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ANR Pipeline Company

TransCanada US Pipelines
USGO Integrity Services Department
700 Louisiana St.
Houston, Texas 77002

December 19, 2018

Michigan Department of Environmental Quality – Air Quality Division
Cadillac District – Gaylord Office
(Northeast Lower Peninsula)
2100 West M-32
Gaylord, MI 49735-9282

Re: Renewable Operating Permit Renewal Application
Cold Springs 12, Blue Lake, and Cold Springs 1 Compressor Stations
Mancelona, Kalkaska County, MI
State Registration Number (SRN): B7198
ANR Storage Company

Dear Ms. Radulski,

Enclosed is the Renewable Operating Permit (ROP) renewal application for ANR Storage Company for the Cold Springs 12, Blue Lake, and Cold Springs 1 (CSBL) Compressor Stations which provide storage and transmission of natural gas. The Renewable Operating Permit (ROP) No. MI-ROP-B7198-2014a for the CSBL Station expires on July 23, 2019. As required under Section A.35 of the CSBL Station ROP, ANR is submitting this permit renewal application no later than 6 months prior to expiration of the permit or January 23, 2019. ANR Pipeline Company submits both the attached hard copy of the application and an electronic version of the ROP Application Package to DEQ-ROP@michigan.gov and thus requests that the determination of administrative completeness of the application be completed within 15 days of receipt of this hard copy version of the application by AQD.

Please find attached the renewal application including all necessary materials as listed below:

- ROP Application Form
- ROP mark-up
- Supplemental Data
- Plans referenced in the ROP

If you have any questions or comments concerning this request, please contact me at (715) 758-3341 or via email at chris_waltman@transcanada.com.

Sincerely,

Chris Waltman
TransCanada US Pipelines
Senior Environmental Specialist

WENCK File #5620-0032
December 2018

Title V Renewable Operating Permit Application Permit No. MI-ROP-B7198-2014a

ANR Storage Company
Cold Springs 12/Blue Lake/Cold Springs 1
Compressor Stations
Kalkaska County, Michigan

Prepared for:

ANR Storage Company

700 Louisiana Street
Suite 700
Houston, TX 77002

TransCanada
In business to deliver

WENCK
Responsive partner.
Exceptional outcomes.

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0.0 ANR Storage Cold Springs/Blue Lake Stations Summary

0.1 INTRODUCTION

ANR Storage Company (ANR) owns and operates several facilities in Michigan that are used in both natural gas transmission and storage. The function of some of ANR compressor stations, including Cold Springs 12/Blue Lake/Cold Springs 1 Compressor Station, is to maintain pressure in pipelines to transport natural gas to other ANR companies and end users. Cold Springs 12/Blue Lake/Cold Springs 1 stationary source consists of three separate natural gas transmission and compressor stations operating separate natural gas storage fields (Cold Springs 12, Blue Lake, and Cold Springs 1).

The Title V regulations established emission thresholds of 100 tons per year (tpy) for all criteria pollutants and 25 tpy for total Hazardous Air Pollutants (HAPs) or 10 tpy for an individual HAP to classify a stationary source as major. The Cold Springs 12/Blue Lake/Cold Springs 1 Compressor Station is considered a Title V Part 70 major source due to NOx, CO, Formaldehyde, and total HAP emissions in excess of the applicability threshold.

The Renewable Operating Permit (ROP) No. MI-ROP-B7198-2014a for the Cold Springs 12/Blue Lake/Cold Springs 1 Compressor Station expires on July 23, 2019. As required under Section 1-A.35, Section 2-A.35, and Section 3-A.35 of the Cold Springs/Blue Lake Stations ROP, ANR is submitting this permit renewal application no later than 6 months prior to expiration of the permit, or January 23, 2018.Therefore, according to R336.1210(7), this is considered a timely renewal application and the facility will be authorized to continue to operate until MDEQ takes final action on this application. There have been no new Permits to Install (PTI) issued by MDEQ since the issuance of the current ROP (MI-ROP- B7198-2014a) that have not been rolled into the ROP. The current ROP was revised November 21, 2014, in order to roll PTI No. 138-13A, a Minor Modification, into the ROP. This ROP application is comprised of the following information:

- Section 1 consists of technical support documentation for Cold Springs 12 Compressor Station;
- Section 2 consists of technical support documentation for Blue Lake Gas Storage;
- Section 3 consists of technical support documentation for Cold Springs 1 Compressor Station;
- Section 4 consists of the ROP renewal application forms (3 separate forms, one for each permit section, are submitted);
- Appendix A consists of the area maps and process flow diagrams;
- Appendix B contains the emission calculations;
- Appendix C contains a mark-up of the current Cold Springs/Blue Lake Stations ROP; and
- Appendix D contains all plans referenced within the ROP, as required by Question C10 of the ROP Renewal Application Form.

1.0 Cold Springs 12 Compressor Station Summary

1.1 PROCESS DESCRIPTION

The Cold Springs 12/Blue Lake/Cold Springs 1 Compressor Station is a natural gas storage and transmission station which consists of three separate natural gas transmission stations operating separate natural gas storage fields (Cold Springs 12, Blue Lake, and Cold Springs 1). The ANR Cold Springs 12 Compressor Station (Cold Springs 12) is a natural gas transmission and storage station that operates three compressor engines, one generator engine, a glycol dehydration system, one boiler, and two withdrawal heaters. The station is located approximately four miles southeast of Mancelona, Michigan in Kalkaska County. Figure A-1 in Appendix A illustrates the location of the Cold Springs 12 Compressor Station. The plot plan for the Cold Springs 12 station is Figure CS12-1 in Appendix A.

Cold Springs 12 injects and withdraws natural gas from a storage reservoir located in Cold Springs Township of Kalkaska County. During the spring and summer seasons, natural gas in injected into the reservoir up to its rated maximum pressure of 3960 psig. During the winter season, natural gas can be withdrawn down to a minimum field pressure of 500 psig.

Cold Springs 12 operates under varying conditions. The pipeline transports natural gas to and from the storage reservoir. During injection, natural gas free flows into the reservoir until the field pressure approaches pipeline pressure. At this point, one or more engines will be brought on line to compress the natural gas into the reservoir. Compression injection usually continues until the field reaches its maximum rated pressure. The station utilizes three natural gas-fired engines for transmission and gas injection. Depending on storage and delivery contracts, gas availability, and demand by end-users, the engines may operate simultaneously, independently, or not at all. The injection process flow diagram is included as Figure CS12-2 in Appendix A. The withdrawal process flow diagram is included as Figure CS12-3 in Appendix A.

1.2 EMISSIONS SOURCE DESCRIPTION

The Cold Springs 12 Station consists of three natural gas-fired internal combustion compressor engines, two natural gas-fired emergency generators, one glycol dehydration system, one natural gas-fired boiler, two natural gas-fired withdrawal heaters, and various exempt storage tanks.

1.2.1 Compressor Engines (EUCS12CMPR-A, EUCS12CMPR-B, EUCS12CMPR-C)

The Cold Springs 12 Station utilizes three natural gas-fired compressor engines to compress natural gas into the storage reservoir during injection, and into the pipeline during withdrawal. All three of these are 3,750 hp 4-stroke lean burn (4SLB) Ingersoll-Rand 410 KVR engines, and were installed in 1980 (EUCS12CMPR-A, EUCS12CMPR-B, and EUCS12CMPR-C). All of the engines fire exclusively pipeline quality natural gas. Depending on storage and delivery contracts, gas availability, and demand by end users, the engines may operate simultaneously, independently, or not at all.

Emissions from the engines are estimated and included in Appendix B. See the calculations for additional details regarding emission estimates.

1.2.2 Emergency Generator Engine (EUCS12EMRGEN-B)

One 580 hp 4-stroke rich burn (4SRB) Waukesha VHP5108G emergency generator (EUCS12EMRGEN-B) was installed in 1979. In October 2016, emergency generator engine EUCS12EMRGEN-A, also installed in 1979, was taken out of service and the fuel supply to the generator engine was dismantled.

Emissions from the engine are estimated and included in Appendix B. See the calculations for additional details regarding emission estimates.

1.2.3 Glycol Dehydration System (EUCS12GLYDHY, SV009, SV010A, SV010B)

The glycol dehydration system can operate in two modes, and for this reason uses Di-ethylene glycol (DEG). The dehydration system will operate in either mode, not both at the same time. Glycol injection mode occurs when a process called low temperature separation is used to remove liquids from the gas stream. DEG is injected into the gas stream and mixes with the liquids prior to cold separation to prevent freezing during this process. Cold separation is the normal operating mode. Glycol absorption mode is used when low temperature separation will not adequately remove the liquids from the gas stream. DEG is circulated through a contactor tower countercurrent to the gas stream. The DEG absorbs the liquid from the gas stream during this process.

During both modes of operation, the glycol enriched gas stream liquid is regenerated in a reboiler (SV009) for continual use. This regeneration system also uses a flash separator with the flashed vapor preferentially burned as fuel in the reboiler. Any additional vapor over and above the fuel requirements is routed to a thermal oxidizer. During regeneration, process water and other hydrocarbon constituents are removed, and lean glycol is returned to the injection system. The reboiler functions as a control device and is fueled exclusively with off-gas except for during periods of start-up, when supplementary natural gas is used. See NESHAP Subpart DDDDD discussion below for regulatory applicability. The Glycol Dehydration System is also controlled by a thermal oxidizer (SV010A) and a condenser (SV010B).

Emissions from the dehydration system are estimated and included in Appendix B. See the calculations for additional details regarding emission estimates.

1.2.4 Boiler (EUCS12BOILER) and Gas Withdrawal Heaters (EUCS12HEATER-A, EUCS12HEATER-B)

Cold Springs 12 uses one natural gas-fired boiler and two natural gas-fired withdrawal heaters. The boiler is a 2.51 MMBtu/hr Cleaver-Brooks. The heaters are 7.5 MMBtu/hr Sivalls indirect heaters.

Emissions from the boiler and heaters are estimated and included in Appendix B. See the calculations for additional details regarding emission estimates.

1.2.5 Insignificant Activities

Activities identified as “insignificant” pursuant to R 336.1212 (2) do not need to be included in an administratively complete application for a renewable operating permit. These activities do not significantly contribute to the actual emissions or the potential to emit. The following activities, identified under R 336.1212 (2) as insignificant, may be performed at the Cold Springs 12 Station:

- Repair and maintenance of grounds and structures (including painting, welding, etc.);
- All activities and changes pursuant to sections (a) through (f) of Rule 285, Permit to install exemptions; miscellaneous, unless any compliance monitoring requirements in the renewable operating permit would be affected by the change;
- All activities and changes pursuant to sections (f) through (h) of Rule 287, Surface coating equipment, unless any compliance monitoring requirements in the renewable operating permit would be affected by the change;
- Use of office supplies;
- Use of housekeeping and janitorial supplies;
- Sanitary plumbing and associated stacks or vents;
- Temporary activities related to the construction or dismantlement of buildings, utility lines, pipelines, wells, earthworks, or other structures;
- Storage and handling of drums or other transportable containers that are sealed during storage and handling;
- Fire protection equipment, firefighting and training in preparation for fighting fires (prior approval by the department for open burning associated with training in preparation for fighting fires will be obtained pursuant to R 336.1310);
- Use, servicing, and maintenance of motor vehicles, except where the activity is subject to an applicable requirement;
- Construction, repair, and maintenance of roads or other paved or unpaved areas, except where the activity is subject to an applicable requirement;
- Piping and storage of natural gas, including venting from pressure relief valves and purging of gas lines; and
- Compressor unit oil demisters.

1.2.6 Emission Sources Exempt from Obtaining a Permit to Install

Certain processes and process equipment exempt by state rule from obtaining a Permit to Install (PTI) may be subject to inclusion in the ROP application. The guidelines for determining whether an exempt process or process equipment must be included in the ROP application are summarized as follows:

- Process or process equipment exempt under R336.1212(3) need not be included in the ROP application, provided there are no applicable requirements;
- Process or process equipment exempt under R336.1212(4) need to be listed in the ROP application as Exempt Devices, provided there are no process-specific emission limitations or standards; and,
- If a process or process equipment identified as exempt under 212(3) or 212(4) has an applicable requirement with a process-specific emission limitation or standard, it must be included as an emission group in the ROP.

There are several sources at the Cold Springs 12 Station that qualify for the above exemptions. These sources are also exempt from the requirement of obtaining a PTI. Table 1 provides a list of such sources. In addition, the table provides a brief description and identifies the specific rule that exempts from the ROP and the requirement of obtaining a PTI.

Please note that as per the guidance received from Janis Denman of MDEQ on March 9, 2004, loading and unloading activities associated with the exempt storage tanks are also considered to be exempt under the same regulation.

Table 1

Equipment Exempt from Permit to Install Requirement

Equipment ID	Description of Exempt Emission Unit	RO Permit Exemption	NSR Permit Exemption	Basis of Exemption
DVCS41-1018	Ethylene Glycol tank, 5,500 gallon	R 336.1212(4)(d)	R 336.1284(2)(i)	< 40,000 gallons and contents with a vapor pressure of ≤ 1.5 psia.
DVCSGT-2000A	Di-Ethylene/Ethylene Glycol tank, 2,300 gallon			
DVCSGT-2000B	Di-Ethylene/Ethylene Glycol tank, 2,900 gallon			
DVCS42-1001A	Brine tank A, 10,000 gallon	R 336.1212(4)(d)	R 336.1284(2)(e)	< 40,000 gallons - Each tank is used to store sweet condensate and has a capacity of less than 40,000 gallons.
DVCS42-1001B	Brine tank B, 10,000 gallon			
DVCS-T21	Condensate tank, T-21, 16,800 gallon			
DVCS42-1002	Methanol storage tank, 16,800 gallon	R 336.1212(4)(d)	R336.1284(2)(i)	< 40,000 gallons and contents with a vapor pressure of ≤ 1.5 psia.
DVCS41-1019	Lube oil tank, 5,500 gallon	R 336.1212(3)(e)	R 336.1284(2)(c)	Container Contents - Each tank is used to store lubricating, hydraulic, thermal oils or indirect heat transfer fluids.
DVCS41-1020	Lube oil tank, 1,100 gallon			
DVCS41-1021	Lube oil tank, 1,400 gallon			
DVCS42-1003	Waste oil tank, 10,000 gallon			
FGCS12COMP	Cold Springs 12 Fugitive emissions from component leaks	R 336.1212(4)(h)	R 336.1290(2)(a)	Fugitive emissions emit VOCs at rates below identified exemption thresholds
Blowdowns	Cold Springs 12 Emergency Shutdown	R 336.1212(4)(e)	R 336.1285(mm)	All emergency venting of natural gas is <1,000,000 scf per event or notification to the pollution emergency alert system is sent within 24 hours.

