heat Release Curve Increments	10	

Remarks

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Flowsheet Environment
PR

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Environment Settings

Number of Poynting Intervals	0	Phase Tolerance	1 %
Gibbs Excess Model Evaluation Temperature	77 °F	Emulsion Enabled	False
Freeze Out Temperature Threshold Difference	10 °F		

Components

Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Carbon Dioxide	False	False	Toluene	False	False
Nitrogen	False	False	Ethylbenzene	False	False
Methane	False	False	m-Xylene	False	False
Ethane	False	False	n-Hexane	False	False
Propane	False	False	2,2,4-Trimethylpentane	False	False
i-Butane	False	False	Neopentane	False	False
n-Butane	False	False	Decanes Plus	False	False
i-Pentane	False	False	Water	False	True
n-Pentane	False	False	Helium	False	False
i-Hexane	False	False	Hydrogen	False	False
Heptane	False	False	Oxygen	False	False
Octane	False	False	Lube Oil	False	False
Nonane	False	False	Propylene Glycol	False	True
Benzene	False	False			

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

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Environments Report

Client Name:	TC Energy	Job: Lube Oil A02	
Location:	Walgrove Compressor Station		

Project-Wide Constants

Atmospheric Pressure	14.6959 psia	Ideal Gas Reference Pressure	14.6959 psia
Ideal Gas Reference Temperature	60 °F	Ideal Gas Reference Volume	379.484 ft^3/lbmol
Liquid Reference Temperature	60 °F		

Environment [PR]

Environment Settings

Number of Poynting Intervals	0	Phase Tolerance	1 %
Gibbs Excess Model Evaluation Temperature	77 °F	Emulsion Enabled	False
Freeze Out Temperature Threshold Difference	10 °F		

Components

Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Carbon Dioxide	False	False	Toluene	False	False
Nitrogen	False	False	Ethylbenzene	False	False
Methane	False	False	m-Xylene	False	False
Ethane	False	False	n-Hexane	False	False
Propane	False	False	2,2,4-Trimethylpentane	False	False
i-Butane	False	False	Neopentane	False	False
n-Butane	False	False	Decanes Plus	False	False
i-Pentane	False	False	Water	False	True
n-Pentane	False	False	Helium	False	False
i-Hexane	False	False	Hydrogen	False	False
Heptane	False	False	Oxygen	False	False
Octane	False	False	Lube Oil	False	False
Nonane	False	False	Propylene Glycol	False	True
Benzene	False	False			

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

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Single Oil Report
Decanes Plus

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	

Properties

Volume Average Boiling Point	240.832	°F	Low Temperature Viscosity	0.441651	cP
* Molecular Weight	108.848	lb/lbmol	Temperature of High T Viscosity	210	°F
* Specific Gravity	0.7432		High Temperature Viscosity	0.256204	cP
API Gravity	58.8929		Watson K	11.9499	
Critical Temperature	563.715	°F	ASTM D86 10-90% Slope	0	°F/%
Critical Pressure	421.397	psia	ASTM D93 Flash Point	47.9739	°F
Critical Volume	6.98262	ft^3/lbmol	? Pour Point	-22.4869	°F
Acentric Factor	0.350921		Paraffinic Fraction	56.3105	%
Carbon to Hydrogen Ratio	5.84021		Naphthenic Fraction	29.8859	%
Refractive Index	1.41346		Aromatic Fraction	13.8037	%
Temperature of Low T Viscosity	100	°F	Ideal Gas Heat Capacity	38.2665	Btu/(lbmol*°F)

Warnings

ProMax:ProMax!Project!Oils!Decanes Plus!Properties!Pour Point

Warning: Pour Point calculation: The value of 240.832 °F for Volume Average Boiling Point should be between 340.33 °F and 1040.33 °F.

Remarks

* User Specified Values
? Extrapolated or Approximate Values

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Single Oil Report
Lube Oil

Client Name:	TC Energy	Job: Lube Oil A02	
Location:	Walgrove Compressor Station		

Properties

Volume Average Boiling Point	791.482	°F	Low Temperature Viscosity	32.6194	cP
* Molecular Weight	380	lb/lbmol	Temperature of High T Viscosity	210	°F
* Specific Gravity	0.9		High Temperature Viscosity	4.52357	cP
API Gravity	25.7222		Watson K	11.9728	
Critical Temperature	1077.76	°F	ASTM D86 10-90% Slope	0	°F/%
Critical Pressure	162.989	psia	ASTM D93 Flash Point	427.922	°F
Critical Volume	20.2275	ft^3/lbmol	Pour Point	89.7805	°F
Acentric Factor	1.0209		Paraffinic Fraction	58.4435	%
? Carbon to Hydrogen Ratio	6.55722		Naphthenic Fraction	30.863	%
Refractive Index	1.49164		Aromatic Fraction	10.6935	%
Temperature of Low T Viscosity	100	°F	Ideal Gas Heat Capacity	133.295	Btu/(lbmol*°F)

Warnings

ProMax:ProMax!Project!Oils!Lube Oil!Properties!Carbon to Hydrogen Ratio

Warning: Carbon to Hydrogen Ratio calculation: The value of 791.482 °F for Volume Average Boiling Point should be between 80 °F and 650 °F.

Remarks

* User Specified Values
? Extrapolated or Approximate Values

ProMax 5.0.19263.0
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User Value Sets Report

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	

Lube Oil Tanks

User Value [BlockReady]

* Parameter	1	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [ShellLength]

* Parameter	12 ft	Upper Bound	ft
Lower Bound	ft	* Enforce Bounds	False

User Value [ShellDiam]

* Parameter	6.5 ft	Upper Bound	ft
Lower Bound	ft	* Enforce Bounds	False

User Value [BreatherVP]

* Parameter	0.03 psig	Upper Bound	psig
Lower Bound	psig	* Enforce Bounds	False

User Value [BreatherVacP]

* Parameter	-0.03 psig	Upper Bound	psig
Lower Bound	psig	* Enforce Bounds	False

User Value [DomeRadius]

Parameter	ft	Upper Bound	ft
Lower Bound	ft	* Enforce Bounds	False

User Value [OpPress]

* Parameter	0 psig	Upper Bound	psig
Lower Bound	psig	* Enforce Bounds	False

User Value [AvgPercentLiq]

* Parameter	50 %	Upper Bound	%
Lower Bound	%	* Enforce Bounds	False

User Value [MaxPercentLiq]

* Parameter	90 %	Upper Bound	%
Lower Bound	%	* Enforce Bounds	False

User Value [MinPercentLiq]

* Parameter	10 %	Upper Bound	%
Lower Bound	%	* Enforce Bounds	False

User Value [AnnNetTP]

* Parameter	2.34324 bbl/day	Upper Bound	bbl/day
Lower Bound	bbl/day	* Enforce Bounds	False

User Value [OREff]

Parameter	%	Upper Bound	%
Lower Bound	%	* Enforce Bounds	False

User Value [MaxAvgT]

* Parameter	61.5 °F	Upper Bound	°F
Lower Bound	°F	* Enforce Bounds	False

User Value [MinAvgT]

* Parameter	39 °F	Upper Bound	°F
Lower Bound	°F	* Enforce Bounds	False

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User Value Sets Report

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	

User Value [BulkLiqT]

* Parameter	52.7485	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [AvgP]

* Parameter	13.69	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [Therml]

* Parameter	1173	Btu/ft^2/day	Upper Bound	Btu/ft^2/day
Lower Bound		Btu/ft^2/day	* Enforce Bounds	False

User Value [AvgWindSpeed]

* Parameter	4.5	mi/h	Upper Bound	mi/h
Lower Bound		mi/h	* Enforce Bounds	False

User Value [MaxHourlyLoadingRate]

Parameter		bbl/hr	Upper Bound	bbl/hr
Lower Bound		bbl/hr	* Enforce Bounds	False

User Value [SumLiqLevelInc]

Parameter		ft/yr	Upper Bound	ft/yr
Lower Bound		ft/yr	* Enforce Bounds	False

User Value [FlashingT]

* Parameter	63.0651	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [EntrainedOilFrac]

* Parameter	1	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [TurnoverRate]

* Parameter	11.8382		Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [LLossSatFactor]

Parameter			Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [AtmPressure]

* Parameter	13.69	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [TVP]

* Parameter	1.03443E-10	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [MaxVP]

* Parameter	2.25198E-10	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [MinVP]

* Parameter	4.6194E-11	psia	Upper Bound	psia

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User Value Sets Report

Client Name:	TC Energy	Job: Lube Oil A02	
Location:	Walgrove Compressor Station		

User Value [MinVP]

Lower Bound	psia	* Enforce Bounds	False

User Value [AvgLiqSurfaceT]

* Parameter	55.0741 °F	Upper Bound	°F
Lower Bound	°F	* Enforce Bounds	False

User Value [MaxLiqSurfaceT]

* Parameter	63.0651 °F	Upper Bound	°F
Lower Bound	°F	* Enforce Bounds	False

User Value [TotalLosses]

* Parameter	3.18622E-11 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [WorkingLosses]

* Parameter	1.70068E-11 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [StandingLosses]

* Parameter	1.48554E-11 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [RimSealLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [WithdrawalLoss]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [LoadingLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [MaxHourlyLoadingLoss]

* Parameter	0 lb/hr	Upper Bound	lb/hr
Lower Bound	lb/hr	* Enforce Bounds	False

User Value [PStar]

Parameter		Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [AllCTotalLosses]

* Parameter	3.18622E-11 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [AllCLoadingLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [AllCMaxHLoadingLoss]

* Parameter	0 lb/hr	Upper Bound	lb/hr
Lower Bound	lb/hr	* Enforce Bounds	False

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User Value Sets Report

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	

User Value [AllCFlashingLosses]

* Parameter	0	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [DeckFittingLosses]

* Parameter	0	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [DeckSeamLosses]

* Parameter	0	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [FlashingLosses]

* Parameter	0	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [TotalResidual]

* Parameter	135.067	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [GasMoleWeight]

* Parameter	0.38	kg/mol	Upper Bound	kg/mol
Lower Bound		kg/mol	* Enforce Bounds	False

User Value [VapReportableFrac]

* Parameter	100	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [LiqReportableFrac]

* Parameter	100	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [FlashReportableFrac]

* Parameter	0	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={536570B8-E272-4395-BAC2-17288F878675}

Process Inputs

User Value [Sales Gas Target]

* Parameter	5	MMSCFD	Upper Bound	MMSCFD
Lower Bound		MMSCFD	* Enforce Bounds	False

User Value [Water Rate Target]

* Parameter	100	gal/yr	Upper Bound	gal/yr
Lower Bound		gal/yr	* Enforce Bounds	False

User Value [Condensate Rate Target]

* Parameter	0	gal/yr	Upper Bound	gal/yr
Lower Bound		gal/yr	* Enforce Bounds	False

Remarks

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User Value Sets Report

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	

Sum Component Flow/Frac.22

User Value [CompSum]

* Parameter	0	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={D6DFB694-43F4-4E3A-8577-215539325CBA}

Sum Component Flow/Frac.29

User Value [CompSum]

* Parameter	1.48554E-11	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={7EA90042-9816-419D-9F09-3EAAC154A08C}

Sum Component Flow/Frac.30

User Value [CompSum]

* Parameter	0	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={880917DC-E053-444A-BAF2-F2EA109E93B1}

Sum Component Flow/Frac.31

User Value [CompSum]

* Parameter	1.70068E-11	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={EF706861-0973-45CA-A058-2812F7D1D534}

Sum Component Flow/Frac.32

User Value [CompSum]

* Parameter	0	lb/h	Upper Bound		lb/h
Lower Bound		lb/h	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={B4263800-9182-4B49-B762-7F7C8FDDE3B9}

Sum Component Flow/Frac.33

User Value [CompSum]

* Parameter	3.39164E-12	lb/h	Upper Bound		lb/h

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User Value Sets Report

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	

Sum Component Flow/Frac.33

User Value [CompSum]

Lower Bound	lb/h	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={14ACFC2A-3815-429B-B179-110152AA57CB}

Sum Component Flow/Frac.34

User Value [CompSum]

* Parameter	0 lb/h	Upper Bound	lb/h
Lower Bound	lb/h	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={EE9183F2-474A-4A4E-ACD9-B5A0035597A6}

Sum Component Flow/Frac.35

User Value [CompSum]

* Parameter	3.88284E-12 lb/h	Upper Bound	lb/h
Lower Bound	lb/h	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={2741FD89-99BF-422D-B568-38CC5E94E4D7}

Sum Component Flow/Frac.36

User Value [CompSum]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={80310EA5-803B-412C-9093-F9FE48D1B421}

Sum Component Flow/Frac.37

User Value [CompSum]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={E6D8FB21-8C44-4D25-9FCF-A515FC7BA2E4}

Sum Component Flow/Frac.38

User Value [CompSum]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={2A6418BA-82BB-4076-B588-E4DACDDDEE44}

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User Value Sets Report

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	

Sum Component Flow/Frac.39

User Value [CompSum]

* Parameter	0 ton/yr		Upper Bound	ton/yr
Lower Bound	ton/yr		* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={33EEB289-8743-48CC-B202-E3ADB5692DF3}

Sum Component Flow/Frac.40

User Value [CompSum]

* Parameter	0 lb/h		Upper Bound	lb/h
Lower Bound	lb/h		* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={AFBCF255-3A8C-42A6-A284-BB413E28B013}

Sum Component Flow/Frac.41

User Value [CompSum]

* Parameter	0 lb/h		Upper Bound	lb/h
Lower Bound	lb/h		* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={176DF4CE-BE32-42FC-A0F4-9180C57257E0}

Sum Component Flow/Frac.42

User Value [CompSum]

* Parameter	0 lb/h		Upper Bound	lb/h
Lower Bound	lb/h		* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={F5A83A40-60FA-42F2-87DE-A0A2DCB198EA}