1.3 PERMITTING SUMMARY AND COMPLIANCE HISTORY

There have been no administrative or judicial actions taken against ANR within the past five years pertaining to operation of the Cold Springs 12 Station. There are currently no outstanding violations of state or federal environmental laws or regulations at the Cold Springs 12 Station. Any new PTI issued by MDEQ since the issuance of the initial ROP effective date have been rolled into the current ROP dated November 21, 2014. Since its issuance, ANR has complied with the terms and conditions of the existing ROP.

1.4 FEDERAL AND STATE REGULATORY REVIEW

The Cold Springs 12 Station is subject to a variety of federal and state air quality regulations which are discussed in this section.

1.4.1 Prevention of Significant Deterioration (PSD)

The Prevention of Significant Deterioration (PSD) applicability is triggered by construction of a "major stationary source" or "major modification" to an existing major stationary source. PSD regulations in 40 CFR 52.21 define a major source as any source type (belonging to a list of 28 categories) that emits or has the potential to emit 100 tpy or more of any regulated pollutant under the CAA, or any other source type that emits or has the potential to emit such pollutants in amounts equal to or greater than 250 tpy [40 CFR 52.21 (b)(1)(i)(b)]. The potential to emit is based on the maximum design capacity of a source, subject to federally enforceable permit limitations (e.g., limits on annual hours of operation) and takes into account pollution control efficiency.

Cold Springs 12 was subject to PSD regulations at the time of construction, and a PSD Permit was issued in 1980 (Permit No. 68-80) for the construction of the three 3,750 hp compressor engines that are still onsite. Since the construction of the station, no modifications have been made which would trigger PSD requirements. Future modifications of the process equipment may be subject to PSD requirements.

1.4.2 New Source Performance Standards (NSPS)

NSPS contained in 40 CFR 60 require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the relevant regulations. The following NSPS regulations were reviewed and all were confirmed to be non-applicable to the Cold Springs 12 Compressor Station. The results of this review are summarized by regulatory citation in Table 1.4.2-1 below.

Table 1.4.2-1 NSPS Regulatory Review

Regulatory Citation	Non-Applicability Determination
40 CFR 60 Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units	This standard is not applicable to Cold Springs 12 because there are no natural gas-fired boilers with a design heat input capacity of 2.9 MW (10 MMBtu/hr.) or greater.
40 CFR 60 Subpart K - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973 and prior to May 19, 1978	There are no petroleum storage vessels with capacity greater than 40,000 gallons at this facility. Therefore, this regulation is not applicable.

40 CFR 60 Subpart Ka - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978 and prior to July 23, 1984	There are no petroleum storage vessels with capacity greater than 40,000 gallons at this facility. Therefore, this regulation is not applicable.
40 CFR 60 Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984	There are no volatile organic liquid storage vessels with capacity greater than 75 cubic meters at this facility. Therefore, this regulation is not applicable.
40 CFR 60 Subpart GG - Standards of Performance for Stationary Gas Turbines	There are no stationary gas turbines at Cold Springs 12. Therefore, this regulation is not applicable.
40 CFR 60 Subpart KKK-Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants	This regulation is not applicable to the Cold Springs 12 Station because the facility is not a natural gas processing plant as defined in the regulation.
40 CFR 60 Subpart LLL - Standards of Performance for Onshore Natural Gas Processing: SO_2 Emissions	The Cold Springs 12 Station processes natural gas but does not operate a sweetening unit or a sulfur recovery unit. Therefore, this regulation is not applicable.
40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE)	The Cold Springs 12 Station does not operate any stationary CI ICE; therefore, this regulation does not apply.
40 CFR 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE)	The engines at the Cold Springs 12 Station were constructed prior to June 12, 2006 and have not been modified or reconstructed since June 12, 2006. Therefore, this regulation does not apply.

1.4.3 National Emission Standards for Hazardous Air Pollution (NESHAP)

Federal NESHAP regulations promulgated pursuant to Section 112 of the CAA are found in 40 CFR Parts 61 and 63. In general, NESHAP, or Maximum Achievable Control Technology (MACT) standards apply to major stationary sources of HAP emissions, defined as potential-to- emit of 10 tons or more per year of any single HAP or 25 tons or more per year of any combination of HAP and minor stationary sources of HAP emissions (thresholds less than a major source). Cold Springs 12 is considered a major source of HAPs due to potential total HAPs emissions that exceed 25 tpy, and potential formaldehyde emissions that exceed 10 tpy. Potentially applicable NESHAPs are discussed below.

40 CFR 61 Subpart M - National Emission Standard for Asbestos

The Cold Springs 12 Station may at times engage in demolition and/or renovation activities involving asbestos-containing materials (ACM). Therefore, the facility could be potentially subject to Subpart M, Standards for Demolition and Renovation (40 CFR 61.145). Procedures are in place to ensure the facility complies with these standards.

40 CFR 61 Subpart V - National Emission Standard for Equipment Leaks (Fugitive Emission Sources)

This regulation is not applicable to Cold Springs 12 because the provisions of this subpart apply to sources that are intended to operate in volatile hazardous air pollutant (VHAP) service. “In VHAP service means that a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 10 percent by weight a volatile hazardous air pollutant (VHAP) as determined according to the provisions of 61.245(d).” The Cold Springs 12 processes do not have any sources that operate in VHAP service.

40 CFR 63 Subpart HH - NESHAP from Oil and Natural Gas Production Facilities

This regulation is not applicable to the Cold Springs 12 Station because the facility is a transmission and storage facility and is not an oil and gas production facility as defined in this regulation.

40 CFR 63 Subpart HHH - NESHAP from Natural Gas Transmission and Storage Facilities

Subpart HHH establishes national emission limitations and operating limitations for natural gas transmission and storage facilities that are major sources of HAP emissions. The rule affects facilities that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final user. Cold Springs 12 is a natural gas compression and storage facility and is potentially subject to this regulation. The facility is a major source of HAPs and operates a glycol dehydration unit (affected source).

However, the previous General Standard cited under Subpart 63.1274(d)(2) allowed for an exemption from the requirements associated with the rule if actual average emissions of benzene from the glycol dehydration unit process vents to the atmosphere are less than 0.90 megagram per year. The dehydration unit at Cold Springs 12 qualified for the exemption because the benzene emissions are less than 0.90 megagrams (1.1 tons) per year.

An amendment to the Standard was published on August 16, 2012. The permittee complies with all provisions of the amended National Emission Standards for Hazardous Air Pollutants as specified in 40 CFR Pat 63, Subparts A and HHH and will continue to comply.

40 CFR 63 Subpart EEEE – NESHAP for Organic Liquids Distribution (non-Gasoline)

40 CFR 63 Subpart EEEE was promulgated on August 25, 2003 and applies to organic liquids distribution (OLD) operations that are located at, or are part of, a major source of hazardous air pollutant (HAP) emissions as defined in section 112(a) of the Clean Air Act. This regulation does not apply to the tanks or loading operations at Cold Springs 12 because per 40 CFR 63.2334(c)(2), OLD operations located at Natural Gas Transmission and Storage facilities as defined in 40 CFR 63 Subpart HHH are exempt from the requirements of 40 CFR 63 Subpart EEEE (OLD MACT).

40 CFR 63 Subpart ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines (RICE)

Subpart ZZZZ regulates HAP emissions from existing, new, and reconstructed stationary compression ignition (CI) and spark ignition (SI), emergency and non-emergency, RICE located at major and area sources of HAP emissions. This standard is potentially applicable to Cold Springs 12 because the facility is a major source for HAP emissions and operates reciprocating internal combustion engines. The three (3) non-emergency compressor engines are existing (constructed prior to December 19, 2002) 4-stroke lean-burn RICE (EUCS12CMPR-A, EUCS12CMPR-B, EUCS12CMPR-C) with site ratings greater than 500 hp. Per 63.6600(c), existing four-stroke lean burn stationary RICE located at a major source of HAP with a site rating of more than 500 hp "do not need to comply with the emission limitations in Tables 1a, 2a, 2c, and 2d…or operating limitations in Tables 1b and 2b…".

The facility's two 580 hp natural gas-fired emergency generators a[illegible] existing (installed in 1979) four-stroke rich burn engines. Per §63.6640(f)(2), the engine will be subject to operating requirements in §63.6640(f)(2)(i)-(iii).

40 CFR 63 Subpart DDDDD – NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters

The Industrial/Commercial/Institutional Boilers and Process Heaters MACT for major sources was promulgated on March 21, 2011, and regulates HAP emissions from new and existing industrial, commercial, or institutional boilers and process heaters located at major sources of HAP emissions.

This rule is applicable to the boiler and heaters located at Cold Springs 12, since the Station is a major source of HAP. All three of the units (EUCS12BOILER, EUCS12HEATER-A, and EUCS12HEATER-B) are classified as existing (constructed before June 4, 2010), <10 MMBtu/hr., natural gas burning units. As such, they are subject to biennial (EUCS12HEATER-A and EUCS12HEATER-B) or 5-year (EUCS12BOILER) tune-ups, a facility energy assessment, and the associated reporting and recordkeeping requirements. The facility has already completed the energy assessment. ANR complies with this rule as it applies to these emission units and will continue to comply.
The reboiler (SV009) that serves as both part of the process and also as a control for the glycol dehydration system (EU CS12GLYDHY) is exempt from this rule per §63.7491(i) which states that a unit is not subject to the subpart if it is "Any boiler or process heater that is used as a control device to comply with another subpart of this part… of this chapter provided that at least 50 percent of the average annual heat input during any 3 consecutive calendar years to the boiler or process heater is provided by regulated gas streams that are subject to another standard." The fuel input to the reboiler is provided by the off-gas subject to NESHAP Subpart HHH. Supplementary natural gas is used only during periods of start-up of the reboiler, therefore the unit is exempt from NESHAP Subpart DDDDD. Furthermore, the reboiler is affected by MACT HHH, and per EPA's response to comments for 40 CFR 63 DDDDD, a boiler that is affected by another MACT rule is not subject to the Boiler MACT.

Subpart JJJJJJ - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial and Institutional Boilers Area Sources

The Industrial/Commercial/Institutional Boilers and Process Heaters for area sources was promulgated on March 21, 2011, and regulates HAP emissions from industrial, commercial, or institutional boilers located at area sources of HAP emissions. Cold Springs 12 is a major source of HAP; therefore, this regulation does not apply.

1.4.4 Compliance Assurance Monitoring (CAM)

Enhanced monitoring requirements have been adopted into 40 CFR 64. The enhanced monitoring requirements are referred to as Compliance Assurance Monitoring (CAM). CAM is applicable to sources that have a potential to emit in excess of major source thresholds, not considering “tailpipe” emission controls, and use an “active” control device to achieve compliance with the emission limit. Combustion controls may be considered in evaluating the potential to emit.

An emission unit is subject to CAM if all of the following criteria are satisfied:

- the unit is located at a major source that is required to obtain a Part 70 or Part 71 permit;
- the unit is subject to an emission limitation or standard for a regulated air pollutant;
- the unit uses an active control device to achieve compliance with any such emission limit or standard, and
- the unit has potential pre-controlled emissions of the applicable air pollutant above the major source threshold.

The emissions of NOx from the three natural gas fired compressor engines are in excess of the appropriate major source thresholds. However, these units do not employ an active device to control these emissions. No other emissions units associated with the Cold Springs 12 facility meet the above criteria because none have the potential to emit any regulated pollutant in excess of applicable major source thresholds. For these reasons, the CAM rule does not apply to Cold Springs 12.

1.4.5 Chemical Accident Prevention Provision and Risk Management Plan

The Cold Springs 12 Compressor Station is not subject to the Chemical Accident Prevention Provisions of 40 CFR Subpart 68. Applicability to this regulation is based on the type and quantity of certain regulated substances stored at a facility, and Cold Springs 12 does not exceed the applicability thresholds (40 CFR 68.10). The facility is not considered a stationary source under 40 CFR 68.3 (Chemical Accident Prevention) because it is regulated under 49 CFR 192, DOT.

1.4.6 Acid Rain Regulations

Cold Springs 12 is not subject to the federal acid rain regulations found in 40 CFR Parts 72 through 77 because the Station does not own or operate an affected unit as defined in 40 CFR part 72.6

1.4.7 Michigan State Air Pollution Control Rules (R336)

The following paragraphs discuss the Michigan state air pollution control rules that apply to the station, as well as general compliance procedures.

Part 2 – Air Use Approval

This part requires facilities in Michigan to obtain a permit to install prior to installation, construction, reconstruction, relocation, or modification of any process or process equipment, including associated control equipment, that has the potential to emit any pollutant to the atmosphere. In addition, some facilities are required to obtain a renewable operating permit.