Sum Component Flow/Frac.43

User Value [CompSum]

* Parameter	0 lb/h		Upper Bound	lb/h
Lower Bound	lb/h		* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={48CFE74F-443F-4EDA-BC93-E174B30EB812}

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Recoveries Report

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	

Component Recoveries - Project Inlets

Status: Solved

Recovery Stream Data Source - All Inlets in Project

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Lube Oil		

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	False	Atomic Basis	False

Tabulated Data

Index	Lube Oil:Lube Oil lbmol/h	Summary Table lbmol/h		
Carbon Dioxide	0	0		
Nitrogen	0	0		
Methane	0	0		
Ethane	0	0		
Propane	0	0		
i-Butane	0	0		
n-Butane	0	0		
i-Pentane	0	0		
n-Pentane	0	0		
i-Hexane	0	0		
Heptane	0	0		
Octane	0	0		
Nonane	0	0		
Benzene	0	0		
Toluene	0	0		
Ethylbenzene	0	0		
m-Xylene	0	0		
n-Hexane	0	0		
2,2,4-Trimethylpentane	0	0		
Neopentane	0	0		
Decanes Plus	0	0		
Water	0	0		
Helium	0	0		
Hydrogen	0	0		
Oxygen	0	0		
Lube Oil	0.0811507	0.0811507		
Propylene Glycol	0	0		
Total	0.0811507	0.0811507		

Remarks

Component Recoveries - Project Outlets

Status: Solved

Recovery Stream Data Source - All Outlets in Project

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Flash	Lube Oil	Liquids

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	False	Atomic Basis	False

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Recoveries Report

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	

Tabulated Data

Index	Lube Oil:Flash lbmol/h	Lube Oil:Liquids lbmol/h	Summary Table lbmol/h	
Carbon Dioxide		0	0	
Nitrogen		0	0	
Methane		0	0	
Ethane		0	0	
Propane		0	0	
i-Butane		0	0	
n-Butane		0	0	
i-Pentane		0	0	
n-Pentane		0	0	
i-Hexane		0	0	
Heptane		0	0	
Octane		0	0	
Nonane		0	0	
Benzene		0	0	
Toluene		0	0	
Ethylbenzene		0	0	
m-Xylene		0	0	
n-Hexane		0	0	
2,2,4-Trimethylpentane		0	0	
Neopentane		0	0	
Decanes Plus		0	0	
Water		0	0	
Helium		0	0	
Hydrogen		0	0	
Oxygen		0	0	
Lube Oil		0.0811507	0.0811507	
Propylene Glycol		0	0	
Total		0.0811507	0.0811507	

Remarks

Component Recoveries - Project Losses

Status: Solved

Reference Stream Data Source - All Outlets in Project

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Flash	Lube Oil	Liquids

Recovery Stream Data Source - All Inlets in Project

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Lube Oil		

Parameters

Composition Basis	Molar Flow	Summation Option	Summation Only
Calculate Ratios	False	Atomic Basis	False

Tabulated Data

Index	Summary Table lbmol/h			
Carbon Dioxide	0			
Nitrogen	0			
Methane	0			
Ethane	0			
Propane	0			
i-Butane	0			

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Recoveries Report

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	

Tabulated Data

Index	Summary Table lbmol/h			
n-Butane	0			
i-Pentane	0			
n-Pentane	0			
i-Hexane	0			
Heptane	0			
Octane	0			
Nonane	0			
Benzene	0			
Toluene	0			
Ethylbenzene	0			
m-Xylene	0			
n-Hexane	0			
2,2,4-Trimethylpentane	0			
Neopentane	0			
DecanesPlus	0			
Water	0			
Helium	0			
Hydrogen	0			
Oxygen	0			
Lube Oil	0			
Propylene Glycol	0			
Total	0			

Remarks

Component Recoveries - Project Recoveries

Status: Solved

Reference Stream Data Source - All Inlets in Project

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Lube Oil		

Recovery Stream Data Source - All Outlets in Project

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Flash	Lube Oil	Liquids

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	True	Atomic Basis	False

Tabulated Data

Index	Lube Oil:Flash %	Lube Oil:Liquids %	Summary Table %	
Carbon Dioxide				
Nitrogen				
Methane				
Ethane				
Propane				
i-Butane				
n-Butane				
i-Pentane				
n-Pentane				
i-Hexane				
Heptane				

* User Specified Values
? Extrapolated or Approximate Values

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Recoveries Report

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	

Tabulated Data

Index	Lube Oil:Flash %	Lube Oil:Liquids %	Summary Table %	
Octane				
Nonane				
Benzene				
Toluene				
Ethylbenzene				
m-Xylene				
n-Hexane				
2,2,4-Trimethylpentane				
Neopentane				
Decanes Plus				
Water				
Helium				
Hydrogen				
Oxygen				
Lube Oil		100	100	
Propylene Glycol				
Total		100	100	

Remarks

Component Recoveries - Lube Oil Inlets

Status: Solved

Recovery Stream Data Source - All Inlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Lube Oil		

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	False	Atomic Basis	False

Tabulated Data

Index	Lube Oil:Lube Oil lbmol/h	Summary Table lbmol/h		
Carbon Dioxide	0	0		
Nitrogen	0	0		
Methane	0	0		
Ethane	0	0		
Propane	0	0		
i-Butane	0	0		
n-Butane	0	0		
i-Pentane	0	0		
n-Pentane	0	0		
i-Hexane	0	0		
Heptane	0	0		
Octane	0	0		
Nonane	0	0		
Benzene	0	0		
Toluene	0	0		
Ethylbenzene	0	0		
m-Xylene	0	0		
n-Hexane	0	0		
2,2,4-Trimethylpentane	0	0		
Neopentane	0	0		
Decanes Plus	0	0		

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Recoveries Report

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	

Tabulated Data

Index	Lube Oil:Lube Oil lbmol/h	Summary Table lbmol/h		
Water	0	0		
Helium	0	0		
Hydrogen	0	0		
Oxygen	0	0		
Lube Oil	0.0811507	0.0811507		
Propylene Glycol	0	0		
Total	0.0811507	0.0811507		

Remarks

Component Recoveries - Lube Oil Outlets

Status: Solved

Recovery Stream Data Source - All Outlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Flash	Lube Oil	Liquids

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	False	Atomic Basis	False

Tabulated Data

Index	Lube Oil:Flash lbmol/h	Lube Oil:Liquids lbmol/h	Summary Table lbmol/h	
Carbon Dioxide		0	0	
Nitrogen		0	0	
Methane		0	0	
Ethane		0	0	
Propane		0	0	
i-Butane		0	0	
n-Butane		0	0	
i-Pentane		0	0	
n-Pentane		0	0	
i-Hexane		0	0	
Heptane		0	0	
Octane		0	0	
Nonane		0	0	
Benzene		0	0	
Toluene		0	0	
Ethylbenzene		0	0	
m-Xylene		0	0	
n-Hexane		0	0	
2,2,4-Trimethylpentane		0	0	
Neopentane		0	0	
DecanesPlus		0	0	
Water		0	0	
Helium		0	0	
Hydrogen		0	0	
Oxygen		0	0	
Lube Oil		0.0811507	0.0811507	
Propylene Glycol		0	0	
Total		0.0811507	0.0811507	

Remarks

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Recoveries Report

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	

Component Recoveries - Lube Oil Losses

Status: Solved

Reference Stream Data Source - All Outlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Flash	Lube Oil	Liquids

Recovery Stream Data Source - All Inlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Lube Oil		

Parameters

Composition Basis	Molar Flow	Summation Option	Summation Only
Calculate Ratios	False	Atomic Basis	False

Tabulated Data

Index	Summary Table lbmol/h			
Carbon Dioxide	0			
Nitrogen	0			
Methane	0			
Ethane	0			
Propane	0			
i-Butane	0			
n-Butane	0			
i-Pentane	0			
n-Pentane	0			
i-Hexane	0			
Heptane	0			
Octane	0			
Nonane	0			
Benzene	0			
Toluene	0			
Ethylbenzene	0			
m-Xylene	0			
n-Hexane	0			
2,2,4-Trimethylpentane	0			
Neopentane	0			
DecanesPlus	0			
Water	0			
Helium	0			
Hydrogen	0			
Oxygen	0			
Lube Oil	0			
Propylene Glycol	0			
Total	0			

Remarks

Component Recoveries - Lube Oil Recoveries

Status: Solved

Reference Stream Data Source - All Inlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Lube Oil		

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Recoveries Report

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	

Recovery Stream Data Source - All Outlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Flash	Lube Oil	Liquids

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	True	Atomic Basis	False

Tabulated Data

Index	Lube Oil:Flash %	Lube Oil:Liquids %	Summary Table %	
Carbon Dioxide				
Nitrogen				
Methane				
Ethane				
Propane				
i-Butane				
n-Butane				
i-Pentane				
n-Pentane				
i-Hexane				
Heptane				
Octane				
Nonane				
Benzene				
Toluene				
Ethylbenzene				
m-Xylene				
n-Hexane				
2,2,4-Trimethylpentane				
Neopentane				
Decanes Plus				
Water				
Helium				
Hydrogen				
Oxygen				
Lube Oil		100	100	
Propylene Glycol				
Total		100	100	

Remarks

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Energy Budgets Report

Client Name:	TC Energy	Job: Lube Oil A02	
Location:	Walgrove Compressor Station		

Power Budget - Project Power Budget

Status: Solved

Parameters

Net Power	0 hp	Total Power Required	0 hp
Total Power Supplied	0 hp	External Energy Only	True

Remarks

Heat Budget - Project Heat Budget

Status: Solved

Heat Budget Data Source - All Exchangers in Project

Flowsheet	Block	Flowsheet	Block
Lube Oil	Lube Oil Tank		

Parameters

Net Duty	0 Btu/h	Total Duty Required	0 Btu/h
Total Duty Supplied	0 Btu/h	External Energy Only	True

Tabulated Data

Index	Block Duty Btu/h	Block Highest Temperature °F	Block Lowest Temperature °F
Lube Oil:Lube Oil Tank	0	70	70

Remarks

Power Budget - Lube Oil Power Budget

Status: Solved

Parameters

Net Power	0 hp	Total Power Required	0 hp
Total Power Supplied	0 hp	External Energy Only	True

Remarks

Heat Budget - Lube Oil Heat Budget

Status: Solved

Heat Budget Data Source - All Exchangers in Flowsheet

Flowsheet	Block	Flowsheet	Block
Lube Oil	Lube Oil Tank		

Parameters

Net Duty	0 Btu/h	Total Duty Required	0 Btu/h
Total Duty Supplied	0 Btu/h	External Energy Only	True

Tabulated Data

Index	Block Duty Btu/h	Block Highest Temperature °F	Block Lowest Temperature °F
Lube Oil:Lube Oil Tank	0	70	70

Remarks

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Energy Budgets Report

Client Name:	TC Energy	Job: Lube Oil A02
Location:	Walgrove Compressor Station	

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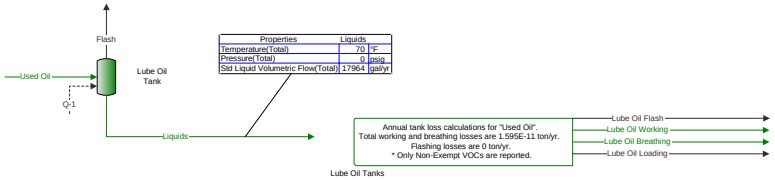
Lube Oil
Plant Schematic

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Assumptions
- 100% Lube Oil
-70 F, 0 PSIG

TC Energy
Frametown Compressor Station
Used Oil Tank Emissions
Tank B04



Properties	Liquids	
Temperature(Total)	70	°F
Pressure(Total)	0	psig
Std Liquid Volumetric Flow(Total)	17964	gal/yr

"Lube Oil Flash" VOCs = 0 ton/yr
"Lube Oil Breathing" VOCs = 7.488E-12 ton/yr
"Lube Oil Loading" VOCs = 0 ton/yr
"Lube Oil Working" VOCs = 8.459E-12 ton/yr

"Lube Oil Flash" VOCs = 0 lb/h
"Lube Oil Breathing" VOCs = 1.709E-12 lb/h
"Lube Oil Loading" VOCs = 0 lb/h
"Lube Oil Working" VOCs = 1.931E-12 lb/h

"Lube Oil Flash" HAPs = 0 ton/yr
"Lube Oil Breathing" HAPs = 0 ton/yr
"Lube Oil Loading" HAPs = 0 ton/yr
"Lube Oil Working" HAPs = 0 ton/yr

"Lube Oil Flash" HAPs = 0 lb/h
"Lube Oil Breathing" HAPs = 0 lb/h
"Lube Oil Loading" HAPs = 0 lb/h
"Lube Oil Working" HAPs = 0 lb/h

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Connections

	Flash	Liquids	Lube Oil Breathing	Lube Oil Flash	Lube Oil Loading
From Block	Lube Oil Tank	Lube Oil Tank	--	--	--
To Block	--	--	--	--	--

Stream Composition

Mole Fraction	Flash %	Liquids %	Lube Oil Breathing %	Lube Oil Flash %	Lube Oil Loading %
Carbon Dioxide	0	0	0 *		0 *
Nitrogen	0	0	0 *		0 *
Methane	0	0	0 *		0 *
Ethane	0	0	0 *		0 *
Propane	0	0	0 *		0 *
i-Butane	0	0	0 *		0 *
n-Butane	0	0	0 *		0 *
i-Pentane	0	0	0 *		0 *
n-Pentane	0	0	0 *		0 *
i-Hexane	0	0	0 *		0 *
Heptane	0	0	0 *		0 *
Octane	0	0	0 *		0 *
Nonane	0	0	0 *		0 *
Benzene	0	0	0 *		0 *
Toluene	0	0	0 *		0 *
Ethylbenzene	0	0	0 *		0 *
m-Xylene	0	0	0 *		0 *
n-Hexane	0	0	0 *		0 *
2,2,4-Trimethylpentane	0	0	0 *		0 *
Neopentane	0	0	0 *		0 *
DecanesPlus	0	0	0 *		0 *
Water	0	0	0 *		0 *
Helium	0	0	0 *		0 *
Hydrogen	0	0	0 *		0 *
Oxygen	0	0	0 *		0 *
Lube Oil	100	100	100 *		100 *
Propylene Glycol	0	0	0 *		0 *