All processes or process equipment at this facility either have a permit to install or qualify under one of the various exemptions provided in the rule (See Table 1 in Section 1.2.6

above for a complete list of exempt sources along with the exemption criteria under which they qualify). This facility was also required to obtain a renewable operating permit. A complete and timely application was originally submitted in 1996 and a renewable operating permit was issued. This application is being submitted in order to renew this renewable operating permit.

Part 3 – Emission Limitations and Prohibitions- Particulate Matter

The processes and the process equipment at this facility will be subject to the visible emission limitations specified in R336.1301(1). All sources at the facility will be operated in compliance with these requirements. It should be noted that for natural gas-fired fuel burning equipment, compliance with this requirement is demonstrated by using pipeline quality natural gas.

R336.1331 of this part limits the emissions of particulate matter from a process or process equipment. This facility does not operate any sources listed in Table 31. The rule also establishes a particulate matter emission limit based on a process weight rate. However, no particulate matter emissions, other than fuel combustion sources, are anticipated from the processes at this facility. Therefore, the rule is not currently applicable to the facility.

Part 4 – Emissions Limitations and Prohibitions- Sulfur-Bearing Compounds

R336.1403 limits emissions of sour gas from an oil- or natural gas-producing or transporting facility, of a natural gas-processing facility. This facility does not handle sour gas, and does not operate any other process or process equipment for which an emission limit is specified in Part 4. Therefore, this part is not applicable.

Part 6 – Emission Limitations and Prohibitions- Existing Sources of Volatile Organic Compound Emissions

This part limits emissions of volatile organic compounds from various sources including storage vessels, loading facilities, and natural gas processing plants. The facility is in compliance with all the applicable requirements of this regulation. R336.1629 requires a monitoring program to control emissions of volatile organic compounds from components of existing process equipment used in natural gas processing. The rule only applies to facilities located in Kent, Livingston, Macomb, Monroe, Muskegon, Oakland, Ottawa, St. Clair, Washtenaw, and Wayne. This facility is not a natural gas processing plant and is not located in one of the counties listed above. Therefore, the rule does not apply.

Part 7 – Emission Limitations and Prohibitions- New Sources of Volatile Organic Compound Emissions

This part limits emissions of volatile organic compounds from all new sources. A “new source” is defined as a process or process equipment which is either placed into operation on or after July 1, 1979, or for which a permit to install is made to the DEQ on or after July 1, 1979. Some of the sources at the facility may be subject to this regulation. The facility is in compliance with all the applicable requirements of this regulation.

Part 9 – Emission Limitations and Prohibitions- Miscellaneous

Part 9 specifies numerous miscellaneous limitations and prohibitions. Rule 336.1911 requires the facility to develop a malfunction abatement plan if and when requested by the department. The facility will develop and implement a malfunction abatement plan upon receipt of such request from the department. The Cold Springs 12 Station has developed and implemented a malfunction abatement plan.

Part 10 – Intermittent Testing and Sampling

Part 10 allows the department to require the owner or operator of a source to conduct performance tests using reference test methods or the department to conduct the tests on behalf of the state. Upon receipt of any such request from the department, the facility will conduct the specified performance test within the established time lines and following the agreed upon reference test methods. If the department intends to perform the test, the owner or operator will provide the necessary performance test facilities.

1.5 PROPOSED CHANGES TO EXISTING RENEWABLE OPERATING PERMIT

ANR is not requesting any significant changes to the wording of the current ROP. ANR has requested to remove from the permit emergency generator engine EUCS12EMRGEN-A, which was taken out of service in October 2016. ANR has proposed updated language to the flexible group FG CS12DDDDD to reflect updates to the standard Boiler MACT language used in templates provided by MDEQ. ANR has proposed excluding conditions related to initial compliance demonstrations for existing boilers and process heaters, as these conditions have all been satisfied. ANR has proposed correcting references to conditions in section EU CS12HHH where they previously referenced the incorrect condition. The updates are included in the marked-up version of the permit included in Appendix C.

1.6 SUMMARY

This document contains all the necessary elements for ANR to meet the requirements for a complete ROP renewal application under the MDEQ rules and guidance. ANR requests that this renewal application be reviewed and a draft ROP be issued at the earliest convenience.

2.0 Blue Lakes Storage Company Summary

2.1 PROCESS DESCRIPTION

The Cold Springs 12/Blue Lake/Cold Springs 1 Compressor Station is a natural gas storage and transmission station which consists of three separate natural gas transmission stations operating separate natural gas storage fields (Cold Springs 12, Blue Lake, and Cold Springs 1). The station is located approximately four miles southeast of Mancelona, Michigan in Kalkaska County. Figure A-1 in Appendix A illustrates the location of the Blue Lake Compressor Station. The plot plan for the Blue Lake station is Figure BL-1 in Appendix A.

Blue Lake injects and withdraws natural gas from a storage reservoir located in Blue Lake Township of Kalkaska County. During the spring and summer seasons, natural gas in injected into the reservoir up to its rated maximum pressure of 4200 psig. During the winter season, natural gas can be withdrawn down to a minimum field pressure of 300 psig.

Blue Lake operates under varying conditions. The pipeline transports natural gas to and from the storage reservoir. During injection, natural gas free flows into the reservoir until the field pressure approaches pipeline pressure. At this point, one or more engines will be brought on line to compress the natural gas into the reservoir. Compression injection usually continues until the field reaches its maximum rated pressure. The station utilizes three natural gas-fired engines for transmission and gas injection. Depending on storage and delivery contracts, gas availability, and demand by end-users, the engines may operate simultaneously, independently, or not at all. The injection process flow diagram is included as Figure BL-2 in Appendix A.

During withdrawal, natural gas initially free flows out of the reservoirs into the pipeline. The withdrawal process flow diagram is included as Figure BL-3 in Appendix A.

2.2 EMISSIONS SOURCE DESCRIPTION

The Blue Lake Station consists of three natural gas-fired compressor engines, three natural gas-fired generator engines, one glycol dehydration system, one natural gas-fired boiler, two withdrawal gas heaters, a cold cleaner, and various exempt storage tanks.

2.2.1 Compressor Engines (EUBLCMPR-A, EUBLCMPR-B, EUBLCMPR-C)

The Blue Lake Station utilizes three natural gas-fired compressor engines to compress natural gas into the storage reservoir during injection, and into the pipeline during withdrawal. All three of these are 6,000 hp 2-stroke lean burn (2SLB) Dresser Rand TCVD-12 engines, and were installed in 1991 (EUBLCMPR-A, EUBLCMPR-B, and EUBLCMPR-C). The combined total operating hours of the three compressor engines is restricted to a maximum of 15,000 hours per calendar year. MDEQ imposed an operating hour limitation for a permit to install under R336.1205(1) to restrict the emissions below that which would constitute a major permitting effort. All of the engines fire exclusively pipeline quality natural gas. Depending on storage and delivery contracts, gas availability, and demand by end users, the engines may operate simultaneously, independently, or not at all.

Emissions from the engines are estimated and included in Appendix B

2.2.2 Generator Engines (EUBLGEN-A, EUBLGEN-B, EUBLGEN-C)

Three 1,125 hp 4-stroke lean burn (4SLB) Caterpillar 3516 generators (EUBLGEN-A, EUBLGEN- B, EUBLGEN-C) were installed in 1992 to provide primary power to the compressor station and can each produce a maximum of 800 KW of energy. Each generator is equipped with a clean burn combustion system and an oxidation catalyst. The combined total operating hours of the three generator engines is restricted to a maximum of 16,380 hours per calendar year. MDEQ imposed an operating hour limitation for a permit to install under R336.1205(1) to restrict the emission below that which would constitute a major permitting effort. All of the engines fire exclusively pipeline quality natural gas. Depending on storage and delivery contracts, gas availability, and demand by end users, the engines may operate simultaneously, independently, or not at all.

Emissions from the engines are estimated and included in Appendix B.

2.2.3 Glycol Dehydration System (EUBLGLYDHY, SV110, SV111TI, SV111C)

The glycol dehydration system operates only in injection mode and therefore uses ethylene glycol (EG). Glycol injection occurs when a process called low temperature separation is used to remove liquids from the gas stream. EG is injected into the gas stream and mixes with the liquids to prevent freezing during this process prior to cold separation. The glycol enriched gas stream liquid is regenerated in a reboiler (SV110) for continual use. This regeneration system also uses a flash separator with the flashed vapor preferentially burned as fuel in the reboiler. Any additional vapor over and above the fuel requirements is routed to a thermal oxidizer. During regeneration, process water and other hydrocarbon constituents are removed, and lean glycol is returned to the injection system. The reboiler functions as a control device and is fueled exclusively with off-gas except for during periods of start-up, when supplementary natural gas is used. See NESHAP Subpart DDDDD discussion below for regulatory applicability. The Glycol Dehydration System is also controlled by a thermal oxidizer (SV111TI) and a condenser (SV111C).

Emissions from the dehydration system are estimated and included in Appendix B. See the calculations for additional details regarding emission estimates.

2.2.4 Boiler (EUBLBOILER) and Gas Withdrawal Heaters (EUBLHTR-A, EUBLHTR-B)

Blue Lake uses one natural gas-fired boiler and two natural gas-fired withdrawal heaters. The boiler is a 4.184 MMBtu/hr Cleaver-Brooks. The heaters are 16 MMBtu/hr Sivalls indirect heaters.

Emissions from the boiler and heater are estimated and included in Appendix B. See the calculations for additional details regarding emission estimates.

2.2.5 Cold Cleaner (EUBLCLEANER)

Blue Lake operates and maintains a cold cleaner. The ROP states that the cold cleaner was installed and/or modified in 1994. The unit is considered exempt from the requirement to obtain a Permit to Install (PTI) required by Rule 201 because the unit is considered exempt pursuant to Rule 278 and Rule 281(h) or Rule 285(r)(iv). However, the unit is subject to Michigan State Air Pollution Control Rules Part 7 (R 336.1701-336.1710) – Emissions

Limitations and Prohibitions for New Sources of Volatile Organic Compound Emissions. Under these rules, the unit is considered a "new source" because it was placed into operation on or after July 1, 1979. The requirements of this Part have already been rolled into the ROP and the source complies with all requirements.

2.2.6 Insignificant Activities

Activities identified as "insignificant" pursuant to R 336.1212 (2) do not need to be included in an administratively complete application for a renewable operating permit. These activities do not significantly contribute to the actual emissions or the potential to emit. The following activities, identified under R 336.1212 (2) as insignificant, may be performed at the Blue Lake Station:

- Repair and maintenance of grounds and structures (including painting, welding, etc.);
- All activities and changes pursuant to sections (a) through (f) of Rule 285, Permit to install exemptions; miscellaneous, unless any compliance monitoring requirements in the renewable operating permit would be affected by the change;
- All activities and changes pursuant to sections (f) through (h) of Rule 287, Surface coating equipment, unless any compliance monitoring requirements in the renewable operating permit would be affected by the change;
- Use of office supplies;
- Use of housekeeping and janitorial supplies;
- Sanitary plumbing and associated stacks or vents;
- Temporary activities related to the construction or dismantlement of buildings, utility lines, pipelines, wells, earthworks, or other structures;
- Storage and handling of drums or other transportable containers that are sealed during storage and handling;
- Fire protection equipment, firefighting and training in preparation for fighting fires (prior approval by the department for open burning associated with training in preparation for fighting fires will be obtained pursuant to R 336.1310);
- Use, servicing, and maintenance of motor vehicles, except where the activity is subject to an applicable requirement;
- Construction, repair, and maintenance of roads or other paved or unpaved areas, except where the activity is subject to an applicable requirement;
- Piping and storage of natural gas, including venting from pressure relief valves and purging of gas
- lines; and
- Compressor unit oil demisters.

2.2.7 Exempt Sources

Certain processes and process equipment exempt by state rule from obtaining a Permit to Install (PTI) may be subject to inclusion in the ROP application. The guidelines for determining whether an exempt process or process equipment must be included in the ROP application are summarized as follows:

- Process or process equipment exempt under R336.1212(3) need not be included in the ROP application, provided there are no applicable requirements;

- Process or process equipment exempt under R336.1212(4) need to be listed in the ROP application as Exempt Devices, provided there are no process-specific emission limitations or standards; and,
- If a process or process equipment identified as exempt under 212(3) or 212(4) has an applicable requirement with a process-specific emission limitation or standard, it must be included as an emission group in the ROP.

There are several sources at the Blue Lake Station that qualify for the above exemptions. These sources are also exempt from the requirement of obtaining a PTI. Table 2 provides a list of such sources. In addition, the table provides a brief description and identifies the specific rule that exempts from the ROP and the requirement of obtaining a PTI.

Please note that as per the guidance received from Janis Denman of MDEQ on March 9, 2004, loading and unloading activities associated with the exempt storage tanks are also considered to be exempt under the same regulation.

Table 2

Equipment Exempt from Permit to Install Requirement

Equipment ID	Description of Exempt Emission Unit	RO Permit Exemption	NSR Permit Exemption	Basis of Exemption
DVBLT-3401	Glycol tank, T-3401, 16,800 gallon	R 336.1212(4)(d)	R 336.1284(2)(e)	< 40,000 gallons - Each tank is used to store sweet condensate and has a capacity of less than 40,000 gallons.
DVBLT-3402	Condensate/brine tank, T-3402, 16,800 gallon			
DVBLT-3403	Condensate/brine tank, T-3403, 16,800 gallon			
DVBLT-3404	Glycol tank, T-3404, 16,800 gallon			
DVBLT-3302	Ethylene Glycol tank, T-3302, 16,800 gallon	R 336.1212(4)(d)	R 336.1284(2)(i)	< 40,000 gallons and contents with a vapor pressure of ≤ 1.5 psia.
DVBLT-3303	Ethylene Glycol recycle tank, T-3303, 16,800 gallon			
DVBLT-3306	Waste oil tank, T-3306, 16,800 gallon	R 336.1212(3)(e)	R 336.1284(2)(c)	Container Contents - Each tank is used to store lubricating, hydraulic, thermal oils or indirect heat transfer fluids.
DVBLV-3701	Coolant tank, T-3701, 5,080 gallon	R 336.1212(4)(d)	R 336.1284(2)(i)	< 40,000 gallons and contents with a vapor pressure of ≤ 1.5 psia.
DVBLV-3702	Coolant Recycle tank, T-3702, 2,540 gallon			
DVBLV-3703	Lube oil recycle tank, T-3703, 5,080 gallon	R 336.1212(3)(e)	R 336.1284(2)(c)	Container Contents - Each tank is used to store lubricating, hydraulic, thermal oils or indirect heat transfer fluids.
DVBLV-3705	Engine lube oil tank, T-3705, 5,080 gallon			
DVBLV-3707	H.P cylinder lube oil tank, T-3707, 2,540 gallon			
DVBLV-3709	Generator lube oil tank, T-3709, 2,540 gallon			
DVBLV-3307	Propane receiver tank, 4,610 gallon	R 336.1212(4)(d)	R 336.1284(2)(b)	Propane storage < 40,000 gallons.
DVBLV-4307	Propane receiver tank, 4,610 gallon			
FGBLCOMP	Blue Lake Fugitive emissions from component leaks	R 336.1212(4)(h)	R 336.1290(2)(a)	Fugitive emissions emit VOCs at rates below identified exemption thresholds
Blowdowns	Blue Lake Emergency Shutdown	R 336.1212(4)(e)	R 336.1285(mm)	All emergency venting of natural gas is <1,000,000 scf per event or notification to the pollution emergency alert system is sent within 24 hours.

2.3 PERMITTING SUMMARY AND COMPLIANCE HISTORY

There have been no administrative or judicial actions taken against ANR within the past five years pertaining to operation of the Blue Lake Station. There are currently no outstanding violations of state or federal environmental laws or regulations at the Blue Lake Station. Any new PTI issued by MDEQ since the issuance of the initial ROP effective date have been rolled into the current ROP dated November 21, 2014. Since its issuance, ANR has complied with the terms and conditions of the existing ROP.

2.4 FEDERAL AND STATE REGULATORY REVIEW

The Blue Lake Station is subject to a variety of federal and state air quality regulations which are discussed in this section.

2.4.1 Prevention of Significant Deterioration (PSD)

The Prevention of Significant Deterioration (PSD) applicability is triggered by construction of a “major stationary source” or “major modification” to an existing major stationary source. PSD regulations in 40 CFR 52.21 define a major source as any source type (belonging to a list of 28 categories) that emits or has the potential to emit 100 tpy or more of any regulated pollutant under the CAA, or any other source type that emits or has the potential to emit such pollutants in amounts equal to or greater than 250 tpy [40 CFR 52.21 (b)(1)(i)(b)]. The potential to emit is based on the maximum design capacity of a source, subject to federally enforceable permit limitations (e.g., limits on annual hours of operation) and takes into account pollution control efficiency.

The potential NOx and CO emissions from the existing equipment at Blue Lake exceed 250 tpy. Therefore, the facility is considered an “existing major source” for PSD permitting purposes. Future modifications of the process equipment may be subject to PSD requirements.

2.4.2 New Source Performance Standards (NSPS)

NSPS contained in 40 CFR 60 require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the relevant regulations. The following NSPS regulations were reviewed and all were confirmed to be non-applicable to the Blue Lake Station. The results of this review are summarized by regulatory citation in Table 2.4.2-1 below.

Table 2.4.2-1 NSPS Regulatory Review

Regulatory Citation	Non-Applicability Determination
40 CFR 60 Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units	This standard is not applicable to Blue Lake because there are no natural gas-fired boilers with a design heat input capacity of 2.9 MW (10 MMBtu/hr.) or greater.
40 CFR 60 Subpart K - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973 and prior to May 19, 1978	There are no petroleum storage vessels with capacity greater than 40,000 gallons at this facility. Therefore, this regulation is not applicable.

40 CFR 60 Subpart Ka - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978 and prior to July 23, 1984	There are no petroleum storage vessels with capacity greater than 40,000 gallons at this facility. Therefore, this regulation is not applicable.
40 CFR 60 Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984	There are no volatile organic liquid storage vessels with capacity greater than 75 cubic meters at this facility. Therefore, this regulation is not applicable.
40 CFR 60 Subpart GG - Standards of Performance for Stationary Gas Turbines	There are no stationary gas turbines at Blue Lake. Therefore, this regulation is not applicable.
40 CFR 60 Subpart KKK-Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants	This regulation is not applicable to the Blue Lake Station because the facility is not a natural gas processing plant as defined in the regulation.
40 CFR 60 Subpart LLL - Standards of Performance for Onshore Natural Gas Processing: SO_2 Emissions	The Blue Lake Station processes natural gas but does not operate a sweetening unit or a sulfur recovery unit. Therefore, this regulation is not applicable.
40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE)	The Blue Lake Station does not operate any stationary CI ICE; therefore, this regulation does not apply.
40 CFR 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE)	The engines at the Blue Lake Station were constructed prior to June 12, 2006 and have not been modified or reconstructed since June 12, 2006. Therefore, this regulation does not apply.

2.4.3 National Emission Standards for Hazardous Air Pollutants (NESHAP)

Federal NESHAP regulations promulgated pursuant to Section 112 of the CAA are found in 40 CFR Parts 61 and 63. In general, NESHAP, or Maximum Achievable Control Technology (MACT) standards apply to major stationary sources of HAP emissions, defined as potential-to-emit of 10 tons or more per year of any single HAP or 25 tons or more per year of any combination of HAP and minor stationary sources of HAP emissions (thresholds less than a major source). Blue Lake is considered a major source of HAPs due to potential total HAPs emissions that exceed 25 tpy, and potential formaldehyde emissions that exceed 10 tpy. Potentially applicable NESHAPs are discussed below.

40 CFR 61 Subpart M - National Emission Standard for Asbestos

The Blue Lake Station may at times engage in demolition and/or renovation activities involving asbestos-containing materials (ACM). Therefore, the facility could be potentially subject to Subpart M, Standards for Demolition and Renovation (40 CFR 61.145). Procedures are in place to ensure the facility complies with these standards.

40 CFR 61 Subpart V - National Emission Standard for Equipment Leaks (Fugitive Emission Sources)

This regulation is not applicable to Blue Lake because the provisions of this subpart apply to sources that are intended to operate in volatile hazardous air pollutant (VHAP) service. “In VHAP service means that a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 10 percent by weight a volatile hazardous air pollutant (VHAP) as determined according to the provisions of 61.245(d).” The Blue Lake processes do not have any sources that operate in VHAP service.

40 CFR 63 Subpart HH - NESHAP from Oil and Natural Gas Production Facilities

This regulation is not applicable to the Blue Lake Station because the facility is a transmission and storage facility and is not an oil and gas production facility as defined in this regulation.

40 CFR 63 Subpart HHH - NESHAP from Natural Gas Transmission and Storage Facilities

Subpart HHH establishes national emission limitations and operating limitations for natural gas transmission and storage facilities that are major sources of HAP emissions. The rule affects facilities that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final user. Blue Lake is a natural gas compression and storage facility and is potentially subject to this regulation. The facility is a major source of HAPs and operates a glycol dehydration unit (affected source).

However, the previous General Standard cited under Subpart 63.1274(d)(2) allowed for an exemption from the requirements associated with the rule if actual average emissions of benzene from the glycol dehydration unit process vents to the atmosphere are less than 0.90 megagram per year. The dehydration unit at Blue Lake qualified for the exemption because the benzene emissions are less than 0.90 megagrams (1.1 tons) per year.

An amendment to the Standard was published on August 16, 2012. The permittee complies with all provisions of the amended National Emission Standards for Hazardous Air Pollutants as specified in 40 CFR Pat 63, Subparts A and HHH and will continue to comply.

40 CFR 63 Subpart EEEE – NESHAP for Organic Liquids Distribution (non-Gasoline)

40 CFR 63 Subpart EEEE was promulgated on August 25, 2003 and applies to organic liquids distribution (OLD) operations that are located at, or are part of, a major source of hazardous air pollutant (HAP) emissions as defined in section 112(a) of the Clean Air Act. This regulation does not apply to the tanks or loading operations at Blue Lake because per 40 CFR 63.2334(c)(2), OLD operations located at Natural Gas Transmission and Storage facilities as defined in 40 CFR 63 Subpart HHH are exempt from the requirements of 40 CFR 63 Subpart EEEE (OLD MACT).

40 CFR 63 Subpart ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines (RICE)

Subpart ZZZZ regulates HAP emissions from existing, new, and reconstructed stationary compression ignition (CI) and spark ignition (SI), emergency and non-emergency, RICE located at major and area sources of HAP emissions. This standard is potentially applicable to Blue Lake because the facility is a major source for HAP emissions and operates reciprocating internal combustion engines. The three (3) non-emergency compressor engines are existing (constructed prior to December 19, 2002) 2-stroke lean-burn RICE (EUBLCOMP-A, EUBLCOMP-B, EUBLCOMP-C) with site ratings greater than 500 hp. Per 63.6590(b)(3)(i), existing spark ignition two stroke lean burn stationary RICE located at a major source of HAP with a site rating of more than 500 hp "do not have to meet the requirements of this subpart and of subpart A of this part, including initial notification requirements."

The facility's three 1,125 hp natural gas-fired electrical generators are existing (installed in 1992) four-stroke Clean burn/lean burn system with an air/fuel ratio control system generator engines with catalytic oxidizers. Per 63.6590(b)(3)(ii), existing spark ignition four stroke lean burn stationary RICE located at a major source of HAP with a site rating of more than 500 hp "do not have to meet the requirements of this subpart and of subpart A of this part, including initial notification requirements."

40 CFR 63 Subpart DDDDD – NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters

The Industrial/Commercial/Institutional Boilers and Process Heaters MACT for major sources was promulgated on March 21, 2011, and regulates HAP emissions from new and existing industrial, commercial, or institutional boilers and process heaters located at major sources of HAP emissions.

This rule is applicable to the boiler and heaters located at Blue Lake, since the Station is a major source of HAP. The boiler (EUBLBOILER) is classified as an existing (constructed before June 4, 2010), <10 MMBtu/hr, natural gas burning unit. As such, it is subject to biennial tune-ups, a facility energy assessment, and the associated reporting and recordkeeping requirements. The withdrawal heaters (EUBLHTR-A, and EUBLHTR-B) are classified as existing (constructed before June 4, 2010), >10 MMBtu/hr, natural gas burning units. As such, they are subject to annual tune-ups, a facility energy assessment, and the associated reporting and recordkeeping requirements. The facility has already completed the energy assessments. ANR complies with this rule as it applies to these emission units and will continue to comply.

The reboiler (SV110) that serves as both part of the process and also as a control for the glycol dehydration system (EU BLGLYDHY) is exempt from this rule per §63.7491(i) which states that a unit is not subject to the subpart if it is "Any boiler or process heater that is used as a control device to comply with another subpart of this part… of this chapter provided that at least 50 percent of the average annual heat input during any 3 consecutive calendar years to the boiler or process heater is provided by regulated gas streams that are subject to another standard." The fuel input to the reboiler is provided by the off-gas subject to NESHAP Subpart HHH. Supplementary natural gas is used only during periods of start-up of the reboiler, therefore the unit is exempt from NESHAP Subpart DDDDD. Furthermore, the reboiler is affected by MACT HHH, and per EPA's response to comments for 40 CFR 63 DDDDD, a boiler that is affected by another MACT rule is not subject to the Boiler MACT.

Subpart JJJJJJ - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial and Institutional Boilers Area Sources

The Industrial/Commercial/Institutional Boilers and Process Heaters for area sources was promulgated on March 21, 2011, and regulates HAP emissions from industrial, commercial, or institutional boilers located at area sources of HAP emissions. Blue Lake is a major source of HAP, therefore this regulation does not apply.

2.4.4 Compliance Assurance Monitoring (CAM)

Enhanced monitoring requirements have been adopted into 40 CFR 64. The enhanced monitoring requirements are referred to as Compliance Assurance Monitoring (CAM). CAM is applicable to sources that have a potential to emit in excess of major source thresholds, not considering “tailpipe” emission controls, and use an “active” control device to achieve compliance with the emission limit. Combustion controls may be considered in evaluating the potential to emit.

An emission unit is subject to CAM if all of the following criteria are satisfied:

- the unit is located at a major source that is required to obtain a Part 70 or Part 71 permit;
- the unit is subject to an emission limitation or standard for a regulated air pollutant;
- the unit uses an active control device to achieve compliance with any such emission limit or standard, and
- the unit has potential pre-controlled emissions of the applicable air pollutant above the major source threshold.

The emissions of NOx from the three natural gas fired compressor engines are in excess of the appropriate major source thresholds. However, these units do not employ an active device to control these emissions. No other emissions units associated with the Blue Lakes facility meet the above criteria because none have the potential to emit any regulated pollutant in excess of applicable major source thresholds. For these reasons, the CAM rule does not apply to Blue Lakes.

2.4.5 Chemical Accident Prevention Provisions and Risk Management Plan

The Blue Lake Compressor Station is not subject to the Chemical Accident Prevention Provisions of 40 CFR Subpart 68. Applicability to this regulation is based on the type and quantity of certain regulated substances stored at a facility, and Blue Lake does not exceed the applicability thresholds (40 CFR 68.10). The facility is not considered a stationary source under 40 CFR 68.3 (Chemical Accident Prevention) because it is regulated under 49 CFR 192, DOT.

2.4.6 Acid Rain Regulations

Blue Lake is not subject to the federal acid rain regulations found in 40 CFR Parts 72 through 77 because the Station does not own or operate an affected unit as defined in 40 CFR part 72.6.