Molar Flow	Flash lbmol/h	Liquids lbmol/h	Lube Oil Breathing lbmol/h	Lube Oil Flash lbmol/h	Lube Oil Loading lbmol/h
Carbon Dioxide	0	0	0 *	0	0
Nitrogen	0	0	0 *	0	0
Methane	0	0	0 *	0	0
Ethane	0	0	0 *	0	0
Propane	0	0	0 *	0	0
i-Butane	0	0	0 *	0	0
n-Butane	0	0	0 *	0	0
i-Pentane	0	0	0 *	0	0
n-Pentane	0	0	0 *	0	0
i-Hexane	0	0	0 *	0	0
Heptane	0	0	0 *	0	0
Octane	0	0	0 *	0	0
Nonane	0	0	0 *	0	0
Benzene	0	0	0 *	0	0
Toluene	0	0	0 *	0	0
Ethylbenzene	0	0	0 *	0	0
m-Xylene	0	0	0 *	0	0
n-Hexane	0	0	0 *	0	0
2,2,4-Trimethylpentane	0	0	0 *	0	0
Neopentane	0	0	0 *	0	0
DecanesPlus	0	0	0 *	0	0

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Molar Flow	Flash lbmol/h	Liquids lbmol/h	Lube Oil Breathing lbmol/h	Lube Oil Flash lbmol/h	Lube Oil Loading lbmol/h
Water	0	0	0 *	0	0
Helium	0	0	0 *	0	0
Hydrogen	0	0	0 *	0	0
Oxygen	0	0	0 *	0	0
Lube Oil	0	0.0404942	4.49865E-15 *	0	0
Propylene Glycol	0	0	0 *	0	0

Mass Fraction	Flash %	Liquids %	Lube Oil Breathing %	Lube Oil Flash %	Lube Oil Loading %
Carbon Dioxide	0	0	0		0
Nitrogen	0	0	0		0
Methane	0	0	0		0
Ethane	0	0	0		0
Propane	0	0	0		0
i-Butane	0	0	0		0
n-Butane	0	0	0		0
i-Pentane	0	0	0		0
n-Pentane	0	0	0		0
i-Hexane	0	0	0		0
Heptane	0	0	0		0
Octane	0	0	0		0
Nonane	0	0	0		0
Benzene	0	0	0		0
Toluene	0	0	0		0
Ethylbenzene	0	0	0		0
m-Xylene	0	0	0		0
n-Hexane	0	0	0		0
2,2,4-Trimethylpentane	0	0	0		0
Neopentane	0	0	0		0
Decanes Plus	0	0	0		0
Water	0	0	0		0
Helium	0	0	0		0
Hydrogen	0	0	0		0
Oxygen	0	0	0		0
Lube Oil	100	100	100		100
Propylene Glycol	0	0	0		0

Mass Flow	Flash lb/h	Liquids lb/h	Lube Oil Breathing lb/h	Lube Oil Flash lb/h	Lube Oil Loading lb/h
Carbon Dioxide	0	0	0 *	0	0
Nitrogen	0	0	0 *	0	0
Methane	0	0	0 *	0	0
Ethane	0	0	0 *	0	0
Propane	0	0	0 *	0	0
i-Butane	0	0	0 *	0	0
n-Butane	0	0	0 *	0	0
i-Pentane	0	0	0 *	0	0
n-Pentane	0	0	0 *	0	0
i-Hexane	0	0	0 *	0	0
Heptane	0	0	0 *	0	0
Octane	0	0	0 *	0	0
Nonane	0	0	0 *	0	0
Benzene	0	0	0 *	0	0
Toluene	0	0	0 *	0	0
Ethylbenzene	0	0	0 *	0	0
m-Xylene	0	0	0 *	0	0
n-Hexane	0	0	0 *	0	0
2,2,4-Trimethylpentane	0	0	0 *	0	0

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Mass Flow	Flash lb/h	Liquids lb/h	Lube Oil Breathing lb/h	Lube Oil Flash lb/h	Lube Oil Loading lb/h
Neopentane	0	0	0 *	0	0
Decanes Plus	0	0	0 *	0	0
Water	0	0	0 *	0	0
Helium	0	0	0 *	0	0
Hydrogen	0	0	0 *	0	0
Oxygen	0	0	0 *	0	0
Lube Oil	0	15.3878	1.70949E-12 *	0	0
Propylene Glycol	0	0	0 *	0	0

Stream Properties

Property	Units	Flash	Liquids	Lube Oil Breathing	Lube Oil Flash	Lube Oil Loading
Temperature	°F	70 *	70	63.0342	63.0342	63.0342
Pressure	psia	14.6959 *	14.6959	2.00453E-10		
Mole Fraction Vapor	%	0	0	100	100	100
Mole Fraction Light Liquid	%	100	100	0		
Mole Fraction Heavy Liquid	%	0	0	0		
Molecular Weight	lb/lbmol	380	380	380		380
Mass Density	lb/ft^3	55.8932	55.8932	1.35793E-11		
Molar Flow	lbmol/h	0	0.0404942	4.49865E-15	0	0
Mass Flow	lb/h	0	15.3878	1.70949E-12	0	0
Vapor Volumetric Flow	ft^3/h	0	0.275307	0.125889	0	0
Liquid Volumetric Flow	gpm	0	0.034324	0.0156953	0	0
Std Vapor Volumetric Flow	MMSCFD	0	0.000368806	4.0972E-17	0	0
Std Liquid Volumetric Flow	sgpm	0	0.0341781	3.79697E-15	0	0
Compressibility		0.0175773	0.0175773	1		
Specific Gravity		0.896174	0.896174	13.1204		
API Gravity		25.713	25.713			
Enthalpy	Btu/h	0	-11994.7	-1.10277E-09	0	0
Mass Enthalpy	Btu/lb	-779.496	-779.496	-645.086		
Mass Cp	Btu/(lb*°F)	0.441559	0.441559	0.352675		
Ideal Gas CpCv Ratio		1.01486	1.01486	1.01504		1.01504
Dynamic Viscosity	cP	79.7422	79.7422	0.00357024		
Kinematic Viscosity	cSt	89.0653	89.0653	1.64134E+10		
Thermal Conductivity	Btu/(h*ft*°F)	0.0760457	0.0760457	0.00196317		
Surface Tension	lbf/ft	0.00229143	0.00229143			
Net Ideal Gas Heating Value	Btu/ft^3	18191.1	18191.1	18191.1		18191.1
Net Liquid Heating Value	Btu/lb	18022	18022	18022		18022
Gross Ideal Gas Heating Value	Btu/ft^3	19322.8	19322.8	19322.8		19322.8
Gross Liquid Heating Value	Btu/lb	19152.2	19152.2	19152.2		19152.2

Remarks

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Connections

	Lube Oil Working	Used Oil			
From Block	--	--			
To Block	--	Lube Oil Tank			

Stream Composition

Mole Fraction	Lube Oil Working %	Used Oil %			
Carbon Dioxide	0 *	0 *			
Nitrogen	0 *	0 *			
Methane	0 *	0 *			
Ethane	0 *	0 *			
Propane	0 *	0 *			
i-Butane	0 *	0 *			
n-Butane	0 *	0 *			
i-Pentane	0 *	0 *			
n-Pentane	0 *	0 *			
i-Hexane	0 *	0 *			
Heptane	0 *	0 *			
Octane	0 *	0 *			
Nonane	0 *	0 *			
Benzene	0 *	0 *			
Toluene	0 *	0 *			
Ethylbenzene	0 *	0 *			
m-Xylene	0 *	0 *			
n-Hexane	0 *	0 *			
2,2,4-Trimethylpentane	0 *	0 *			
Neopentane	0 *	0 *			
DecanesPlus	0 *	0 *			
Water	0 *	0 *			
Helium	0 *	0 *			
Hydrogen	0 *	0 *			
Oxygen	0 *	0 *			
Lube Oil	100 *	100 *			
Propylene Glycol	0 *	0 *			

Molar Flow	Lube Oil Working lbmol/h	Used Oil lbmol/h			
Carbon Dioxide	0 *	0 *			
Nitrogen	0 *	0 *			
Methane	0 *	0 *			
Ethane	0 *	0 *			
Propane	0 *	0 *			
i-Butane	0 *	0 *			
n-Butane	0 *	0 *			
i-Pentane	0 *	0 *			
n-Pentane	0 *	0 *			
i-Hexane	0 *	0 *			
Heptane	0 *	0 *			
Octane	0 *	0 *			
Nonane	0 *	0 *			
Benzene	0 *	0 *			
Toluene	0 *	0 *			
Ethylbenzene	0 *	0 *			
m-Xylene	0 *	0 *			
n-Hexane	0 *	0 *			
2,2,4-Trimethylpentane	0 *	0 *			
Neopentane	0 *	0 *			
DecanesPlus	0 *	0 *			

* User Specified Values
? Extrapolated or Approximate Values

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Molar Flow	Lube Oil Working lbmol/h	Used Oil lbmol/h			
Water	0 *	0 *			
Helium	0 *	0 *			
Hydrogen	0 *	0 *			
Oxygen	0 *	0 *			
Lube Oil	5.08231E-15 *	0.0404942 *			
Propylene Glycol	0 *	0 *			

Mass Fraction	Lube Oil Working %	Used Oil %			
Carbon Dioxide	0	0 *			
Nitrogen	0	0 *			
Methane	0	0 *			
Ethane	0	0 *			
Propane	0	0 *			
i-Butane	0	0 *			
n-Butane	0	0 *			
i-Pentane	0	0 *			
n-Pentane	0	0 *			
i-Hexane	0	0 *			
Heptane	0	0 *			
Octane	0	0 *			
Nonane	0	0 *			
Benzene	0	0 *			
Toluene	0	0 *			
Ethylbenzene	0	0 *			
m-Xylene	0	0 *			
n-Hexane	0	0 *			
2,2,4-Trimethylpentane	0	0 *			
Neopentane	0	0 *			
DecanesPlus	0	0 *			
Water	0	0 *			
Helium	0	0 *			
Hydrogen	0	0 *			
Oxygen	0	0 *			
Lube Oil	100	100 *			
Propylene Glycol	0	0 *			

Mass Flow	Lube Oil Working lb/h	Used Oil lb/h			
Carbon Dioxide	0 *	0 *			
Nitrogen	0 *	0 *			
Methane	0 *	0 *			
Ethane	0 *	0 *			
Propane	0 *	0 *			
i-Butane	0 *	0 *			
n-Butane	0 *	0 *			
i-Pentane	0 *	0 *			
n-Pentane	0 *	0 *			
i-Hexane	0 *	0 *			
Heptane	0 *	0 *			
Octane	0 *	0 *			
Nonane	0 *	0 *			
Benzene	0 *	0 *			
Toluene	0 *	0 *			
Ethylbenzene	0 *	0 *			
m-Xylene	0 *	0 *			
n-Hexane	0 *	0 *			
2,2,4-Trimethylpentane	0 *	0 *			

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Mass Flow	Lube Oil Working lb/h	Used Oil lb/h			
Neopentane	0 *	0 *			
Decanes Plus	0 *	0 *			
Water	0 *	0 *			
Helium	0 *	0 *			
Hydrogen	0 *	0 *			
Oxygen	0 *	0 *			
Lube Oil	1.93128E-12 *	15.3878 *			
Propylene Glycol	0 *	0 *			

Stream Properties

Property	Units	Lube Oil Working	Used Oil			
Temperature	°F	63.0342	70 *			
Pressure	psia	2.00453E-10	14.6959 *			
Mole Fraction Vapor	%	100	0			
Mole Fraction Light Liquid	%	0	100			
Mole Fraction Heavy Liquid	%	0	0			
Molecular Weight	lb/lbmol	380	380			
Mass Density	lb/ft^3	1.35793E-11	55.8932			
Molar Flow	lbmol/h	5.08231E-15	0.0404942			
Mass Flow	lb/h	1.93128E-12	15.3878			
Vapor Volumetric Flow	ft^3/h	0.142222	0.275307			
Liquid Volumetric Flow	gpm	0.0177316	0.034324			
Std Vapor Volumetric Flow	MMSCFD	4.62877E-17	0.000368806			
Std Liquid Volumetric Flow	sgpm	4.28959E-15	0.0341781 *			
Compressibility		1	0.0175773			
Specific Gravity		13.1204	0.896174			
API Gravity			25.713			
Enthalpy	Btu/h	-1.24584E-09	-11994.7			
Mass Enthalpy	Btu/lb	-645.086	-779.496			
Mass Cp	Btu/(lb*°F)	0.352675	0.441559			
Ideal Gas CpCv Ratio		1.01504	1.01486			
Dynamic Viscosity	cP	0.00357024	79.7422			
Kinematic Viscosity	cSt	1.64134E+10	89.0653			
Thermal Conductivity	Btu/(h*ft*°F)	0.00196317	0.0760457			
Surface Tension	lbf/ft		0.00229143			
Net Ideal Gas Heating Value	Btu/ft^3	18191.1	18191.1			
Net Liquid Heating Value	Btu/lb	18022	18022			
Gross Ideal Gas Heating Value	Btu/ft^3	19322.8	19322.8			
Gross Liquid Heating Value	Btu/lb	19152.2	19152.2			

Remarks

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Energy Stream Report

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Energy Streams

Energy Stream	Energy Rate	Power	From Block	To Block
Q-1	0 Btu/h	0 hp	--	Lube Oil Tank