2.4.7 Michigan State Air Pollution Control Rules (R336)

The following paragraphs discuss the Michigan state air pollution control rules that apply to the station, as well as general compliance procedures.

Part 2 – Air Use Approval

This part requires facilities in Michigan to obtain a permit to install prior to installation, construction, reconstruction, relocation, or modification of any process or process equipment, including associated control equipment, that has the potential to emit any pollutant to the atmosphere. In addition, some facilities are required to obtain a renewable operating permit.

All processes or process equipment at this facility either have a permit to install or qualify under one of the various exemptions provided in the rule (See Table 2 in Section 2.2.7 above for a complete list of exempt sources along with the exemption criteria under which they qualify). This facility was also required to obtain a renewable operating permit. A complete and timely application was originally submitted in 1996 and a renewable operating permit was issued. This application is being submitted in order to renew this renewable operating permit.

Part 3 – Emission Limitations and Prohibitions- Particulate Matter

The processes and the process equipment at this facility will be subject to the visible emission limitations specified in R336.1301(1). All sources at the facility will be operated in compliance with these requirements. It should be noted that for natural gas-fired fuel burning equipment, compliance with this requirement is demonstrated by using pipeline quality natural gas.

R336.1331 of this part limits the emissions of particulate matter from a process or process equipment. This facility does not operate any sources listed in Table 31. The rule also establishes a particulate matter emission limit based on a process weight rate. However, no particulate matter emissions, other than fuel combustion sources, are anticipated from the processes at this facility. Therefore, the rule is not currently applicable to the facility.

Part 4 – Emissions Limitations and Prohibitions- Sulfur-Bearing Compounds

R336.1403 limits emissions of sour gas from an oil- or natural gas-producing or transporting facility, of a natural gas-processing facility. This facility does not handle sour gas and does not operate any other process or process equipment for which an emission limit is specified in Part 4. Therefore, this part is not applicable.

Part 6 – Emission Limitations and Prohibitions- Existing Sources of Volatile Organic Compound Emissions

This part limits emissions of volatile organic compounds from various sources including storage vessels, loading facilities, and natural gas processing plants. The facility is in compliance with all the applicable requirements of this regulation. R336.1629 requires a monitoring program to control emissions of volatile organic compounds from components of existing process equipment used in natural gas processing. The rule only applies to facilities located in Kent, Livingston, Macomb, Monroe, Muskegon, Oakland, Ottawa, St. Clair, Washtenaw, and Wayne. This facility is not a natural gas processing plant and is not located in one of the counties listed above. Therefore, the rule does not apply.

Part 7 – Emission Limitations and Prohibitions- New Sources of Volatile Organic Compound Emissions

This part limits emissions of volatile organic compounds from all new sources. A “new source” is defined as a process or process equipment which is either placed into operation on or after July 1, 1979, or for which a permit to install is made to the DEQ on or after July 1, 1979. Some of the sources at the facility may be subject to this regulation (including EU BLCOLDCLEANER). The facility is in compliance with all the applicable requirements of this regulation.

Part 9 – Emission Limitations and Prohibitions- Miscellaneous

Part 9 specifies numerous miscellaneous limitations and prohibitions. Rule 336.1911 requires the facility to develop a malfunction abatement plan if and when requested by the department. The Blue Lake Station has developed and implemented a malfunction abatement plan.

Part 10 – Intermittent Testing and Sampling

Part 10 allows the department to require the owner or operator of a source to conduct performance tests using reference test methods or the department to conduct the tests on behalf of the state. Upon receipt of any such request from the department, the facility will conduct the specified performance test within the established time lines and following the agreed upon reference test methods. If the department intends to perform the test, the owner or operator will provide the necessary performance test facilities.

2.5 PROPOSED CHANGES TO EXISTING RENEWABLE OPERATING PERMIT

ANR is not requesting any significant changes to the wording of the current ROP. ANR has proposed updated language to the flexible group FG BLDDDDD to reflect updates to the standard Boiler MACT language used in templates provided by MDEQ. ANR has proposed excluding conditions related to initial compliance demonstrations for existing boilers and process heaters, as these conditions have all been satisfied. ANR has proposed correcting references to conditions in section EU BLHHH where they previously referenced the incorrect condition, and to correct the description of the dehydration system (EUBLGLYDHY) as it has always used ethylene glycol and operated only in injection mode. The updates are included in the marked-up version of the permit included in Appendix C.

2.6 SUMMARY

This document contains all the necessary elements for ANR to meet the requirements for a complete ROP renewal application under the MDEQ rules and guidance. ANR requests that this renewal application be reviewed and a draft ROP be issued at the earliest convenience.

3.0 Cold Springs 1 Compressor Station Summary

3.1 PROCESS DESCRIPTION

The Cold Springs 12/Blue Lake/Cold Springs 1 Compressor Station is a natural gas storage and transmission station which consists of three separate natural gas transmission stations operating separate natural gas storage fields (Cold Springs 12, Blue Lake, and Cold Springs 1). The station is located approximately four miles southeast of Mancelona, Michigan in Kalkaska County. Figure A-2 in Appendix A illustrates the location of the Cold Springs 1 Compressor Station. The plot plan for the Cold Springs 1 station is Figure CS1-1 in Appendix A.

The processes at the Cold Springs 1 Station consist of three components: a natural gas electric compression system, a glycol dehydration system, and a liquid stabilization system.

3.1.1 Glycol Dehydration System Process Description

As the wet natural gas is withdrawn from the storage field, the difference between the field pressure and the pipeline pressure causes the temperature of the natural gas to drop. This temperature drop causes condensation of water and hydrocarbon liquids present in the wet natural gas. Cold Springs 1 uses ethylene glycol injection into the withdrawal gas stream for prevention of hydrate formation and freeze protection.

During regeneration, process water and other hydrocarbon constituents are removed, and lean glycol is returned to the injection system. The regenerator’s still column off-gases are routed first through a condenser for bulk water and hydrocarbon removal. The remaining hydrocarbon-rich vapors are then sent to the thermal oxidizer. The glycol dehydration process flow diagram is included as Figure CS1-2 in Appendix A.

3.1.2 Liquid Stabilization System Process Description

The liquid stabilization system receives hydrocarbon liquids from all three of the storage fields (Cold Springs 12, Blue Lake, and Cold Springs 1) located at the site and other ANR facilities. The amount of hydrocarbon condensates generated during natural gas withdrawal from the storage field varies with the size of the field, production profile, and the number of injection/withdrawal cycles. The liquid stabilization system removes the lighter hydrocarbon components from liquid condensates. This allows the liquid condensate to be stored in storage tanks controlled by a thermal oxidizer at the site. The stabilization system uses flash-separation and a heated stripping column to drive off the lighter hydrocarbon components. The hydrocarbon vapors removed from the condensate are recovered and recycled to the gas conditioning systems. The storage system controls VOC emissions by blanketing the tank contents with natural gas and exhausting their vents to a thermal oxidizer. The liquid stabilization system process flow diagram is included as Figure CS1-3 in Appendix A.

3.2 EMISSIONS SOURCE DESCRIPTION

The glycol dehydration system component consists of one glycol dehydration system and various exempt storage tanks. The liquid stabilization system consists of four stabilized condensate storage tanks, the NGL bullet tanks, heater, and residual wastewater tank.

Emissions from the significant sources are estimated and included in Appendix B. It should be noted that all emissions are estimated for representation purposes only and are not intended to convey any limitations or restrictions.

3.2.1 Boiler (EUCS1BOILER), Gas Withdrawal Heater (EUCS1WDHEATER)

The Cold Springs 1 facility uses one natural gas-fired boiler rated at 3.5 MMBtu/hr, and one natural gas- fired withdrawal heater rated at 15 MMBtu/hr.

Emissions from the boiler and heater are estimated and included in Appendix B. See the calculations for additional details regarding emission estimates.

3.2.2 Glycol Dehydration System: (EUCS1GLYDHY, SVCS1REBOILER, SV011A, SV011B)

The glycol dehydration system at Cold Springs 1 uses ethylene glycol (EG) injection into the withdrawal gas stream for prevention of hydrate formation and freeze protection prior to cold separation. The system uses two injection stages at a combined rate of approximately 12 gallons per minute of ethylene glycol/water solution (75% by weight). Glycol injection occurs at two separate temperature and pressure levels and an intermediate separator is used to recover entrained hydrocarbons. The separator significantly reduces the hydrocarbon loading of the regenerator (reboiler).

The water rich glycol from the gas conditioning system is processed at the regenerator (SVCS1REBOILER). This regeneration system also uses a flash separator with the flashed vapor preferentially burned as fuel in the reboiler. Any additional vapor over and above the fuel requirements is routed to a thermal oxidizer. During regeneration, process water and other hydrocarbon constituents are removed, and lean glycol is returned to the injection system. The regenerator’s still column off-gases are routed first through a condenser (SV011B) for bulk water and hydrocarbon removal. The remaining hydrocarbon-rich vapors are then sent to a thermal oxidizer (SV011A). The reboiler functions as a control device and is fueled exclusively with off-gas except for during periods of start-up, when supplementary natural gas is used. See NESHAP Subpart DDDDD discussion below for regulatory applicability.

Emissions from the dehydration system are estimated and included in Appendix B. See the calculations for additional details regarding emission estimates.

3.2.3 Liquid Stabilization System: Stabilizer Heater (EUCS1LSHEATER)

The liquid stabilization system at Cold Springs 1 uses one stabilizer heater rated at 5 MMBtu/hr.

Emissions from the heater are estimated and included in Appendix B. See the calculations for additional details regarding emission estimates.

3.2.4 Liquid Stabilization System: Stabilized Condensate Tanks (EUCS1CNDTANK1, EUCS1CNDTANK2, EUCS1CNDTANK3, EUCS1CNDTANK4)

The liquid stabilization system uses four condensate storage tanks, each with a maximum capacity of 16,800 gallons, are used to store stabilized condensate liquids. A natural gas blanket is used to minimize VOC and toxic air contaminants (TAC) emissions from these storage tanks. Condensate liquids are transferred from the storage tanks to a pipeline. A thermal oxidizer (SV011C) is used to control hydrocarbon vapors resulting from breathing and working losses from the condensate storage tanks. The thermal oxidizer is expected to have a minimum VOC control efficiency of 98%.

Emissions from the stabilization tanks and thermal oxidizer are estimated and included in Appendix B. See the calculations for additional details regarding emission estimates.

3.2.5 Liquid Stabilization System: NGL Bullet Tanks (EUCS1NGLV6009A and EUCS1NGLV6009B) and Truck Loading (EUCS1TL)

The liquid stabilization system uses two 30,000 gallon pressurized bullet tanks (80-120 psia) to store natural gas liquids. The tanks are considered insignificant activities. The liquids are loaded from these storage tanks to trucks and sent offsite. The truck loading is vapor balanced back to the bullet tanks. The only anticipated emissions are from fugitive components and are expected to be negligible.

3.2.6 Insignificant Activities

Activities identified as “insignificant” pursuant to R 336.1212 (2) do not need to be included in an administratively complete application for a renewable operating permit. These activities do not significantly contribute to the actual emissions or the potential to emit. The following activities, identified under R 336.1212 (2) as insignificant, may be performed at the Cold Springs 1 Station:

- Repair and maintenance of grounds and structures (including painting, welding, etc.);
- All activities and changes pursuant to sections (a) through (f) of Rule 285, Permit to install exemptions; miscellaneous, unless any compliance monitoring requirements in the renewable operating permit would be affected by the change;
- All activities and changes pursuant to sections (f) through (h) of Rule 287, Surface coating equipment, unless any compliance monitoring requirements in the renewable operating permit would be affected by the change;
- Use of office supplies;
- Use of housekeeping and janitorial supplies;
- Sanitary plumbing and associated stacks or vents;
- Temporary activities related to the construction or dismantlement of buildings, utility lines, pipelines, wells, earthworks, or other structures;
- Storage and handling of drums or other transportable containers that are sealed during storage and handling;
- Fire protection equipment, firefighting and training in preparation for fighting fires (prior approval by the department for open burning associated with training in preparation for fighting fires will be obtained pursuant to R 336.1310);
- Use, servicing, and maintenance of motor vehicles, except where the activity is subject to an applicable requirement;
- Construction, repair, and maintenance of roads or other paved or unpaved areas, except where the activity is subject to an applicable requirement;
- Piping and storage of natural gas, including venting from pressure relief valves and purging of gas lines; and

- Compressor unit oil demisters.

3.2.7 Exempt Sources

Certain processes and process equipment exempt by state rule from obtaining a Permit to Install (PTI) may be subject to inclusion in the ROP application. The guidelines for determining whether an exempt process or process equipment must be included in the ROP application are summarized as follows:

- Process or process equipment exempt under R336.1212(3) need not be included in the ROP application, provided there are no applicable requirements;
- Process or process equipment exempt under R336.1212(4) need to be listed in the ROP application as Exempt Devices, provided there are no process-specific emission limitations or standards; and,
- If a process or process equipment identified as exempt under 212(3) or 212(4) has an applicable requirement with a process-specific emission limitation or standard, it must be included as an emission group in the ROP.

There are several sources at the Cold Springs 1 Station that qualify for the above exemptions. These sources are also exempt from the requirement of obtaining a PTI. Table 3 provides a list of such sources. In addition, the table provides a brief description and identifies the specific rule that exempts from the ROP and the requirement of obtaining a PTI.

Please note that as per the guidance received from Janis Denman of MDEQ on March 9, 2004, loading and unloading activities associated with the exempt storage tanks are also considered to be exempt under the same regulation.