Remarks

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Blocks
Lube Oil Tank
Separator Report

Client Name:	TC Energy	Job: Used Oil B04	
Location:	Walgrove Compressor Station	Modified: 9:40 AM, 9/11/2020	
Flowsheet:	Lube Oil	Status: Solved 12:36 PM, 4/8/2021	

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Used Oil	Inlet		Flash	Vapor Outlet	
Liquids	Light Liquid Outlet		Q-1	Energy	

Block Parameters

Pressure Drop	0	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	0	%	Heat Duty	0	Btu/h
Mole Fraction Light Liquid	100	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	0	%	Heat Release Curve Increments	10	

Remarks

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Flowsheet Environment
PR

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	
Flowsheet:	Lube Oil	

Environment Settings

Number of Poynting Intervals	0	Phase Tolerance	1 %
Gibbs Excess Model Evaluation Temperature	77 °F	Emulsion Enabled	False
Freeze Out Temperature Threshold Difference	10 °F		

Components

Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Carbon Dioxide	False	False	Toluene	False	False
Nitrogen	False	False	Ethylbenzene	False	False
Methane	False	False	m-Xylene	False	False
Ethane	False	False	n-Hexane	False	False
Propane	False	False	2,2,4-Trimethylpentane	False	False
i-Butane	False	False	Neopentane	False	False
n-Butane	False	False	Decanes Plus	False	False
i-Pentane	False	False	Water	False	True
n-Pentane	False	False	Helium	False	False
i-Hexane	False	False	Hydrogen	False	False
Heptane	False	False	Oxygen	False	False
Octane	False	False	Lube Oil	False	False
Nonane	False	False	Propylene Glycol	False	True
Benzene	False	False			

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

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Environments Report

Client Name:	TC Energy	Job: Used Oil B04	
Location:	Walgrove Compressor Station		

Project-Wide Constants

Atmospheric Pressure	14.6959 psia	Ideal Gas Reference Pressure	14.6959 psia
Ideal Gas Reference Temperature	60 °F	Ideal Gas Reference Volume	379.484 ft^3/lbmol
Liquid Reference Temperature	60 °F		

Environment [PR]

Environment Settings

Number of Poynting Intervals	0	Phase Tolerance	1 %
Gibbs Excess Model Evaluation Temperature	77 °F	Emulsion Enabled	False
Freeze Out Temperature Threshold Difference	10 °F		

Components

Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Carbon Dioxide	False	False	Toluene	False	False
Nitrogen	False	False	Ethylbenzene	False	False
Methane	False	False	m-Xylene	False	False
Ethane	False	False	n-Hexane	False	False
Propane	False	False	2,2,4-Trimethylpentane	False	False
i-Butane	False	False	Neopentane	False	False
n-Butane	False	False	Decanes Plus	False	False
i-Pentane	False	False	Water	False	True
n-Pentane	False	False	Helium	False	False
i-Hexane	False	False	Hydrogen	False	False
Heptane	False	False	Oxygen	False	False
Octane	False	False	Lube Oil	False	False
Nonane	False	False	Propylene Glycol	False	True
Benzene	False	False			

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

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Single Oil Report
Decanes Plus

Client Name:	TC Energy	Job: Used Oil B04	
Location:	Walgrove Compressor Station		

Properties

Volume Average Boiling Point	240.832	°F	Low Temperature Viscosity	0.441651	cP
* Molecular Weight	108.848	lb/lbmol	Temperature of High T Viscosity	210	°F
* Specific Gravity	0.7432		High Temperature Viscosity	0.256204	cP
API Gravity	58.8929		Watson K	11.9499	
Critical Temperature	563.715	°F	ASTM D86 10-90% Slope	0	°F/%
Critical Pressure	421.397	psia	ASTM D93 Flash Point	47.9739	°F
Critical Volume	6.98262	ft^3/lbmol	? Pour Point	-22.4869	°F
Acentric Factor	0.350921		Paraffinic Fraction	56.3105	%
Carbon to Hydrogen Ratio	5.84021		Naphthenic Fraction	29.8859	%
Refractive Index	1.41346		Aromatic Fraction	13.8037	%
Temperature of Low T Viscosity	100	°F	Ideal Gas Heat Capacity	38.2665	Btu/(lbmol*°F)

Warnings

ProMax:ProMax!Project!Oils!Decanes Plus!Properties!Pour Point

Warning: Pour Point calculation: The value of 240.832 °F for Volume Average Boiling Point should be between 340.33 °F and 1040.33 °F.

Remarks

* User Specified Values
? Extrapolated or Approximate Values

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Single Oil Report
Lube Oil

Client Name:	TC Energy	Job: Used Oil B04	
Location:	Walgrove Compressor Station		

Properties

Volume Average Boiling Point	791.482	°F	Low Temperature Viscosity	32.6194	cP
* Molecular Weight	380	lb/lbmol	Temperature of High T Viscosity	210	°F
* Specific Gravity	0.9		High Temperature Viscosity	4.52357	cP
API Gravity	25.7222		Watson K	11.9728	
Critical Temperature	1077.76	°F	ASTM D86 10-90% Slope	0	°F/%
Critical Pressure	162.989	psia	ASTM D93 Flash Point	427.922	°F
Critical Volume	20.2275	ft^3/lbmol	Pour Point	89.7805	°F
Acentric Factor	1.0209		Paraffinic Fraction	58.4435	%
? Carbon to Hydrogen Ratio	6.55722		Naphthenic Fraction	30.863	%
Refractive Index	1.49164		Aromatic Fraction	10.6935	%
Temperature of Low T Viscosity	100	°F	Ideal Gas Heat Capacity	133.295	Btu/(lbmol*°F)

Warnings

ProMax:ProMax!Project!Oils!Lube Oil!Properties!Carbon to Hydrogen Ratio

Warning: Carbon to Hydrogen Ratio calculation: The value of 791.482 °F for Volume Average Boiling Point should be between 80 °F and 650 °F.

Remarks

* User Specified Values
? Extrapolated or Approximate Values

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User Value Sets Report

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	

Lube Oil Tanks

User Value [BlockReady]

* Parameter	1		Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [ShellLength]

* Parameter	10.25	ft	Upper Bound	ft
Lower Bound		ft	* Enforce Bounds	False

User Value [ShellDiam]

* Parameter	5	ft	Upper Bound	ft
Lower Bound		ft	* Enforce Bounds	False

User Value [BreatherVP]

* Parameter	0.03	psig	Upper Bound	psig
Lower Bound		psig	* Enforce Bounds	False

User Value [BreatherVacP]

* Parameter	-0.03	psig	Upper Bound	psig
Lower Bound		psig	* Enforce Bounds	False

User Value [DomeRadius]

Parameter		ft	Upper Bound	ft
Lower Bound		ft	* Enforce Bounds	False

User Value [OpPress]

* Parameter	0	psig	Upper Bound	psig
Lower Bound		psig	* Enforce Bounds	False

User Value [AvgPercentLiq]

* Parameter	50	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [MaxPercentLiq]

* Parameter	90	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [MinPercentLiq]

* Parameter	10	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [AnnNetTP]

* Parameter	1.16926	bbl/day	Upper Bound	bbl/day
Lower Bound		bbl/day	* Enforce Bounds	False

User Value [OREff]

Parameter		%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [MaxAvgT]

* Parameter	61.5	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [MinAvgT]

* Parameter	39	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

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User Value Sets Report

Client Name:	TC Energy	Job: Used Oil B04	
Location:	Walgrove Compressor Station		

User Value [BulkLiqT]

* Parameter	52.7485	°F	Upper Bound		°F
Lower Bound		°F	* Enforce Bounds	False	

User Value [AvgP]

* Parameter	13.69	psia	Upper Bound		psia
Lower Bound		psia	* Enforce Bounds	False	

User Value [Thermal]

* Parameter	1173	Btu/ft^2/day	Upper Bound		Btu/ft^2/day
Lower Bound		Btu/ft^2/day	* Enforce Bounds	False	

User Value [AvgWindSpeed]

* Parameter	4.5	mi/h	Upper Bound		mi/h
Lower Bound		mi/h	* Enforce Bounds	False	

User Value [MaxHourlyLoadingRate]

Parameter		bbl/hr	Upper Bound		bbl/hr
Lower Bound		bbl/hr	* Enforce Bounds	False	

User Value [SumLiqLevelInc]

Parameter		ft/yr	Upper Bound		ft/yr
Lower Bound		ft/yr	* Enforce Bounds	False	

User Value [FlashingT]

* Parameter	63.0342	°F	Upper Bound		°F
Lower Bound		°F	* Enforce Bounds	False	

User Value [EntrainedOilFrac]

* Parameter	1	%	Upper Bound		%
Lower Bound		%	* Enforce Bounds	False	

User Value [TurnoverRate]

* Parameter	11.6875		Upper Bound		
Lower Bound			* Enforce Bounds	False	

User Value [LLossSatFactor]

Parameter			Upper Bound		
Lower Bound			* Enforce Bounds	False	

User Value [AtmPressure]

* Parameter	13.69	psia	Upper Bound		psia
Lower Bound		psia	* Enforce Bounds	False	

User Value [TVP]

* Parameter	1.03097E-10	psia	Upper Bound		psia
Lower Bound		psia	* Enforce Bounds	False	

User Value [MaxVP]

* Parameter	2.24532E-10	psia	Upper Bound		psia
Lower Bound		psia	* Enforce Bounds	False	

User Value [MinVP]

* Parameter	4.60202E-11	psia	Upper Bound		psia

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User Value Sets Report

Client Name:	TC Energy	Job: Used Oil B04	
Location:	Walgrove Compressor Station		

User Value [MinVP]

Lower Bound	psia	* Enforce Bounds	False

User Value [AvgLiqSurfaceT]

* Parameter	55.0403 °F	Upper Bound	°F
Lower Bound	°F	* Enforce Bounds	False

User Value [MaxLiqSurfaceT]

* Parameter	63.0342 °F	Upper Bound	°F
Lower Bound	°F	* Enforce Bounds	False

User Value [TotalLosses]

* Parameter	1.59465E-11 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [WorkingLosses]

* Parameter	8.45899E-12 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [StandingLosses]

* Parameter	7.48755E-12 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [RimSealLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [WithdrawalLoss]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [LoadingLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [MaxHourlyLoadingLoss]

* Parameter	0 lb/hr	Upper Bound	lb/hr
Lower Bound	lb/hr	* Enforce Bounds	False

User Value [PStar]

Parameter		Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [AllCTotalLosses]

* Parameter	1.59465E-11 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [AllCLoadingLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [AllCMaxHLoadingLoss]

* Parameter	0 lb/hr	Upper Bound	lb/hr
Lower Bound	lb/hr	* Enforce Bounds	False

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User Value Sets Report

Client Name:	TC Energy	Job: Used Oil B04	
Location:	Walgrove Compressor Station		

User Value [AllCFlashingLosses]

* Parameter	0	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [DeckFittingLosses]

* Parameter	0	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [DeckSeamLosses]

* Parameter	0	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [FlashingLosses]

* Parameter	0	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [TotalResidual]

* Parameter	67.3986	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [GasMoleWeight]

* Parameter	0.38	kg/mol	Upper Bound	kg/mol
Lower Bound		kg/mol	* Enforce Bounds	False

User Value [VapReportableFrac]

* Parameter	100	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [LiqReportableFrac]

* Parameter	100	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [FlashReportableFrac]

* Parameter	0	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={536570B8-E272-4395-BAC2-17288F878675}

Process Inputs

User Value [Sales Gas Target]

* Parameter	5	MMSCFD	Upper Bound	MMSCFD
Lower Bound		MMSCFD	* Enforce Bounds	False

User Value [Water Rate Target]

* Parameter	100	gal/yr	Upper Bound	gal/yr
Lower Bound		gal/yr	* Enforce Bounds	False

User Value [Condensate Rate Target]

* Parameter	0	gal/yr	Upper Bound	gal/yr
Lower Bound		gal/yr	* Enforce Bounds	False

Remarks

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User Value Sets Report

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	

Sum Component Flow/Frac.22

User Value [CompSum]

* Parameter	0	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={D6DFB694-43F4-4E3A-8577-215539325CBA}

Sum Component Flow/Frac.29

User Value [CompSum]

* Parameter	7.48755E-12	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={7EA90042-9816-419D-9F09-3EAAC154A08C}

Sum Component Flow/Frac.30

User Value [CompSum]

* Parameter	0	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={880917DC-E053-444A-BAF2-F2EA109E93B1}

Sum Component Flow/Frac.31

User Value [CompSum]

* Parameter	8.45899E-12	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={EF706861-0973-45CA-A058-2812F7D1D534}

Sum Component Flow/Frac.32

User Value [CompSum]

* Parameter	0	lb/h	Upper Bound		lb/h
Lower Bound		lb/h	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={B4263800-9182-4B49-B762-7F7C8FDDE3B9}

Sum Component Flow/Frac.33

User Value [CompSum]

* Parameter	1.70949E-12	lb/h	Upper Bound		lb/h

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User Value Sets Report

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	

Sum Component Flow/Frac.33

User Value [CompSum]

Lower Bound	lb/h	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={14ACFC2A-3815-429B-B179-110152AA57CB}

Sum Component Flow/Frac.34

User Value [CompSum]

* Parameter	0 lb/h	Upper Bound	lb/h
Lower Bound	lb/h	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={EE9183F2-474A-4A4E-ACD9-B5A0035597A6}

Sum Component Flow/Frac.35

User Value [CompSum]

* Parameter	1.93128E-12 lb/h	Upper Bound	lb/h
Lower Bound	lb/h	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={2741FD89-99BF-422D-B568-38CC5E94E4D7}

Sum Component Flow/Frac.36

User Value [CompSum]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={80310EA5-803B-412C-9093-F9FE48D1B421}

Sum Component Flow/Frac.37

User Value [CompSum]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={E6D8FB21-8C44-4D25-9FCF-A515FC7BA2E4}

Sum Component Flow/Frac.38

User Value [CompSum]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={2A6418BA-82BB-4076-B588-E4DACDDDEE44}

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User Value Sets Report

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	

Sum Component Flow/Frac.39

User Value [CompSum]

* Parameter	0 ton/yr		Upper Bound	ton/yr
Lower Bound	ton/yr		* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={33EEB289-8743-48CC-B202-E3ADB5692DF3}

Sum Component Flow/Frac.40

User Value [CompSum]

* Parameter	0 lb/h		Upper Bound	lb/h
Lower Bound	lb/h		* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={AFBCF255-3A8C-42A6-A284-BB413E28B013}

Sum Component Flow/Frac.41

User Value [CompSum]

* Parameter	0 lb/h		Upper Bound	lb/h
Lower Bound	lb/h		* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={176DF4CE-BE32-42FC-A0F4-9180C57257E0}

Sum Component Flow/Frac.42

User Value [CompSum]

* Parameter	0 lb/h		Upper Bound	lb/h
Lower Bound	lb/h		* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={F5A83A40-60FA-42F2-87DE-A0A2DCB198EA}

Sum Component Flow/Frac.43

User Value [CompSum]

* Parameter	0 lb/h		Upper Bound	lb/h
Lower Bound	lb/h		* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={48CFE74F-443F-4EDA-BC93-E174B30EB812}

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Recoveries Report

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	

Component Recoveries - Project Inlets

Status: Solved

Recovery Stream Data Source - All Inlets in Project

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Used Oil		

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	False	Atomic Basis	False

Tabulated Data

Index	Lube Oil:Used Oil lbmol/h	Summary Table lbmol/h		
Carbon Dioxide	0	0		
Nitrogen	0	0		
Methane	0	0		
Ethane	0	0		
Propane	0	0		
i-Butane	0	0		
n-Butane	0	0		
i-Pentane	0	0		
n-Pentane	0	0		
i-Hexane	0	0		
Heptane	0	0		
Octane	0	0		
Nonane	0	0		
Benzene	0	0		
Toluene	0	0		
Ethylbenzene	0	0		
m-Xylene	0	0		
n-Hexane	0	0		
2,2,4-Trimethylpentane	0	0		
Neopentane	0	0		
Decanes Plus	0	0		
Water	0	0		
Helium	0	0		
Hydrogen	0	0		
Oxygen	0	0		
Lube Oil	0.0404942	0.0404942		
Propylene Glycol	0	0		
Total	0.0404942	0.0404942		

Remarks

Component Recoveries - Project Outlets

Status: Solved

Recovery Stream Data Source - All Outlets in Project

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Flash	Lube Oil	Liquids

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	False	Atomic Basis	False

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Recoveries Report

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	

Tabulated Data

Index	Lube Oil:Flash lbmol/h	Lube Oil:Liquids lbmol/h	Summary Table lbmol/h	
Carbon Dioxide		0	0	
Nitrogen		0	0	
Methane		0	0	
Ethane		0	0	
Propane		0	0	
i-Butane		0	0	
n-Butane		0	0	
i-Pentane		0	0	
n-Pentane		0	0	
i-Hexane		0	0	
Heptane		0	0	
Octane		0	0	
Nonane		0	0	
Benzene		0	0	
Toluene		0	0	
Ethylbenzene		0	0	
m-Xylene		0	0	
n-Hexane		0	0	
2,2,4-Trimethylpentane		0	0	
Neopentane		0	0	
Decanes Plus		0	0	
Water		0	0	
Helium		0	0	
Hydrogen		0	0	
Oxygen		0	0	
Lube Oil		0.0404942	0.0404942	
Propylene Glycol		0	0	
Total		0.0404942	0.0404942	

Remarks

Component Recoveries - Project Losses

Status: Solved

Reference Stream Data Source - All Outlets in Project

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Flash	Lube Oil	Liquids

Recovery Stream Data Source - All Inlets in Project

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Used Oil		

Parameters

Composition Basis	Molar Flow	Summation Option	Summation Only
Calculate Ratios	False	Atomic Basis	False

Tabulated Data

Index	Summary Table lbmol/h			
Carbon Dioxide	0			
Nitrogen	0			
Methane	0			
Ethane	0			
Propane	0			
i-Butane	0			

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Recoveries Report

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	

Tabulated Data

Index	Summary Table lbmol/h			
n-Butane	0			
i-Pentane	0			
n-Pentane	0			
i-Hexane	0			
Heptane	0			
Octane	0			
Nonane	0			
Benzene	0			
Toluene	0			
Ethylbenzene	0			
m-Xylene	0			
n-Hexane	0			
2,2,4-Trimethylpentane	0			
Neopentane	0			
DecanesPlus	0			
Water	0			
Helium	0			
Hydrogen	0			
Oxygen	0			
Lube Oil	0			
Propylene Glycol	0			
Total	0			

Remarks

Component Recoveries - Project Recoveries

Status: Solved

Reference Stream Data Source - All Inlets in Project

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Used Oil		

Recovery Stream Data Source - All Outlets in Project

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Flash	Lube Oil	Liquids

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	True	Atomic Basis	False

Tabulated Data

Index	Lube Oil:Flash %	Lube Oil:Liquids %	Summary Table %	
Carbon Dioxide				
Nitrogen				
Methane				
Ethane				
Propane				
i-Butane				
n-Butane				
i-Pentane				
n-Pentane				
i-Hexane				
Heptane				

* User Specified Values
? Extrapolated or Approximate Values

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Recoveries Report

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	

Tabulated Data

Index	Lube Oil:Flash %	Lube Oil:Liquids %	Summary Table %	
Octane				
Nonane				
Benzene				
Toluene				
Ethylbenzene				
m-Xylene				
n-Hexane				
2,2,4-Trimethylpentane				
Neopentane				
Decanes Plus				
Water				
Helium				
Hydrogen				
Oxygen				
Lube Oil		100	100	
Propylene Glycol				
Total		100	100	

Remarks

Component Recoveries - Lube Oil Inlets

Status: Solved

Recovery Stream Data Source - All Inlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Used Oil		

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	False	Atomic Basis	False

Tabulated Data

Index	Lube Oil:Used Oil lbmol/h	Summary Table lbmol/h		
Carbon Dioxide	0	0		
Nitrogen	0	0		
Methane	0	0		
Ethane	0	0		
Propane	0	0		
i-Butane	0	0		
n-Butane	0	0		
i-Pentane	0	0		
n-Pentane	0	0		
i-Hexane	0	0		
Heptane	0	0		
Octane	0	0		
Nonane	0	0		
Benzene	0	0		
Toluene	0	0		
Ethylbenzene	0	0		
m-Xylene	0	0		
n-Hexane	0	0		
2,2,4-Trimethylpentane	0	0		
Neopentane	0	0		
Decanes Plus	0	0		

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Recoveries Report

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	

Tabulated Data

Index	Lube Oil:Used Oil lbmol/h	Summary Table lbmol/h		
Water	0	0		
Helium	0	0		
Hydrogen	0	0		
Oxygen	0	0		
Lube Oil	0.0404942	0.0404942		
Propylene Glycol	0	0		
Total	0.0404942	0.0404942		

Remarks

Component Recoveries - Lube Oil Outlets

Status: Solved

Recovery Stream Data Source - All Outlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Flash	Lube Oil	Liquids

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	False	Atomic Basis	False

Tabulated Data

Index	Lube Oil:Flash lbmol/h	Lube Oil:Liquids lbmol/h	Summary Table lbmol/h	
Carbon Dioxide		0	0	
Nitrogen		0	0	
Methane		0	0	
Ethane		0	0	
Propane		0	0	
i-Butane		0	0	
n-Butane		0	0	
i-Pentane		0	0	
n-Pentane		0	0	
i-Hexane		0	0	
Heptane		0	0	
Octane		0	0	
Nonane		0	0	
Benzene		0	0	
Toluene		0	0	
Ethylbenzene		0	0	
m-Xylene		0	0	
n-Hexane		0	0	
2,2,4-Trimethylpentane		0	0	
Neopentane		0	0	
DecanesPlus		0	0	
Water		0	0	
Helium		0	0	
Hydrogen		0	0	
Oxygen		0	0	
Lube Oil		0.0404942	0.0404942	
Propylene Glycol		0	0	
Total		0.0404942	0.0404942	

Remarks

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Recoveries Report

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	

Component Recoveries - Lube Oil Losses

Status: Solved

Reference Stream Data Source - All Outlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Flash	Lube Oil	Liquids

Recovery Stream Data Source - All Inlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Used Oil		

Parameters

Composition Basis	Molar Flow	Summation Option	Summation Only
Calculate Ratios	False	Atomic Basis	False

Tabulated Data

Index	Summary Table lbmol/h			
Carbon Dioxide	0			
Nitrogen	0			
Methane	0			
Ethane	0			
Propane	0			
i-Butane	0			
n-Butane	0			
i-Pentane	0			
n-Pentane	0			
i-Hexane	0			
Heptane	0			
Octane	0			
Nonane	0			
Benzene	0			
Toluene	0			
Ethylbenzene	0			
m-Xylene	0			
n-Hexane	0			
2,2,4-Trimethylpentane	0			
Neopentane	0			
DecanesPlus	0			
Water	0			
Helium	0			
Hydrogen	0			
Oxygen	0			
Lube Oil	0			
Propylene Glycol	0			
Total	0			

Remarks

Component Recoveries - Lube Oil Recoveries

Status: Solved

Reference Stream Data Source - All Inlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Used Oil		

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Recoveries Report

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	

Recovery Stream Data Source - All Outlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Lube Oil	Flash	Lube Oil	Liquids

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	True	Atomic Basis	False

Tabulated Data

Index	Lube Oil:Flash %	Lube Oil:Liquids %	Summary Table %	
Carbon Dioxide				
Nitrogen				
Methane				
Ethane				
Propane				
i-Butane				
n-Butane				
i-Pentane				
n-Pentane				
i-Hexane				
Heptane				
Octane				
Nonane				
Benzene				
Toluene				
Ethylbenzene				
m-Xylene				
n-Hexane				
2,2,4-Trimethylpentane				
Neopentane				
Decanes Plus				
Water				
Helium				
Hydrogen				
Oxygen				
Lube Oil		100	100	
Propylene Glycol				
Total		100	100	

Remarks

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Energy Budgets Report

Client Name:	TC Energy	Job: Used Oil B04	
Location:	Walgrove Compressor Station		

Power Budget - Project Power Budget

Status: Solved

Parameters

Net Power	0 hp	Total Power Required	0 hp
Total Power Supplied	0 hp	External Energy Only	True

Remarks

Heat Budget - Project Heat Budget

Status: Solved

Heat Budget Data Source - All Exchangers in Project

Flowsheet	Block	Flowsheet	Block
Lube Oil	Lube Oil Tank		

Parameters

Net Duty	0 Btu/h	Total Duty Required	0 Btu/h
Total Duty Supplied	0 Btu/h	External Energy Only	True

Tabulated Data

Index	Block Duty Btu/h	Block Highest Temperature °F	Block Lowest Temperature °F	
Lube Oil:Lube Oil Tank	0	70	70	

Remarks

Power Budget - Lube Oil Power Budget

Status: Solved

Parameters

Net Power	0 hp	Total Power Required	0 hp
Total Power Supplied	0 hp	External Energy Only	True

Remarks

Heat Budget - Lube Oil Heat Budget

Status: Solved

Heat Budget Data Source - All Exchangers in Flowsheet

Flowsheet	Block	Flowsheet	Block
Lube Oil	Lube Oil Tank		

Parameters

Net Duty	0 Btu/h	Total Duty Required	0 Btu/h
Total Duty Supplied	0 Btu/h	External Energy Only	True

Tabulated Data

Index	Block Duty Btu/h	Block Highest Temperature °F	Block Lowest Temperature °F	
Lube Oil:Lube Oil Tank	0	70	70	

Remarks

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Energy Budgets Report

Client Name:	TC Energy	Job: Used Oil B04
Location:	Walgrove Compressor Station	

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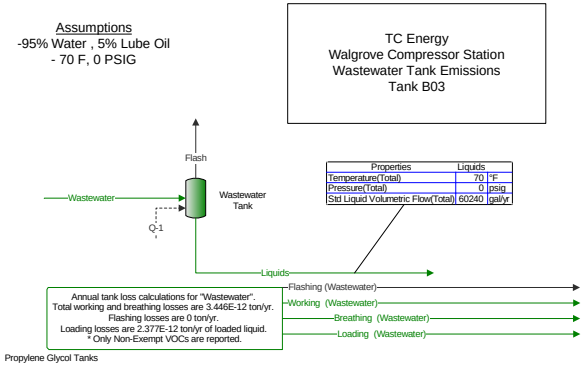
Wastewater
Plant Schematic

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	
Flowsheet:	Wastewater	



"Flashing (Wastewater)" VOCs = 0 ton/yr	"Flashing (Wastewater)" VOCs = 0 lb/h
"Breathing (Wastewater)" VOCs = 1.817E-12 ton/yr	"Breathing (Wastewater)" VOCs = 4.148E-13 lb/h
"Loading (Wastewater)" VOCs = 2.377E-12 ton/yr	"Loading (Wastewater)" VOCs = 5.428E-13 lb/h
"Working (Wastewater)" VOCs = 1.629E-12 ton/yr	"Working (Wastewater)" VOCs = 3.720E-13 lb/h
"Flashing (Wastewater)" HAPs = 0 ton/yr	"Flashing (Wastewater)" HAPs = 0 lb/h
"Breathing (Wastewater)" HAPs = 0 ton/yr	"Breathing (Wastewater)" HAPs = 0 lb/h
"Loading (Wastewater)" HAPs = 0 ton/yr	"Loading (Wastewater)" HAPs = 0 lb/h
"Working (Wastewater)" HAPs = 0 ton/yr	"Working (Wastewater)" HAPs = 0 lb/h