Table 3
Equipment Exempt from Permit to Install Requirement

Equipment ID	Description of Exempt Emission Unit	RO Permit Exemption	NSR Permit Exemption	Basis of Exemption
EUCS1V6009A	LSP NGL tank, T-6009A, 30,000 gallons	R 336.1212(4)(d)	R 336.1284(2)(b)	< 40,000 gallons – Each tank is used to store liquefied petroleum gas and has a capacity of less than 40,000 gallons.
EUCS1V6009B	LSP NGL tank, T-6009B, 30,000 gallons			
EUCS1TL	LSP NGL Truck Loading	R 336.1212(4)(d)	R 336.1284(2)(i)	< 40,000 gallons and contents with a vapor pressure of ≤ 1.5 psia.
EUCS1BRINETK1	Brine/Condensate tank, Tank 1, 16,800 gallons	R 336.1212(4)(d)	R 336.1284(2)(e)	< 40,000 gallons - Each tank is used to store sweet condensate and has a capacity of less than 40,000 gallons.
EUCS1BRINETK2	Brine/Condensate tank, Tank 2, 16,800 gallons			
EUCS1GLYTANK1	Ethylene Glycol tank, Tank 1, 16,800 gallons	R 336.1212(4)(d)	R 336.1284(2)(i)	< 40,000 gallons and contents with a vapor pressure of ≤ 1.5 psia.
EUCS1GLYTANK2	Ethylene Glycol tank, Tank 2, 16,800 gallons			
EUCS1LUBEOILTK1	Lube Oil tank, Tank 1, 3,000 gallons	R 336.1212(3)(e)	R 336.1284(2)(c)	Container Contents - Each tank is used to store lubricating, hydraulic, thermal oils or indirect heat transfer fluids.
EUCS1LUBEOILTK2	Lube Oil tank, Tank 2, 3,000 gallons			
EUCS1USEDLUBEOILTK	Used oil tank, 16,800 gallons			
EUCS1LUBET5124	Compressor Cylinder Lube Oil tank,T-5124, 300 gallons			
EUCS1COOLANTTK	Glycol/water tank, 3,000 gallons	R 336.1212(4)(d)	R 336.1284(2)(i)	< 40,000 gallons and contents with a vapor pressure of ≤ 1.5 psia.
EUCS1PROPANE	Propane pressure tank, 1500 gallons	R 336.1212(4)(d)	R 336.1284(2)(b)	Propane storage < 40,000 gallons.
EUCS1HTRH5804	Hot water heater rated < 0.1 MMBtu/hr (H-5804)	R 336.1212(4)(c)	R 336.1282(2)(b)	Natural gas-fueled equipment used for service water heating or oil and gas production <50 MMBtu/hr.
EUCS1BRINET6008	LSP Brine tank, T-6008, 8,460 gallons	R 336.1212(4)(d)	R 336.1284(2)(e)	< 40,000 gallons - Each tank is used to store sweet condensate and has a capacity of less than

				40,000 gallons.
FGCS1COMP	Cold Springs 1 Fugitive emissions from component leaks	R 336.1212(4)(h)	R 336.1290(2)(a)	Fugitive emissions emit VOCs at rates below identified exemption thresholds
Blowdowns	Cold Springs 1 Emergency Shutdown	R 336.1212(4)(e)	R 336.1285(mm)	All emergency venting of natural gas is <1,000,000 scf per event or notification to the pollution emergency alert system is sent within 24 hours.

3.3 PERMITTING SUMMARY AND COMPLIANCE HISTORY

There have been no administrative or judicial actions taken against ANR within the past five years pertaining to operation of the Cold Springs 1 Station. There are currently no outstanding violations of state or federal environmental laws or regulations at the Cold Springs 1 Station. Any new PTI issued by MDEQ since the issuance of the initial ROP effective date have been rolled into the current ROP dated November 21, 2014. Since its issuance, ANR has complied with the terms and conditions of the existing ROP.

3.4 FEDERAL AND STATE REGULATORY REVIEW

The Cold Springs 1 Station is subject to a variety of federal and state air quality regulations which are discussed in this section.

3.4.1 Prevention of Significant Deterioration (PSD)

The Prevention of Significant Deterioration (PSD) applicability is triggered by construction of a “major stationary source” or “major modification” to an existing major stationary source. PSD regulations in 40 CFR 52.21 define a major source as any source type (belonging to a list of 28 categories) that emits or has the potential to emit 100 tpy or more of any regulated pollutant under the CAA, or any other source type that emits or has the potential to emit such pollutants in amounts equal to or greater than 250 tpy [40 CFR 52.21 (b)(1)(i)(b)]. The potential to emit is based on the maximum design capacity of a source, subject to federally enforceable permit limitations (e.g., limits on annual hours of operation) and takes into account pollution control efficiency.

The potential to emit each NSR regulated pollutant at the Cold Springs 1 facility is less than the respective PSD significant emission rate threshold. Since the construction of the facility, no modifications have been made which would trigger PSD requirements. Future modifications of the process equipment may be subject to PSD requirements.

3.4.2 New Source Performance Standards (NSPS)

NSPS contained in 40 CFR 60 require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the relevant regulations. The following NSPS regulations were reviewed and all were confirmed to be non-applicable to the Cold Springs 1 Station. The results of this review are summarized by regulatory citation in Table 3.4.2-1 below.

Table 3.4.2-1 NSPS Regulatory Review

Regulatory Citation	Non-Applicability Determination
40 CFR 60 Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units	This standard is not applicable to Cold Springs 1 because the 15 MMBtu/hr withdrawal gas heater does not use any heat transfer medium.
40 CFR 60 Subpart K - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973 and prior to May 19, 1978	There are no storage vessels at this facility that were constructed, reconstructed, or modified during this time period. Therefore, this regulation is not applicable.

40 CFR 60 Subpart Ka - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978 and prior to July 23, 1984	There are no storage vessels at this facility that were constructed, reconstructed, or modified during this time period. Therefore, this regulation is not applicable.
40 CFR 60 Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984	Subpart Kb does not apply to condensate stored, processed, or treated prior to custody transfer. Therefore, this regulation is not applicable.
40 CFR 60 Subpart GG - Standards of Performance for Stationary Gas Turbines	There are no stationary gas turbines at Cold Springs 1. Therefore, this regulation is not applicable.
40 CFR 60 Subpart KKK-Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants	This regulation is not applicable to the Cold Springs 1 Station because the facility is not a natural gas processing plant as defined in the regulation.
40 CFR 60 Subpart LLL - Standards of Performance for Onshore Natural Gas Processing: SO_2 Emissions	The Cold Springs 1 Station processes natural gas but does not operate a sweetening unit or a sulfur recovery unit. Therefore, this regulation is not applicable.
40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE)	The Cold Springs 1 Station does not operate any stationary CI ICE; therefore, this regulation does not apply.
40 CFR 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE)	The engines at the Cold Springs 1 Station were constructed prior to June 12, 2006 and have not been modified or reconstructed since June 12, 2006. Therefore, this regulation does not apply.

3.4.3 National Emission Standards for Hazardous Air Pollutants (NESHAP)

Federal NESHAP regulations promulgated pursuant to Section 112 of the CAA are found in 40 CFR Parts 61 and 63. In general, NESHAP, or Maximum Achievable Control Technology (MACT) standards apply to major stationary sources of HAP emissions, defined as potential-to-emit of 10 tons or more per year of any single HAP or 25 tons or more per year of any combination of HAP and minor stationary sources of HAP emissions (thresholds less than a major source). Cold Springs 1 is considered a major source of HAPs. Potentially applicable NESHAPs are discussed below.

40 CFR 61 Subpart M - National Emission Standard for Asbestos

The Cold Springs 1 Station may at times engage in demolition and/or renovation activities involving asbestos-containing materials (ACM). Therefore, the facility could be potentially subject to Subpart M, Standards for Demolition and Renovation (40 CFR 61.145). Procedures are in place to ensure the facility complies with these standards.

40 CFR 61 Subpart V - National Emission Standard for Equipment Leaks (Fugitive Emission Sources)

This regulation is not applicable to Cold Springs 1 because the provisions of this subpart apply to sources that are intended to operate in volatile hazardous air pollutant (VHAP) service. “In VHAP service means that a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 10 percent by weight a volatile hazardous air pollutant (VHAP) as determined according to the provisions of 61.245(d).” The Cold Springs 1 processes do not have any sources that operate in VHAP service.

40 CFR 63 Subpart HH - NESHAP from Oil and Natural Gas Production Facilities

Subpart HH establishes requirements for HAP emissions from oil and natural gas production facilities that process field natural gas only. The equipment associated with the Cold Springs 1 facility does not process ‘field natural gas’ as defined in 40 CFR 63 Subpart HH. Therefore, the requirements of this standard are not applicable.

40 CFR 63 Subpart HHH - NESHAP from Natural Gas Transmission and Storage Facilities

Subpart HHH establishes national emission limitations and operating limitations for natural gas transmission and storage facilities that are major sources of HAP emissions. The rule affects facilities that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final user. Cold Springs 1 is a natural gas compression and storage facility and is potentially subject to this regulation. The facility is a major source of HAPs and operates a glycol dehydration unit (affected source).

However, the previous General Standard cited under Subpart 63.1274(d)(2) allowed for an exemption from the requirements associated with the rule if actual average emissions of benzene from the glycol dehydration unit process vents to the atmosphere are less than 0.90 megagram per year. The dehydration unit at Cold Springs 1 qualified for the exemption because the benzene emissions are less than 0.90 megagrams (1.1 tons) per year.

An amendment to the Standard was published on August 16, 2012. The permittee complies with all provisions of the amended National Emission Standards for Hazardous Air Pollutants as specified in 40 CFR Pat 63, Subparts A and HHH and will continue to comply.

40 CFR 63 Subpart EEEE – NESHAP for Organic Liquids Distribution (non-Gasoline)

40 CFR 63 Subpart EEEE was promulgated on August 25, 2003 and applies to organic liquids distribution (OLD) operations that are located at, or are part of, a major source of hazardous air pollutant (HAP) emissions as defined in section 112(a) of the Clean Air Act. This regulation does not apply to the tanks or loading operations at Cold Springs 1 because per 40 CFR 63.2334(c)(2), OLD operations located at Natural Gas Transmission and Storage facilities as defined in 40 CFR 63 Subpart HHH are exempt from the requirements of 40 CFR 63 Subpart EEEE (OLD MACT).

40 CFR 63 Subpart ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines (RICE)

Subpart ZZZZ regulates HAP emissions from existing, new, and reconstructed stationary compression ignition (CI) and spark ignition (SI), emergency and non-emergency, RICE located at major and area sources of HAP emissions. Cold Springs 1 does not operate any stationary RICE; therefore, this regulation does not apply.

40 CFR 63 Subpart DDDDD – NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters

The Industrial/Commercial/Institutional Boilers and Process Heaters MACT for major sources was promulgated on March 21, 2011, and regulates HAP emissions from new and existing industrial, commercial, or institutional boilers and process heaters located at major sources of HAP emissions. The EPA subsequently issued a notice on May 18, 2011 to postpone the effective dates of the final rule until the completion of reconsideration or judicial review, whichever is earlier. On January 9, 2012, the EPA vacated the May 18, 2011 notice that delayed the effective dates of the Boiler MACT rule.

This rule is applicable to the boiler and heaters located at Cold Springs 1, since the Station is a major source of HAP. The boiler (EUCS1BOILER) and the Liquid Stabilization Heater (EUCS1SHTR) are classified as existing (constructed before June 4, 2010), <10 MMBtu/hr, natural gas burning units. As such, they are subject to biennial tune-ups, a facility energy assessment, and the associated reporting and recordkeeping requirements. The Glycol Dehydration System Heater (EUCS1HTR) is classified as an existing (constructed before June 4, 2010), >10 MMBtu/hr, natural gas burning unit. As such, it is subject to annual tune-ups, a facility energy assessment, and the associated reporting and recordkeeping requirements. The facility has already completed the required energy assessments. ANR will complies with this rule as it applies to these emission units.

The reboiler (SVCS1REBOILER) that serves as both part of the process and also as a control for the glycol dehydration system (EU CS1GLYDHY) is exempt from this rule per §63.7491(i) which states that a unit is not subject to the subpart if it is “Any boiler or process heater that is used as a control device to comply with another subpart of this part… of this chapter provided that at least 50 percent of the average annual heat input during any 3 consecutive calendar years to the boiler or process heater is provided by regulated gas streams that are subject to another standard.” The fuel input to the reboiler is provided by the off-gas subject to NESHAP Subpart HHH. Supplementary natural gas is used only during periods of start-up of the reboiler, therefore the unit is exempt from NESHAP Subpart DDDDD. Furthermore, the reboiler is affected by MACT HHH, and per EPA’s response to comments for 40 CFR 63 DDDDD, a boiler that is affected by another MACT rule is not subject to the Boiler MACT.

Subpart JJJJJJ - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial and Institutional Boilers Area Sources

The Industrial/Commercial/Institutional Boilers and Process Heaters for area sources was promulgated on March 21, 2011, and regulates HAP emissions from industrial, commercial, or institutional boilers located at area sources of HAP emissions. Cold Springs 1 is a major source of HAP; therefore, this regulation does not apply.

3.4.4 Compliance Assurance Monitoring (CAM)

Enhanced monitoring requirements have been adopted into 40 CFR 64. The enhanced monitoring requirements are referred to as Compliance Assurance Monitoring (CAM). CAM is applicable to sources that have a potential to emit in excess of major source thresholds, not considering “tailpipe” emission controls, and use an “active” control device to achieve compliance with the emission limit. Combustion controls may be considered in evaluating the potential to emit.

An emission unit is subject to CAM if all of the following criteria are satisfied:

- the unit is located at a major source that is required to obtain a Part 70 or Part 71 permit;
- the unit is subject to an emission limitation or standard for a regulated air pollutant;
- the unit uses an active control device to achieve compliance with any such emission limit or standard, and
- the unit has potential pre-controlled emissions of the applicable air pollutant above the major source threshold.