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	
Flowsheet:	Wastewater	

Connections

	Breathing (Wastewater)	Flash	Flashing (Wastewater)	Liquids	Loading (Wastewater)
From Block	--	Wastewater Tank	--	Wastewater Tank	--
To Block	--	--	--	--	--

Stream Composition

Mole Fraction	Breathing (Wastewater) %	Flash %	Flashing (Wastewater) %	Liquids %	Loading (Wastewater) %
Carbon Dioxide	0 *			0	0 *
Nitrogen	0 *			0	0 *
Methane	0 *			0	0 *
Ethane	0 *			0	0 *
Propane	0 *			0	0 *
i-Butane	0 *			0	0 *
n-Butane	0 *			0	0 *
i-Pentane	0 *			0	0 *
n-Pentane	0 *			0	0 *
i-Hexane	0 *			0	0 *
Heptane	0 *			0	0 *
Octane	0 *			0	0 *
Nonane	0 *			0	0 *
Benzene	0 *			0	0 *
Toluene	0 *			0	0 *
Ethylbenzene	0 *			0	0 *
m-Xylene	0 *			0	0 *
n-Hexane	0 *			0	0 *
2,2,4-Trimethylpentane	0 *			0	0 *
Neopentane	0 *			0	0 *
DecanesPlus	0 *			0	0 *
Water	100 *			95	100 *
Helium	0 *			0	0 *
Hydrogen	0 *			0	0 *
Oxygen	0 *			0	0 *
Lube Oil	2.76879E-09 *			5	2.76879E-09 *
Propylene Glycol	0 *			0	0 *

Molar Flow	Breathing (Wastewater) lbmol/h	Flash lbmol/h	Flashing (Wastewater) lbmol/h	Liquids lbmol/h	Loading (Wastewater) lbmol/h
Carbon Dioxide	0 *	0	0	0	0 *
Nitrogen	0 *	0	0	0	0 *
Methane	0 *	0	0	0	0 *
Ethane	0 *	0	0	0	0 *
Propane	0 *	0	0	0	0 *
i-Butane	0 *	0	0	0	0 *
n-Butane	0 *	0	0	0	0 *
i-Pentane	0 *	0	0	0	0 *
n-Pentane	0 *	0	0	0	0 *
i-Hexane	0 *	0	0	0	0 *
Heptane	0 *	0	0	0	0 *
Octane	0 *	0	0	0	0 *
Nonane	0 *	0	0	0	0 *
Benzene	0 *	0	0	0	0 *
Toluene	0 *	0	0	0	0 *
Ethylbenzene	0 *	0	0	0	0 *
m-Xylene	0 *	0	0	0	0 *
n-Hexane	0 *	0	0	0	0 *
2,2,4-Trimethylpentane	0 *	0	0	0	0 *
Neopentane	0 *	0	0	0	0 *

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	
Flowsheet:	Wastewater	

Molar Flow	Breathing (Wastewater) lbmol/h	Flash lbmol/h	Flashing (Wastewater) lbmol/h	Liquids lbmol/h	Loading (Wastewater) lbmol/h
Decanes Plus	0 *	0	0	0	0 *
Water	3.94212E-05 *	0	0	1.42488	5.15879E-05 *
Helium	0 *	0	0	0	0 *
Hydrogen	0 *	0	0	0	0 *
Oxygen	0 *	0	0	0	0 *
Lube Oil	1.09149E-15 *	0	0	0.0749937	1.42836E-15 *
Propylene Glycol	0 *	0	0	0	0 *

Mass Fraction	Breathing (Wastewater) %	Flash %	Flashing (Wastewater) %	Liquids %	Loading (Wastewater) %
Carbon Dioxide	0			0	0
Nitrogen	0			0	0
Methane	0			0	0
Ethane	0			0	0
Propane	0			0	0
i-Butane	0			0	0
n-Butane	0			0	0
i-Pentane	0			0	0
n-Pentane	0			0	0
i-Hexane	0			0	0
Heptane	0			0	0
Octane	0			0	0
Nonane	0			0	0
Benzene	0			0	0
Toluene	0			0	0
Ethylbenzene	0			0	0
m-Xylene	0			0	0
n-Hexane	0			0	0
2,2,4-Trimethylpentane	0			0	0
Neopentane	0			0	0
Decanes Plus	0			0	0
Water	100			47.3896	100
Helium	0			0	0
Hydrogen	0			0	0
Oxygen	0			0	0
Lube Oil	5.84027E-08			52.6104	5.84027E-08
Propylene Glycol	0			0	0

Mass Flow	Breathing (Wastewater) lb/h	Flash lb/h	Flashing (Wastewater) lb/h	Liquids lb/h	Loading (Wastewater) lb/h
Carbon Dioxide	0 *	0	0	0	0 *
Nitrogen	0 *	0	0	0	0 *
Methane	0 *	0	0	0	0 *
Ethane	0 *	0	0	0	0 *
Propane	0 *	0	0	0	0 *
i-Butane	0 *	0	0	0	0 *
n-Butane	0 *	0	0	0	0 *
i-Pentane	0 *	0	0	0	0 *
n-Pentane	0 *	0	0	0	0 *
i-Hexane	0 *	0	0	0	0 *
Heptane	0 *	0	0	0	0 *
Octane	0 *	0	0	0	0 *
Nonane	0 *	0	0	0	0 *
Benzene	0 *	0	0	0	0 *
Toluene	0 *	0	0	0	0 *
Ethylbenzene	0 *	0	0	0	0 *
m-Xylene	0 *	0	0	0	0 *
n-Hexane	0 *	0	0	0	0 *

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	
Flowsheet:	Wastewater	

Mass Flow	Breathing (Wastewater) lb/h	Flash lb/h	Flashing (Wastewater) lb/h	Liquids lb/h	Loading (Wastewater) lb/h
2,2,4-Trimethylpentane	0 *	0	0	0	0 *
Neopentane	0 *	0	0	0	0 *
Decanes Plus	0 *	0	0	0	0 *
Water	0.000710184 *	0	0	25.6696	0.000929371 *
Helium	0 *	0	0	0	0 *
Hydrogen	0 *	0	0	0	0 *
Oxygen	0 *	0	0	0	0 *
Lube Oil	4.14767E-13 *	0	0	28.4976	5.42778E-13 *
Propylene Glycol	0 *	0	0	0	0 *

Stream Properties

Property	Units	Breathing (Wastewater)	Flash	Flashing (Wastewater)	Liquids	Loading (Wastewater)
Temperature	°F	65.3768	70 *	65.3768	70	65.3768
Pressure	psia	0.30998	14.6959 *		14.6959	0.30998
Mole Fraction Vapor	%	100		100	0	100
Mole Fraction Light Liquid	%	0			5.00307	0
Mole Fraction Heavy Liquid	%	0			94.9969	0
Molecular Weight	lb/lbmol	18.0153			36.1145	18.0153
Mass Density	lb/ft^3	0.000991426			58.7518	0.000991426
Molar Flow	lbmol/h	3.94212E-05	0	0	1.49987	5.15879E-05
Mass Flow	lb/h	0.000710184	0	0	54.1672	0.000929371
Vapor Volumetric Flow	ft^3/h	0.716326	0	0	0.921968	0.937409
Liquid Volumetric Flow	gpm	0.0893082	0	0	0.114947	0.116872
Std Vapor Volumetric Flow	MMSCFD	3.59033E-07	0	0	0.0136603	4.69843E-07
Std Liquid Volumetric Flow	sgpm	1.41971E-06	0	0	0.114612	1.85788E-06
Compressibility		0.999661			0.00158924	0.999661
Specific Gravity		0.622021			0.942007	0.622021
API Gravity					18.2703	
Enthalpy	Btu/h	-4.10222	0	0	-197488	-5.36831
Mass Enthalpy	Btu/lb	-5776.28			-3645.9	-5776.28
Mass Cp	Btu/(lb*°F)	0.448426			0.697746	0.448426
Ideal Gas CpCv Ratio		1.32606			1.1592	1.32606
Dynamic Viscosity	cP	0.00973587			44.4671	0.00973587
Kinematic Viscosity	cSt	613.047			47.2495	613.047
Thermal Conductivity	Btu/(h*ft*°F)	0.0115612			0.197215	0.0115612
Surface Tension	lbf/ft				0.0035171	
Net Ideal Gas Heating Value	Btu/ft^3	5.03673E-07			909.553	5.03673E-07
Net Liquid Heating Value	Btu/lb	-1059.76			8979.21	-1059.76
Gross Ideal Gas Heating Value	Btu/ft^3	50.31			1013.94	50.31
Gross Liquid Heating Value	Btu/lb	1.11854E-05			10076.1	1.11854E-05

Remarks

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	
Flowsheet:	Wastewater	

Connections

	Wastewater	Working (Wastewater)			
From Block	--	--			
To Block	Wastewater Tank	--			

Stream Composition

Mole Fraction	Wastewater %	Working (Wastewater) %			
Carbon Dioxide	0 *	0 *			
Nitrogen	0 *	0 *			
Methane	0 *	0 *			
Ethane	0 *	0 *			
Propane	0 *	0 *			
i-Butane	0 *	0 *			
n-Butane	0 *	0 *			
i-Pentane	0 *	0 *			
n-Pentane	0 *	0 *			
i-Hexane	0 *	0 *			
Heptane	0 *	0 *			
Octane	0 *	0 *			
Nonane	0 *	0 *			
Benzene	0 *	0 *			
Toluene	0 *	0 *			
Ethylbenzene	0 *	0 *			
m-Xylene	0 *	0 *			
n-Hexane	0 *	0 *			
2,2,4-Trimethylpentane	0 *	0 *			
Neopentane	0 *	0 *			
DecanesPlus	0 *	0 *			
Water	95 *	100 *			
Helium	0 *	0 *			
Hydrogen	0 *	0 *			
Oxygen	0 *	0 *			
Lube Oil	5 *	2.76879E-09 *			
Propylene Glycol	0 *	0 *			

Molar Flow	Wastewater lbmol/h	Working (Wastewater) lbmol/h			
Carbon Dioxide	0 *	0 *			
Nitrogen	0 *	0 *			
Methane	0 *	0 *			
Ethane	0 *	0 *			
Propane	0 *	0 *			
i-Butane	0 *	0 *			
n-Butane	0 *	0 *			
i-Pentane	0 *	0 *			
n-Pentane	0 *	0 *			
i-Hexane	0 *	0 *			
Heptane	0 *	0 *			
Octane	0 *	0 *			
Nonane	0 *	0 *			
Benzene	0 *	0 *			
Toluene	0 *	0 *			
Ethylbenzene	0 *	0 *			
m-Xylene	0 *	0 *			
n-Hexane	0 *	0 *			
2,2,4-Trimethylpentane	0 *	0 *			
Neopentane	0 *	0 *			

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	
Flowsheet:	Wastewater	

Molar Flow	Wastewater lbmol/h	Working (Wastewater) lbmol/h			
Decanes Plus	0 *	0 *			
Water	1.42488 *	3.53553E-05 *			
Helium	0 *	0 *			
Hydrogen	0 *	0 *			
Oxygen	0 *	0 *			
Lube Oil	0.0749937 *	9.78917E-16 *			
Propylene Glycol	0 *	0 *			

Mass Fraction	Wastewater %	Working (Wastewater) %			
Carbon Dioxide	0 *	0			
Nitrogen	0 *	0			
Methane	0 *	0			
Ethane	0 *	0			
Propane	0 *	0			
i-Butane	0 *	0			
n-Butane	0 *	0			
i-Pentane	0 *	0			
n-Pentane	0 *	0			
i-Hexane	0 *	0			
Heptane	0 *	0			
Octane	0 *	0			
Nonane	0 *	0			
Benzene	0 *	0			
Toluene	0 *	0			
Ethylbenzene	0 *	0			
m-Xylene	0 *	0			
n-Hexane	0 *	0			
2,2,4-Trimethylpentane	0 *	0			
Neopentane	0 *	0			
Decanes Plus	0 *	0			
Water	47.3896 *	100			
Helium	0 *	0			
Hydrogen	0 *	0			
Oxygen	0 *	0			
Lube Oil	52.6104 *	5.84027E-08			
Propylene Glycol	0 *	0			

Mass Flow	Wastewater lb/h	Working (Wastewater) lb/h			
Carbon Dioxide	0 *	0 *			
Nitrogen	0 *	0 *			
Methane	0 *	0 *			
Ethane	0 *	0 *			
Propane	0 *	0 *			
i-Butane	0 *	0 *			
n-Butane	0 *	0 *			
i-Pentane	0 *	0 *			
n-Pentane	0 *	0 *			
i-Hexane	0 *	0 *			
Heptane	0 *	0 *			
Octane	0 *	0 *			
Nonane	0 *	0 *			
Benzene	0 *	0 *			
Toluene	0 *	0 *			
Ethylbenzene	0 *	0 *			
m-Xylene	0 *	0 *			
n-Hexane	0 *	0 *			

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Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	
Flowsheet:	Wastewater	

Mass Flow	Wastewater lb/h	Working (Wastewater) lb/h			
2,2,4-Trimethylpentane	0 *	0 *			
Neopentane	0 *	0 *			
Decanes Plus	0 *	0 *			
Water	25.6696 *	0.000636936 *			
Helium	0 *	0 *			
Hydrogen	0 *	0 *			
Oxygen	0 *	0 *			
Lube Oil	28.4976 *	3.71988E-13 *			
Propylene Glycol	0 *	0 *			