None of the emissions units associated with the Cold Springs 1 facility meet the above criteria because none have the potential to emit any regulated pollutant in excess of applicable major source thresholds. For this reason, the CAM rule does not apply to Cold Springs 1.

3.4.5 Chemical Accident Prevention Provisions and Risk Management Plan

The Cold Springs 1 Compressor Station is not subject to the Chemical Accident Prevention Provisions of 40 CFR Subpart 68. Applicability to this regulation is based on the type and quantity of certain regulated substances stored at a facility, and Cold Springs 1 does not exceed the applicability thresholds (40 CFR 68.10). The facility is not considered a stationary source under 40 CFR 68.3 (Chemical Accident Prevention) because it is regulated under 49 CFR 192, DOT.

3.4.6 Acid Rain Regulations

Cold Springs 1 is not subject to the federal acid rain regulations found in 40 CFR Parts 72 through 77 because the Station does not own or operate an affected unit as defined in 40 CFR part 72.6.

3.4.7 Michigan State Air Pollution Control Rules (R336)

The following paragraphs discuss the Michigan state air pollution control rules that apply to the station, as well as general compliance procedures.

Part 2 – Air Use Approval

This part requires facilities in Michigan to obtain a permit to install prior to installation, construction, reconstruction, relocation, or modification of any process or process equipment, including associated control equipment, that has the potential to emit any pollutant to the atmosphere. In addition, some facilities are required to obtain a renewable operating permit.

All processes or process equipment at this facility either have a permit to install or qualify under one of the various exemptions provided in the rule (See Table 3 in Section 3.2.7 above for a complete list of exempt sources along with the exemption criteria under which they qualify). This facility was also required to obtain a renewable operating permit. A complete and timely Permit to Install application was originally submitted in 2007, and the facility was rolled into the renewable operating permit with the Cold Springs 12 and Blue Lake facilities. This application is being submitted in order to renew this renewable operating permit.

Part 3 – Emission Limitations and Prohibitions- Particulate Matter

The processes and the process equipment at this facility will be subject to the visible emission limitations specified in R336.1301(1). All sources at the facility will be operated in compliance with these requirements. It should be noted that for natural gas-fired fuel burning equipment, compliance with this requirement is demonstrated by using pipeline quality natural gas.

R336.1331 of this part limits the emissions of particulate matter from a process or process equipment. This facility does not operate any sources listed in Table 31. The rule also establishes a particulate matter emission limit based on a process weight rate. However, no particulate matter emissions, other than fuel combustion sources, are anticipated from the processes at this facility. Therefore, the rule is not currently applicable to the facility.

Part 4 – Emissions Limitations and Prohibitions- Sulfur-Bearing Compounds

R336.1403 limits emissions of sour gas from an oil- or natural gas-producing or transporting facility, of a natural gas-processing facility. This facility does not handle sour gas and does not operate any other process or process equipment for which an emission limit is specified in Part 4. Therefore, this part is not applicable.

Part 6 – Emission Limitations and Prohibitions- Existing Sources of Volatile Organic Compound Emissions

This part limits emissions of volatile organic compounds from various sources including storage vessels, loading facilities, and natural gas processing plants. The facility is in compliance with all the applicable requirements of this regulation. R336.1629 requires a monitoring program to control emissions of volatile organic compounds from components of existing process equipment used in natural gas processing. The rule only applies to facilities located in Kent, Livingston, Macomb, Monroe, Muskegon, Oakland, Ottawa, St. Clair, Washtenaw, and Wayne. This facility is not a natural gas processing plant and is not located in one of the counties listed above. Therefore, the rule does not apply.

Part 7 – Emission Limitations and Prohibitions- New Sources of Volatile Organic Compound Emissions

This part limits emissions of volatile organic compounds from all new sources. A “new source” is defined as a process or process equipment which is either placed into operation on or after July 1, 1979, or for which a permit to install is made to the DEQ on or after July 1, 1979. Some of the sources at the facility are subject to this regulation. Emissions of VOC from the glycol regenerator (reboiler) still column off gases are exhausted through a condenser to a thermal oxidizer. Emissions of VOC from the condensate storage tank vents are exhausted to a thermal oxidizer. The use of thermal oxidizers to combust hydrocarbon vapors from the glycol dehydration system and the liquid stabilization system represents BACT for these types of processes. As part of the PTI submittal for the construction of the Cold Springs 1 facility, a review of recently issued permits supported the conclusion that the proposed VOC controls were consistent with BACT precedent for the source category. The facility is in compliance with all the applicable requirements of this regulation.

Part 9 – Emission Limitations and Prohibitions- Miscellaneous

Part 9 specifies numerous miscellaneous limitations and prohibitions. Rule 336.1911 requires the facility to develop a malfunction abatement plan if and when requested by the department. The Cold Springs 1 Station has developed and implemented a malfunction abatement plan.

Part 10 – Intermittent Testing and Sampling

Part 10 allows the department to require the owner or operator of a source to conduct performance tests using reference test methods or the department to conduct the tests on behalf of the state. Upon receipt of any such request from the department, the facility will conduct the specified performance test within the established time lines and following the agreed upon reference test methods. If the department intends to perform the test, the owner or operator will provide the necessary performance test facilities.

3.5 PROPOSED CHANGES TO EXISTING RENEWABLE OPERATING PERMIT

ANR is not requesting any significant changes to the wording of the current ROP. ANR has proposed updated language to the flexible group FG CS1DDDDD to reflect updates to the standard Boiler MACT language used in templates provided by MDEQ. ANR has proposed excluding conditions related to initial compliance demonstrations for existing boilers and process heaters, as these conditions have all been satisfied. ANR has proposed correcting references to conditions in section EU CS1HHH where they previously referenced the incorrect condition. The updates are included in the marked-up version of the permit included in Appendix C.

3.6 SUMMARY

This document contains all the necessary elements for ANR to meet the requirements for a complete ROP renewal application under the MDEQ rules and guidance. ANR requests that this renewal application be reviewed and a draft ROP be issued at the earliest convenience.

4.0 Application Forms

Michigan Department of Environmental Quality - Air Quality Division

RENEWABLE OPERATING PERMIT
RENEWAL APPLICATION FORM

This information is required by Article II, Chapter 1, Part 55 (Air Pollution Control) of P.A. 451 of 1994, as amended, and the Federal Clean Air Act of 1990. Failure to obtain a permit required by Part 55 may result in penalties and/or imprisonment. Refer to instructions for additional information to complete the Renewable Operating Permit Renewal Application Form.

GENERAL INSTRUCTIONS

This application form should be submitted as part of an administratively complete application package for renewal of a Renewable Operating Permit (ROP). This application form consists of nine parts. Parts A – H must be completed for all applications and must also be completed for each section of a sectioned ROP. Answer all questions in all parts of the form unless directed otherwise. Detailed instructions for this application form can be found at http://michigan.gov/air (select the Permits Tab, “Renewable Operating Permits (ROP)/Title V”, then “ROP Forms & Templates”).

PART A: GENERAL INFORMATION

Enter information about the source, owner, contact person and the responsible official.

SOURCE INFORMATION

SRN	SIC Code	NAICS Code	Existing ROP Number	Section Number (if applicable)
B7198	4922	486210	MI-ROP-B7198-2014a	1

Source Name
ANR Storage Company – Cold Springs 12 Compressor Station

Street Address
10000 Pflum Road

City	State	ZIP Code	County
Mancelona	MI	49659	Kalkaska

Section/Town/Range (if address not available)

Source Description
The Cold Springs 12/Blue Lake/Cold Springs 1 Compressor Station is a natural gas storage and transmission station which consists of three separate natural gas transmission and compressor stations operating separate natural gas storage fields (Cold Springs 12, Blue Lake, and Cold Springs 1). The ANR Cold Springs 12 Compressor Station (Cold Springs 12) is a natural gas storage and transmission station that operates three compressor engines, two generator engines, a glycol dehydration system, one boiler, and two withdrawal heaters. The station is located approximately four miles southeast of Mancelona, Michigan in Kalkaska County.

☐ Check here if any of the above information is different than what appears in the existing ROP. Identify any changes on the marked-up copy of your existing ROP.

OWNER INFORMATION

Owner Name	Section Number (if applicable)
ANR Pipeline Company	1

Mailing address (☐ check if same as source address)
700 Louisiana Street, Suite 700

City	State	ZIP Code	County	Country
Houston	TX	77002	Harris	USA

☐ Check here if any information in this ROP renewal application is confidential. Confidential information should be identified on an Additional Information (AI-001) Form.

SRN: B7198	Section Number (if applicable): 1

PART A: GENERAL INFORMATION (continued)

At least one contact and responsible official must be identified. Additional contacts and responsible officials may be included if necessary.

CONTACT INFORMATION

Contact 1 Name Mr. Christian Waltman			Title Senior Environmental Specialist	
Mailing address (☐ check if same as source address) N4956 Oakcrest Dr				
City Bonduel	State WI	ZIP Code 54107	County Shawano	Country USA
Phone number 715-758-3341		E-mail address chris_waltman@transcanada.com		

Contact 2 Name (optional)			Title	
Mailing address (☐ check if same as source address)				
City	State	ZIP Code	County	Country
Phone number		E-mail address		

RESPONSIBLE OFFICIAL INFORMATION

Responsible Official 1 Name Mr. Richard Connor			Title Director, US Pipeline Operations, Great Lakes Region	
Mailing address (☐ check if same as source address) 11039 150th Ave				
City Big Rapids	State MI	ZIP Code 49307	County Mecosta	Country USA
Phone number 231-527-2122		E-mail address Richard_connor@transcanada.com		

Responsible Official 2 Name (optional)			Title	
Mailing address (☐ check if same as source address)				
City	State	ZIP Code	County	Country
Phone number		E-mail address		

☐ Check here if an AI-001 Form is attached to provide more information for Part A. Enter AI-001 Form ID:

SRN: B7198	Section Number (if applicable): 1

PART B: APPLICATION SUBMITTAL and CERTIFICATION by Responsible Official

Identify the items that are included as part of your administratively complete application in the checklist below. For your application to be complete, it must include information necessary to evaluate the source and to determine all applicable requirements. Answer the compliance statements as they pertain to all the applicable requirements to which the source is subject. The source's Responsible Official must sign and date this form.

Listing of ROP Application Contents. Check the box for the items included with your application.

☒ Completed ROP Renewal Application Form (and any AI-001 Forms) (required)	☐ Compliance Plan/Schedule of Compliance
☒ Mark-up copy of existing ROP using official version from the AQD website (required)	☐ Stack information
☐ Copies of all Permit(s) to Install that have not been incorporated into existing ROP (required)	☐ Acid Rain Permit Initial/Renewal Application
☒ HAP/Criteria Pollutant Potential to Emit Calculations	☐ Cross State Air Pollution Rule (CSAPR) Information
☐ MAERS Forms (to report emissions not previously submitted)	☐ Confidential Information
☐ Copies of all Consent Order/Consent Judgments that have not been incorporated into existing ROP	☒ Paper copy of all documentation provided (required)
☐ Compliance Assurance Monitoring (CAM) Plan	☒ Electronic documents provided (optional)
☒ Other Plans (e.g. Malfunction Abatement, Fugitive Dust, Operation and Maintenance, etc.)	☐ Other, explain:

Compliance Statement

This source is in compliance with **all** of its applicable requirements, including those contained in the existing ROP, Permits to Install that have not yet been incorporated into that ROP, and other applicable requirements not currently contained in the existing ROP.	☒ Yes ☐ No
This source will continue to be in compliance with all of its applicable requirements, including those contained in the existing ROP, Permits to Install that have not yet been incorporated into that ROP, and other applicable requirements not currently contained in the existing ROP.	☒ Yes ☐ No
This source will meet in a timely manner applicable requirements that become effective during the permit term.	☒ Yes ☐ No

The method(s) used to determine compliance for each applicable requirement is/are the method(s) specified in the existing ROP, Permits to Install that have not yet been incorporated into that ROP, and all other applicable requirements not currently contained in the existing ROP.

If any of the above are checked No, identify the emission unit(s) or flexible group(s) affected and the specific condition number(s) or applicable requirement for which the source is or will be out of compliance at the time of issuance of the ROP renewal on an AI-001 Form. Provide a compliance plan and schedule of compliance on an AI-001 Form.

Name and Title of the Responsible Official (Print or Type)

Richard Connor, Director, USPO Great Lakes Region

As a Responsible Official, I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this application are true, accurate, and complete.

Signature of Responsible Official

12-18-18

Date

SRN: B7198	Section Number (if applicable): 1

PART C: SOURCE REQUIREMENT INFORMATION

Answer the questions below for specific requirements or programs to which the source may be subject.