Stream Properties

Property	Units	Wastewater	Working (Wastewater)			
Temperature	°F	70 *	65.3768			
Pressure	psia	14.6959 *	0.30998			
Mole Fraction Vapor	%	0	100			
Mole Fraction Light Liquid	%	5.00307	0			
Mole Fraction Heavy Liquid	%	94.9969	0			
Molecular Weight	lb/lbmol	36.1145	18.0153			
Mass Density	lb/ft^3	58.7518	0.000991426			
Molar Flow	lbmol/h	1.49987	3.53553E-05			
Mass Flow	lb/h	54.1672	0.000636936			
Vapor Volumetric Flow	ft^3/h	0.921968	0.642445			
Liquid Volumetric Flow	gpm	0.114947	0.080097			
Std Vapor Volumetric Flow	MMSCFD	0.0136603	3.22003E-07			
Std Liquid Volumetric Flow	sgpm	0.114612 *	1.27328E-06			
Compressibility		0.00158924	0.999661			
Specific Gravity		0.942007	0.622021			
API Gravity		18.2703				
Enthalpy	Btu/h	-197488	-3.67912			
Mass Enthalpy	Btu/lb	-3645.9	-5776.28			
Mass Cp	Btu/(lb*°F)	0.697746	0.448426			
Ideal Gas CpCv Ratio		1.1592	1.32606			
Dynamic Viscosity	cP	44.4671	0.00973587			
Kinematic Viscosity	cSt	47.2495	613.047			
Thermal Conductivity	Btu/(h*ft*°F)	0.197215	0.0115612			
Surface Tension	lbf/ft	0.0035171				
Net Ideal Gas Heating Value	Btu/ft^3	909.553	5.03673E-07			
Net Liquid Heating Value	Btu/lb	8979.21	-1059.76			
Gross Ideal Gas Heating Value	Btu/ft^3	1013.94	50.31			
Gross Liquid Heating Value	Btu/lb	10076.1	1.11854E-05			

Remarks

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Energy Stream Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	
Flowsheet:	Wastewater	

Energy Streams

Energy Stream	Energy Rate	Power	From Block	To Block
Q-1	0 Btu/h	0 hp	--	Wastewater Tank

Remarks

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Blocks
Wastewater Tank
Separator Report

Client Name:	TC Energy	Job: Wastewater Tank B03	
Location:	Walgrove Compressor Station	Modified: 3:18 PM, 10/16/2020	
Flowsheet:	Wastewater	Status: Solved 12:14 PM, 4/8/2021	

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Wastewater	Inlet		Flash	Vapor Outlet	
Liquids	Light Liquid Outlet		Q-1	Energy	

Block Parameters

Pressure Drop	0	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	0	%	Heat Duty	0	Btu/h
Mole Fraction Light Liquid	5.00307	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	94.9969	%	Heat Release Curve Increments	10	

Remarks

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Flowsheet Environment
PR

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	
Flowsheet:	Wastewater	

Environment Settings

Number of Poynting Intervals	0	Phase Tolerance	1 %
Gibbs Excess Model Evaluation Temperature	77 °F	Emulsion Enabled	False
Freeze Out Temperature Threshold Difference	10 °F		

Components

Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Carbon Dioxide	False	False	Toluene	False	False
Nitrogen	False	False	Ethylbenzene	False	False
Methane	False	False	m-Xylene	False	False
Ethane	False	False	n-Hexane	False	False
Propane	False	False	2,2,4-Trimethylpentane	False	False
i-Butane	False	False	Neopentane	False	False
n-Butane	False	False	Decanes Plus	False	False
i-Pentane	False	False	Water	False	True
n-Pentane	False	False	Helium	False	False
i-Hexane	False	False	Hydrogen	False	False
Heptane	False	False	Oxygen	False	False
Octane	False	False	Lube Oil	False	False
Nonane	False	False	Propylene Glycol	False	True
Benzene	False	False			

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

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Environments Report

Client Name:	TC Energy	Job: Wastewater Tank B03	
Location:	Walgrove Compressor Station		

Project-Wide Constants

Atmospheric Pressure	14.6959 psia	Ideal Gas Reference Pressure	14.6959 psia
Ideal Gas Reference Temperature	60 °F	Ideal Gas Reference Volume	379.484 ft^3/lbmol
Liquid Reference Temperature	60 °F		

Environment [PR]

Environment Settings

Number of Poynting Intervals	0	Phase Tolerance	1 %
Gibbs Excess Model Evaluation Temperature	77 °F	Emulsion Enabled	False
Freeze Out Temperature Threshold Difference	10 °F		

Components

Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Carbon Dioxide	False	False	Toluene	False	False
Nitrogen	False	False	Ethylbenzene	False	False
Methane	False	False	m-Xylene	False	False
Ethane	False	False	n-Hexane	False	False
Propane	False	False	2,2,4-Trimethylpentane	False	False
i-Butane	False	False	Neopentane	False	False
n-Butane	False	False	Decanes Plus	False	False
i-Pentane	False	False	Water	False	True
n-Pentane	False	False	Helium	False	False
i-Hexane	False	False	Hydrogen	False	False
Heptane	False	False	Oxygen	False	False
Octane	False	False	Lube Oil	False	False
Nonane	False	False	Propylene Glycol	False	True
Benzene	False	False			

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

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Single Oil Report
Decanes Plus

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

Properties

Volume Average Boiling Point	240.832	°F	Low Temperature Viscosity	0.441651	cP
* Molecular Weight	108.848	lb/lbmol	Temperature of High T Viscosity	210	°F
* Specific Gravity	0.7432		High Temperature Viscosity	0.256204	cP
API Gravity	58.8929		Watson K	11.9499	
Critical Temperature	563.715	°F	ASTM D86 10-90% Slope	0	°F/%
Critical Pressure	421.397	psia	ASTM D93 Flash Point	47.9739	°F
Critical Volume	6.98262	ft^3/lbmol	? Pour Point	-22.4869	°F
Acentric Factor	0.350921		Paraffinic Fraction	56.3105	%
Carbon to Hydrogen Ratio	5.84021		Naphthenic Fraction	29.8859	%
Refractive Index	1.41346		Aromatic Fraction	13.8037	%
Temperature of Low T Viscosity	100	°F	Ideal Gas Heat Capacity	38.2665	Btu/(lbmol*°F)

Warnings

ProMax:ProMax!Project!Oils!Decanes Plus!Properties!Pour Point

Warning: Pour Point calculation: The value of 240.832 °F for Volume Average Boiling Point should be between 340.33 °F and 1040.33 °F.

Remarks

* User Specified Values
? Extrapolated or Approximate Values

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Single Oil Report
Lube Oil

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

Properties

Volume Average Boiling Point	791.482	°F	Low Temperature Viscosity	32.6194	cP
* Molecular Weight	380	lb/lbmol	Temperature of High T Viscosity	210	°F
* Specific Gravity	0.9		High Temperature Viscosity	4.52357	cP
API Gravity	25.7222		Watson K	11.9728	
Critical Temperature	1077.76	°F	ASTM D86 10-90% Slope	0	°F/%
Critical Pressure	162.989	psia	ASTM D93 Flash Point	427.922	°F
Critical Volume	20.2275	ft^3/lbmol	Pour Point	89.7805	°F
Acentric Factor	1.0209		Paraffinic Fraction	58.4435	%
? Carbon to Hydrogen Ratio	6.55722		Naphthenic Fraction	30.863	%
Refractive Index	1.49164		Aromatic Fraction	10.6935	%
Temperature of Low T Viscosity	100	°F	Ideal Gas Heat Capacity	133.295	Btu/(lbmol*°F)

Warnings

ProMax:ProMax!Project!Oils!Lube Oil!Properties!Carbon to Hydrogen Ratio

Warning: Carbon to Hydrogen Ratio calculation: The value of 791.482 °F for Volume Average Boiling Point should be between 80 °F and 650 °F.

Remarks

* User Specified Values
? Extrapolated or Approximate Values

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User Value Sets Report

Client Name:	TC Energy	Job: Wastewater Tank B03	
Location:	Walgrove Compressor Station		

Process Inputs

User Value [Sales Gas Target]

* Parameter	5	MMSCFD	Upper Bound		MMSCFD
Lower Bound		MMSCFD	* Enforce Bounds	False	

User Value [Water Rate Target]

* Parameter	100	gal/yr	Upper Bound		gal/yr
Lower Bound		gal/yr	* Enforce Bounds	False	

User Value [Condensate Rate Target]

* Parameter	0	gal/yr	Upper Bound		gal/yr
Lower Bound		gal/yr	* Enforce Bounds	False	

Remarks

Propylene Glycol Tanks

User Value [BlockReady]

* Parameter	1		Upper Bound		
Lower Bound			* Enforce Bounds	False	

User Value [ShellLength]

* Parameter	12	ft	Upper Bound		ft
Lower Bound		ft	* Enforce Bounds	False	

User Value [ShellDiam]

* Parameter	8.5	ft	Upper Bound		ft
Lower Bound		ft	* Enforce Bounds	False	

User Value [BreatherVP]

* Parameter	0.03	psig	Upper Bound		psig
Lower Bound		psig	* Enforce Bounds	False	

User Value [BreatherVacP]

* Parameter	-0.03	psig	Upper Bound		psig
Lower Bound		psig	* Enforce Bounds	False	

User Value [DomeRadius]

Parameter		ft	Upper Bound		ft
Lower Bound		ft	* Enforce Bounds	False	

User Value [OpPress]

* Parameter	0	psig	Upper Bound		psig
Lower Bound		psig	* Enforce Bounds	False	

User Value [AvgPercentLiq]

* Parameter	50	%	Upper Bound		%
Lower Bound		%	* Enforce Bounds	False	

User Value [MaxPercentLiq]

* Parameter	90	%	Upper Bound		%
Lower Bound		%	* Enforce Bounds	False	

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User Value Sets Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

User Value [MinPercentLiq]

* Parameter	10	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [AnnNetTP]

* Parameter	3.92514	bbl/day	Upper Bound	bbl/day
Lower Bound		bbl/day	* Enforce Bounds	False

User Value [OREff]

* Parameter	0	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [MaxAvgT]

* Parameter	61.5	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [MinAvgT]

* Parameter	39	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [BulkLiqT]

* Parameter	53.4171	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [AvgP]

* Parameter	13.69	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [ThermI]

* Parameter	1173	Btu/ft^2/day	Upper Bound	Btu/ft^2/day
Lower Bound		Btu/ft^2/day	* Enforce Bounds	False

User Value [AvgWindSpeed]

* Parameter	4.5	mi/h	Upper Bound	mi/h
Lower Bound		mi/h	* Enforce Bounds	False

User Value [MaxHourlyLoadingRate]

Parameter		bbl/hr	Upper Bound	bbl/hr
Lower Bound		bbl/hr	* Enforce Bounds	False

User Value [SumLiqLevelInc]

Parameter		ft/yr	Upper Bound	ft/yr
Lower Bound		ft/yr	* Enforce Bounds	False

User Value [FlashingT]

* Parameter	65.3768	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [EntrainedOilFrac]

* Parameter	1	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [TurnoverRate]

* Parameter	11.5961		Upper Bound	
Lower Bound			* Enforce Bounds	False

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User Value Sets Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

User Value [LLossSatFactor]

* Parameter	1.45	Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [AtmPressure]

* Parameter	13.69	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [TVP]

* Parameter	0.214556	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [MaxVP]

* Parameter	0.294328	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [MinVP]

* Parameter	0.154435	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [AvgLiqSurfaceT]

* Parameter	56.4765	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [MaxLiqSurfaceT]

* Parameter	65.3768	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [TotalLosses]

* Parameter	3.44599E-12	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [WorkingLosses]

* Parameter	1.62931E-12	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [StandingLosses]

* Parameter	1.81668E-12	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [RimSealLosses]

* Parameter	0	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [WithdrawalLoss]

* Parameter	0	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [LoadingLosses]

* Parameter	2.37737E-12	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [MaxHourlyLoadingLoss]

* Parameter	0	lb/hr	Upper Bound	lb/hr

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User Value Sets Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

User Value [MaxHourlyLoadingLoss]

Lower Bound		lb/hr	* Enforce Bounds		False

User Value [PStar]

Parameter			Upper Bound		
Lower Bound			* Enforce Bounds		False

User Value [AllCTotalLosses]

* Parameter	0.00590039	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds		False

User Value [AllCLoadingLosses]

* Parameter	0.00407065	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds		False

User Value [AllCMaxHLoadingLoss]

Parameter		lb/hr	Upper Bound		lb/hr
Lower Bound		lb/hr	* Enforce Bounds		False

User Value [AllCFlashingLosses]

* Parameter	0	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds		False

User Value [DeckFittingLosses]

* Parameter	0	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds		False

User Value [DeckSeamLosses]

* Parameter	0	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds		False

User Value [FlashingLosses]

* Parameter	0	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds		False

User Value [TotalResidual]

* Parameter	237.247	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds		False

User Value [GasMoleWeight]

* Parameter	0.0180153	kg/mol	Upper Bound		kg/mol
Lower Bound		kg/mol	* Enforce Bounds		False

User Value [VapReportableFrac]

* Parameter	5.84027E-08	%	Upper Bound		%
Lower Bound		%	* Enforce Bounds		False

User Value [LiqReportableFrac]

* Parameter	52.6104	%	Upper Bound		%
Lower Bound		%	* Enforce Bounds		False

User Value [FlashReportableFrac]

* Parameter	0	%	Upper Bound		%
Lower Bound		%	* Enforce Bounds		False

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User Value Sets Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

Remarks
This User Value Set was programmatically generated. GUID={2B36A6D8-C8D1-4CD2-9AE9-43032096E4C0}

Sum Component Flow/Frac.22

User Value [CompSum]

* Parameter	0	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={4357C5FC-CEB2-4442-A1F4-459C0F79940A}

Sum Component Flow/Frac.29

User Value [CompSum]

* Parameter	1.81668E-12	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={9857F953-08E3-4933-8F92-2C95AAAA906A}

Sum Component Flow/Frac.30

User Value [CompSum]

* Parameter	2.37737E-12	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={9C3A165A-84A6-4C39-B59F-E141C34E0C72}

Sum Component Flow/Frac.31

User Value [CompSum]

* Parameter	1.62931E-12	ton/yr	Upper Bound		ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={071E1B34-05C2-47CC-A085-3899527648C5}

Sum Component Flow/Frac.32

User Value [CompSum]

* Parameter	0	lb/h	Upper Bound		lb/h
Lower Bound		lb/h	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={F5A120A0-A5E7-452A-A7E7-C242FA991327}

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User Value Sets Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

Sum Component Flow/Frac.33

User Value [CompSum]

* Parameter	4.14767E-13	lb/h	Upper Bound	lb/h
Lower Bound		lb/h	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={CB3705AB-1F89-4C62-BF55-8508907E81B4}

Sum Component Flow/Frac.34

User Value [CompSum]

* Parameter	5.42778E-13	lb/h	Upper Bound	lb/h
Lower Bound		lb/h	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={DCFE8712-5BB2-48D4-BC97-394C435488B4}

Sum Component Flow/Frac.35

User Value [CompSum]

* Parameter	3.71988E-13	lb/h	Upper Bound	lb/h
Lower Bound		lb/h	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={A5869694-840B-429A-B69A-1E3888ACE8B3}

Sum Component Flow/Frac.36

User Value [CompSum]

* Parameter	0	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={F59DBD0E-0AC2-4422-AB61-597DB81EEC86}

Sum Component Flow/Frac.37

User Value [CompSum]

* Parameter	0	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={21936257-C6B2-46EC-958E-B899560405D5}

Sum Component Flow/Frac.38

User Value [CompSum]

* Parameter	0	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

Remarks

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User Value Sets Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

This User Value Set was programmatically generated. GUID={673602E1-F687-4A48-B880-B62DA6D53544}

Sum Component Flow/Frac.39

User Value [CompSum]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={A66874FE-5757-4A82-A90D-461551A14FE0}

Sum Component Flow/Frac.40

User Value [CompSum]

* Parameter	0 lb/h	Upper Bound	lb/h
Lower Bound	lb/h	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={BB8F1CA3-71BF-4669-98B6-38EA67AE9556}

Sum Component Flow/Frac.41

User Value [CompSum]

* Parameter	0 lb/h	Upper Bound	lb/h
Lower Bound	lb/h	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={15B556F6-F294-4267-BD11-BC8C5F036006}

Sum Component Flow/Frac.42

User Value [CompSum]

* Parameter	0 lb/h	Upper Bound	lb/h
Lower Bound	lb/h	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={160EBD9C-29DD-4770-9C07-6B583A1CF55A}

Sum Component Flow/Frac.43

User Value [CompSum]

* Parameter	0 lb/h	Upper Bound	lb/h
Lower Bound	lb/h	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={C0316A6A-5A27-4BFC-8CB0-59283A21D199}

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Recoveries Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

Component Recoveries - Project Inlets

Status: Solved

Recovery Stream Data Source - All Inlets in Project

Flowsheet	PStream	Flowsheet	PStream
Wastewater	Wastewater		

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	False	Atomic Basis	False

Tabulated Data

Index	Wastewater:Wastewater lbmol/h	Summary Table lbmol/h		
Carbon Dioxide	0	0		
Nitrogen	0	0		
Methane	0	0		
Ethane	0	0		
Propane	0	0		
i-Butane	0	0		
n-Butane	0	0		
i-Pentane	0	0		
n-Pentane	0	0		
i-Hexane	0	0		
Heptane	0	0		
Octane	0	0		
Nonane	0	0		
Benzene	0	0		
Toluene	0	0		
Ethylbenzene	0	0		
m-Xylene	0	0		
n-Hexane	0	0		
2,2,4-Trimethylpentane	0	0		
Neopentane	0	0		
Decanes Plus	0	0		
Water	1.42488	1.42488		
Helium	0	0		
Hydrogen	0	0		
Oxygen	0	0		
Lube Oil	0.0749937	0.0749937		
Propylene Glycol	0	0		
Total	1.49987	1.49987		

Remarks

Component Recoveries - Project Outlets

Status: Solved

Recovery Stream Data Source - All Outlets in Project

Flowsheet	PStream	Flowsheet	PStream
Wastewater	Flash	Wastewater	Liquids

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	False	Atomic Basis	False

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Recoveries Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

Tabulated Data

Index	Wastewater:Flash lbmol/h	Wastewater:Liquids lbmol/h	Summary Table lbmol/h	
Carbon Dioxide		0	0	
Nitrogen		0	0	
Methane		0	0	
Ethane		0	0	
Propane		0	0	
i-Butane		0	0	
n-Butane		0	0	
i-Pentane		0	0	
n-Pentane		0	0	
i-Hexane		0	0	
Heptane		0	0	
Octane		0	0	
Nonane		0	0	
Benzene		0	0	
Toluene		0	0	
Ethylbenzene		0	0	
m-Xylene		0	0	
n-Hexane		0	0	
2,2,4-Trimethylpentane		0	0	
Neopentane		0	0	
Decanes Plus		0	0	
Water		1.42488	1.42488	
Helium		0	0	
Hydrogen		0	0	
Oxygen		0	0	
Lube Oil		0.0749937	0.0749937	
Propylene Glycol		0	0	
Total		1.49987	1.49987	

Remarks

Component Recoveries - Project Losses

Status: Solved

Reference Stream Data Source - All Outlets in Project

Flowsheet	PStream	Flowsheet	PStream
Wastewater	Flash	Wastewater	Liquids

Recovery Stream Data Source - All Inlets in Project

Flowsheet	PStream	Flowsheet	PStream
Wastewater	Wastewater		

Parameters

Composition Basis	Molar Flow	Summation Option	Summation Only
Calculate Ratios	False	Atomic Basis	False

Tabulated Data

Index	Summary Table lbmol/h			
Carbon Dioxide	0			
Nitrogen	0			
Methane	0			
Ethane	0			
Propane	0			
i-Butane	0			

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Recoveries Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

Tabulated Data

Index	Summary Table lbmol/h			
n-Butane	0			
i-Pentane	0			
n-Pentane	0			
i-Hexane	0			
Heptane	0			
Octane	0			
Nonane	0			
Benzene	0			
Toluene	0			
Ethylbenzene	0			
m-Xylene	0			
n-Hexane	0			
2,2,4-Trimethylpentane	0			
Neopentane	0			
DecanesPlus	0			
Water	0			
Helium	0			
Hydrogen	0			
Oxygen	0			
Lube Oil	0			
Propylene Glycol	0			
Total	0			

Remarks

Component Recoveries - Project Recoveries

Status: Solved

Reference Stream Data Source - All Inlets in Project

Flowsheet	PStream	Flowsheet	PStream
Wastewater	Wastewater		

Recovery Stream Data Source - All Outlets in Project

Flowsheet	PStream	Flowsheet	PStream
Wastewater	Flash	Wastewater	Liquids

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	True	Atomic Basis	False

Tabulated Data

Index	Wastewater:Flash %	Wastewater:Liquids %	Summary Table %	
Carbon Dioxide				
Nitrogen				
Methane				
Ethane				
Propane				
i-Butane				
n-Butane				
i-Pentane				
n-Pentane				
i-Hexane				
Heptane				

* User Specified Values
? Extrapolated or Approximate Values

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Recoveries Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

Tabulated Data

Index	Wastewater:Flash %	Wastewater:Liquids %	Summary Table %	
Octane				
Nonane				
Benzene				
Toluene				
Ethylbenzene				
m-Xylene				
n-Hexane				
2,2,4-Trimethylpentane				
Neopentane				
Decanes Plus				
Water		100	100	
Helium				
Hydrogen				
Oxygen				
Lube Oil		100	100	
Propylene Glycol				
Total		100	100	

Remarks

Component Recoveries - Wastewater Inlets

Status: Solved

Recovery Stream Data Source - All Inlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Wastewater	Wastewater		

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	False	Atomic Basis	False

Tabulated Data

Index	Wastewater:Wastewater lbmol/h	Summary Table lbmol/h		
Carbon Dioxide	0	0		
Nitrogen	0	0		
Methane	0	0		
Ethane	0	0		
Propane	0	0		
i-Butane	0	0		
n-Butane	0	0		
i-Pentane	0	0		
n-Pentane	0	0		
i-Hexane	0	0		
Heptane	0	0		
Octane	0	0		
Nonane	0	0		
Benzene	0	0		
Toluene	0	0		
Ethylbenzene	0	0		
m-Xylene	0	0		
n-Hexane	0	0		
2,2,4-Trimethylpentane	0	0		
Neopentane	0	0		
Decanes Plus	0	0		

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Recoveries Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

Tabulated Data

Index	Wastewater:Wastewater lbmol/h	Summary Table lbmol/h		
Water	1.42488	1.42488		
Helium	0	0		
Hydrogen	0	0		
Oxygen	0	0		
Lube Oil	0.0749937	0.0749937		
Propylene Glycol	0	0		
Total	1.49987	1.49987		

Remarks

Component Recoveries - Wastewater Outlets

Status: Solved

Recovery Stream Data Source - All Outlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Wastewater	Flash	Wastewater	Liquids

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	False	Atomic Basis	False

Tabulated Data

Index	Wastewater:Flash lbmol/h	Wastewater:Liquids lbmol/h	Summary Table lbmol/h	
Carbon Dioxide		0	0	
Nitrogen		0	0	
Methane		0	0	
Ethane		0	0	
Propane		0	0	
i-Butane		0	0	
n-Butane		0	0	
i-Pentane		0	0	
n-Pentane		0	0	
i-Hexane		0	0	
Heptane		0	0	
Octane		0	0	
Nonane		0	0	
Benzene		0	0	
Toluene		0	0	
Ethylbenzene		0	0	
m-Xylene		0	0	
n-Hexane		0	0	
2,2,4-Trimethylpentane		0	0	
Neopentane		0	0	
DecanesPlus		0	0	
Water		1.42488	1.42488	
Helium		0	0	
Hydrogen		0	0	
Oxygen		0	0	
Lube Oil		0.0749937	0.0749937	
Propylene Glycol		0	0	
Total		1.49987	1.49987	

Remarks

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Recoveries Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

Component Recoveries - Wastewater Losses

Status: Solved

Reference Stream Data Source - All Outlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Wastewater	Flash	Wastewater	Liquids

Recovery Stream Data Source - All Inlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Wastewater	Wastewater		

Parameters

Composition Basis	Molar Flow	Summation Option	Summation Only
Calculate Ratios	False	Atomic Basis	False

Tabulated Data

Index	Summary Table lbmol/h			
Carbon Dioxide	0			
Nitrogen	0			
Methane	0			
Ethane	0			
Propane	0			
i-Butane	0			
n-Butane	0			
i-Pentane	0			
n-Pentane	0			
i-Hexane	0			
Heptane	0			
Octane	0			
Nonane	0			
Benzene	0			
Toluene	0			
Ethylbenzene	0			
m-Xylene	0			
n-Hexane	0			
2,2,4-Trimethylpentane	0			
Neopentane	0			
DecanesPlus	0			
Water	0			
Helium	0			
Hydrogen	0			
Oxygen	0			
Lube Oil	0			
Propylene Glycol	0			
Total	0			

Remarks

Component Recoveries - Wastewater Recoveries

Status: Solved

Reference Stream Data Source - All Inlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Wastewater	Wastewater		

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Recoveries Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

Recovery Stream Data Source - All Outlets in Flowsheet

Flowsheet	PStream	Flowsheet	PStream
Wastewater	Flash	Wastewater	Liquids

Parameters

Composition Basis	Molar Flow	Summation Option	Streams and Summation
Calculate Ratios	True	Atomic Basis	False

Tabulated Data

Index	Wastewater:Flash %	Wastewater:Liquids %	Summary Table %	
Carbon Dioxide				
Nitrogen				
Methane				
Ethane				
Propane				
i-Butane				
n-Butane				
i-Pentane				
n-Pentane				
i-Hexane				
Heptane				
Octane				
Nonane				
Benzene				
Toluene				
Ethylbenzene				
m-Xylene				
n-Hexane				
2,2,4-Trimethylpentane				
Neopentane				
Decanes Plus				
Water		100	100	
Helium				
Hydrogen				
Oxygen				
Lube Oil		100	100	
Propylene Glycol				
Total		100	100	

Remarks

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Energy Budgets Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

Power Budget - Project Power Budget

Status: Solved

Parameters

Net Power	0 hp	Total Power Required	0 hp
Total Power Supplied	0 hp	External Energy Only	True

Remarks

Heat Budget - Project Heat Budget

Status: Solved

Heat Budget Data Source - All Exchangers in Project

Flowsheet	Block	Flowsheet	Block
Wastewater	Wastewater Tank		

Parameters

Net Duty	0 Btu/h	Total Duty Required	0 Btu/h
Total Duty Supplied	0 Btu/h	External Energy Only	True

Tabulated Data

Index	Block Duty Btu/h	Block Highest Temperature °F	Block Lowest Temperature °F	
Wastewater:Wastewater Tank	0	70	70	

Remarks

Power Budget - Wastewater Power Budget

Status: Solved

Parameters

Net Power	0 hp	Total Power Required	0 hp
Total Power Supplied	0 hp	External Energy Only	True

Remarks

Heat Budget - Wastewater Heat Budget

Status: Solved

Heat Budget Data Source - All Exchangers in Flowsheet

Flowsheet	Block	Flowsheet	Block
Wastewater	Wastewater Tank		

Parameters

Net Duty	0 Btu/h	Total Duty Required	0 Btu/h
Total Duty Supplied	0 Btu/h	External Energy Only	True

Tabulated Data

Index	Block Duty Btu/h	Block Highest Temperature °F	Block Lowest Temperature °F	
Wastewater:Wastewater Tank	0	70	70	

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Energy Budgets Report

Client Name:	TC Energy	Job: Wastewater Tank B03
Location:	Walgrove Compressor Station	

Remarks

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