C1.	Actual emissions and associated data from **all** emission units with applicable requirements (including those identified in the existing ROP, Permits to Install and other equipment that have not yet been incorporated into the ROP) are required to be reported in MAERS. Are there any emissions and associated data that have not been reported in MAERS for the most recent emissions reporting year? If Yes, identify the emission unit(s) that was/were not reported in MAERS on an AI-001 Form. Applicable MAERS form(s) for unreported emission units must be included with this application.	☐ Yes ☒ No
C2.	Is this source subject to the federal regulations on ozone-depleting substances? (40 CFR Part 82)	☒ Yes ☐ No
C3.	Is this source subject to the federal Chemical Accident Prevention Provisions? (Section 112(r) of the Clean Air Act Amendments, 40 CFR Part 68) If Yes, a Risk Management Plan (RMP) and periodic updates must be submitted to the USEPA. Has an updated RMP been submitted to the USEPA?	☐ Yes ☒ No ☐ Yes ☐ No
C4.	Does the source belong to one of the source categories that require quantification of fugitive emissions? If Yes, identify the category on an AI-001 Form and include the fugitive emissions in the PTE calculations for the source. *See ROP Renewal Application instructions.*	☐ Yes ☒ No
C5.	Does this stationary source have the potential to emit (PTE) of 100 tons per year or more of any criteria pollutant (PM-10, PM 2.5, VOC, NOx, SO_2, CO, lead)? If Yes, include potential emission calculations for each identified pollutant on an AI-001 Form.	☒ Yes ☐ No
C6.	Does this stationary source emit any hazardous air pollutants (HAPs) regulated by the federal Clean Air Act, Section 112? If Yes, include potential and actual emission calculations for HAPs on an AI-001 Form. Fugitive emissions **must** be included in HAP calculations.	☒ Yes ☐ No
C7.	Are any emission units subject to the Cross State Air Pollution Rule (CSAPR)? If Yes, identify the specific emission unit(s) subject to CSAPR on an AI-001 Form.	☐ Yes ☒ No
C8.	Are any emission units subject to the federal Acid Rain Program? If Yes, identify the specific emission unit(s) subject to the Federal Acid Rain Program on an AI-001 Form. Is an Acid Rain Permit Renewal Application included with this application?	☐ Yes ☒ No ☐ Yes ☒ No
C9.	Are any emission units identified in the existing ROP subject to compliance assurance monitoring (CAM)? If Yes, identify the specific emission unit(s) subject to CAM on an AI-001 Form. If a CAM plan has not been previously submitted to the MDEQ, one must be included with the ROP renewal application on an AI-001 Form. Is a CAM plan included with this application?	☐ Yes ☒ No ☐ Yes ☒ No
C10.	Does the source have any plans such as a malfunction abatement plan, fugitive dust plan, operation/maintenance plan, or any other monitoring plan that is referenced in an existing ROP, Permit to Install requirement, or any other applicable requirement? If Yes, then a copy must be submitted as part of the ROP renewal application.	☒ Yes ☐ No
C11.	Are there any specific requirements that the source proposes to be identified in the ROP as non-applicable? If Yes, then a description of the requirement and justification must be submitted as part of the ROP renewal application on an AI-001 Form.	☐ Yes ☒ No

☒ Check here if an AI-001 Form is attached to provide more information for Part C. Enter AI-001 Form ID: **AI-**001

SRN: B7198	Section Number (if applicable): 1

PART D: PERMIT TO INSTALL (PTI) EXEMPT EMISSION UNIT INFORMATION

Review all emission units at the source and answer the question below.

D1. Does the source have any emission units that do not appear in the existing ROP but are required to be listed in the ROP application under R 336.1212(4) (Rule 212(4)) of the Michigan Air Pollution Control Rules? If Yes, identify the emission units in the table below. ☒ Yes ☐ No

If No, go to Part E.

Note: Emission units that are subject to process specific emission limitations or standards, even if identified in Rule 212, must be captured in either Part G or H of this application form. Identical emission units may be grouped (e.g. PTI exempt Storage Tanks).

Emission Unit ID	**Emission Unit Description**	**Rule 201 Exemption Rule Citation** [e.g. Rule 282(2)(b)(i)]	**Rule 212(4) Citation** [e.g. Rule 212(4)(c)]
See Application Text, Section 1.2, Table 1.	See Application Text, Section 1.2, Table 1.	See Application Text, Section 1.2, Table 1.	See Application Text, Section 1.2, Table 1.

Comments:

☐ Check here if an AI-001 Form is attached to provide more information for Part D. Enter AI-001 Form ID: **AI-**

SRN: B7198	Section Number (if applicable): 1

PART E: EXISTING ROP INFORMATION

Review all emission units and applicable requirements (including any source wide requirements) in the existing ROP and answer the questions below as they pertain to **all** emission units and **all** applicable requirements in the existing ROP.

E1. Does the source propose to make any additions, changes or deletions to terms, conditions and underlying applicable requirements as they appear in the existing ROP? If Yes, identify changes and additions on Part F, Part G and/or Part H. See Part H and Section 1.5 of the application text for discussion.	☒ Yes ☐ No
E2. For each emission unit(s) identified in the existing ROP, all stacks with applicable requirements are to be reported in MAERS. Are there any stacks with applicable requirements for emission unit(s) identified in the existing ROP that were not reported in the most recent MAERS reporting year? If Yes, identity the stack(s) that was/were not reported on applicable MAERS form(s).	☐ Yes ☒ No
E3. Have any emission units identified in the existing ROP been modified or reconstructed that required a PTI? If Yes, complete Part F with the appropriate information.	☐ Yes ☒ No
E4. Have any emission units identified in the existing ROP been dismantled? If Yes, identify the emission unit(s) and the dismantle date in the comment area below or on an AI-001 Form.	☒ Yes ☐ No

Comments:
Emergency generator engine EUCS12EMRGEN-A was dismantled in October 2016.

☐ Check here if an AI-001 Form is attached to provide more information for Part E. Enter AI-001 Form ID: **AI-**

SRN: B7198	Section Number (if applicable): 1

PART F: PERMIT TO INSTALL (PTI) INFORMATION

Review all emission units and applicable requirements at the source and answer the following questions as they pertain to **all** emission units with PTIs. Any PTI(s) identified below must be attached to the application.

F1. Has the source obtained any PTIs where the applicable requirements from the PTI have not been incorporated into the existing ROP? If Yes, complete the following table. If No, go to Part G. ☐ Yes ☒ No

Permit to Install Number	Emission Units/Flexible Group ID(s)	Description (*Include Process Equipment, Control Devices and Monitoring Devices*)	Date Emission Unit was Installed/ Modified/ Reconstructed

F2. Do any of the PTIs listed above change, add, or delete terms/conditions to **established emission units** in the existing ROP? If Yes, identify the emission unit(s) or flexible group(s) affected in the comments area below or on an AI-001 Form and identify all changes, additions, and deletions in a mark-up of the existing ROP. ☐ Yes ☐ No

F3. Do any of the PTIs listed above identify **new emission units** that need to be incorporated into the ROP? If Yes, submit the PTIs as part of the ROP renewal application on an AI-001 Form, and include the new emission unit(s) or flexible group(s) in the mark-up of the existing ROP. ☐ Yes ☐ No

F4. Are there any stacks with applicable requirements for emission unit(s) identified in the PTIs listed above that were not reported in MAERS for the most recent emissions reporting year? If Yes, identity the stack(s) that were not reported on the applicable MAERS form(s). ☐ Yes ☐ No

F5. Are there any proposed administrative changes to any of the emission unit names, descriptions or control devices in the PTIs listed above for any emission units not already incorporated into the ROP? If Yes, describe the changes on an AI-001 Form. ☐ Yes ☐ No

Comments:

☐ Check here if an AI-001 Form is attached to provide more information for Part F. Enter AI-001 Form ID: **AI-**

SRN: B7198	Section Number (if applicable): 1

PART G: EMISSION UNITS MEETING THE CRITERIA OF RULES 281(2)(h), 285(2)(r)(iv), 287(2)(c), OR 290

Review all emission units and applicable requirements at the source and answer the following questions.

G1. Does the source have any new and/or existing emission units which do not already appear in the existing ROP and which meet the criteria of Rules 281(2)(h), 285(2)(r)(iv), 287(2)(c), or 290.

If Yes, identify the emission units in the table below. If No, go to Part H. ☐ Yes ☒ No

Note: If several emission units were installed under the same rule above, provide a description of each and an installation/modification/reconstruction date for each.

Origin of Applicable Requirements	**Emission Unit Description –** ***Provide Emission Unit ID and a description of Process Equipment, Control Devices and Monitoring Devices***	**Date Emission Unit was Installed/ Modified/ Reconstructed**
☐ Rule 281(2)(h) or 285(2)(r)(iv) cleaning operation		
☐ Rule 287(2)(c) surface coating line		
☐ Rule 290 process with limited emissions		

Comments:

☐ Check here if an AI-001 Form is attached to provide more information for Part G. Enter AI-001 Form ID: **AI-**

SRN: B7198	Section Number (if applicable): 1

PART H: REQUIREMENTS FOR ADDITION OR CHANGE

Complete this part of the application form for all proposed additions, changes or deletions to the existing ROP. This includes state or federal regulations that the source is subject to and that must be incorporated into the ROP or other proposed changes to the existing ROP. **Do not include additions or changes that have already been identified in Parts F or G of this application form.** If additional space is needed copy and complete an additional Part H.

Complete a separate Part H for each emission unit with proposed additions and/or changes.

H1. Are there changes that need to be incorporated into the ROP that have not been identified in Parts F and G? If Yes, answer the questions below.	☒ Yes ☐ No
H2. Are there any proposed administrative changes to any of the existing emission unit names, descriptions or control devices in the ROP? If Yes, describe the changes in questions H8 – H16 below and in the affected Emission Unit Table(s) in the mark-up of the ROP.	☐ Yes ☒ No
H3. Does the source propose to add a new emission unit or flexible group to the ROP not previously identified in Parts F or G? If Yes, identify and describe the emission unit name, process description, control device(s), monitoring device(s) and applicable requirements in questions H8 – H16 below and in a new Emission Unit Table in the mark-up of the ROP. See instructions on how to incorporate a new emission unit/flexible group into the ROP.	☐ Yes ☒ No
H4. Does the source propose to add new state or federal regulations to the existing ROP? If Yes, on an AI-001 Form, identify each emission unit/flexible group that the new regulation applies to and identify <u>each</u> state or federal regulation that should be added. Also, describe the new requirements in questions H8 – H16 below and add the specific requirements to existing emission units/flexible groups in the mark-up of the ROP, create a new Emission Unit/Flexible Group Table, or add an AQD template table for the specific state or federal requirement.	☐ Yes ☒ No
H5. Has a Consent Order/Consent Judgment (CO/CJ) been issued where the requirements were not incorporated into the existing ROP? If Yes, list the CO/CJ number(s) below and add or change the conditions and underlying applicable requirements in the appropriate Emission Unit/Flexible Group Tables in the mark-up of the ROP.	☐ Yes ☒ No
H6. Does the source propose to add, change and/or delete **source-wide** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below.	☐ Yes ☒ No
H7. Are you proposing to **streamline** any requirements? If Yes, identify the streamlined and subsumed requirements and the EU ID, and provide a justification for streamlining the applicable requirement below.	☐ Yes ☒ No

SRN: B7198	Section Number (if applicable): 1

PART H: REQUIREMENTS FOR ADDITION OR CHANGE – (continued)

H8. Does the source propose to add, change and/or delete **emission limit** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☐ Yes ☒ No

H9. Does the source propose to add, change and/or delete **material limit** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG CS12DDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only.

H10. Does the source propose to add, change and/or delete **process/operational restriction** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG CS12DDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only. ANR proposes excluding template language requiring an initial tune-up and Energy Assessment for existing boilers because these conditions have already been satisfied. Any new boilers would have the language from the separate MDEQ template for new boilers and process heaters.

FG CS12ZZZZ: ANR proposes removing all references to EU CS12EMRGEN-A because the engine was taken out of service with the fuel supply dismantled.

H11. Does the source propose to add, change and/or delete **design/equipment parameter** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG CS12ZZZZ: ANR proposes removing all references to EU CS12EMRGEN-A because the engine was taken out of service with the fuel supply dismantled.

H12. Does the source propose to add, change and/or delete **testing/sampling** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG CS12DDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only.

H13. Does the source propose to add, change and/or delete **monitoring/recordkeeping** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

EU CS12HHH: ANR proposes to correct the numbering of several referenced conditions in this section.

FG CS12DDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only.

FG CS12ZZZZ: ANR proposes removing all references to EU CS12EMRGEN-A because the engine was taken out of service with the fuel supply dismantled.

H14. Does the source propose to add, change and/or delete **reporting** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG CS12DDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only. ANR proposes excluding template language requiring submittal of a Notification of Compliance Status following the initial tune-up and Energy Assessment for existing boilers because this condition has already been satisfied. Any new boilers would have the language from the separate MDEQ template for new boilers and process heaters.

FG CS12ZZZZ: ANR proposes removing all references to EU CS12EMRGEN-A because the engine was taken out of service with the fuel supply dismantled.

SRN: B7198

Section Number (if applicable): 1

PART H: REQUIREMENTS FOR ADDITION OR CHANGE – (continued)

H15. Does the source propose to add, change and/or delete **stack/vent restrictions**? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☐ Yes ☒ No

H16. Does the source propose to add, change and/or delete any **other** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG CS12DDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only. ANR proposes excluding template language containing the initial compliance date because the condition has already been satisfied. Any new boilers would have the language from the separate MDEQ template for new boilers and process heaters.

FG CS12ZZZZ: ANR proposes to correct the units referenced in this condition.

H17. Does the source propose to add terms and conditions for an alternative operating scenario or intra-facility trading of emissions? If Yes, identify the proposed conditions in a mark-up of the corresponding section of the ROP and provide a justification below. ☐ Yes ☒ No

☐ Check here if an AI-001 Form is attached to provide more information for Part H. Enter AI-001 Form ID: **AI-**

Michigan Department of Environmental Quality - Air Quality Division

RENEWABLE OPERATING PERMIT APPLICATION

AI-001: ADDITIONAL INFORMATION

This information is required by Article II, Chapter 1, part 55 (Air Pollution Control) of P.A. 451 of 1994, as amended, and the Federal Clean Air Act of 1990. Failure to obtain a permit required by Part 55 may result in penalties and/or imprisonment. Please type or print clearly. Refer to instructions for additional information to complete this form.

	SRN: B7198	Section Number (if applicable): 1

1. Additional Information ID
AI-001

Additional Information

2. Is This Information Confidential? ☐ Yes ☒ No

As Required by Part C: Source Requirement Information of the ROP Renewal Application Form, the following documents have been included as part of either Appendix B (Emissions Calculations) or Appendix D (Plans referenced in the ROP) of the application:

C5. Potential emission calculations for each criteria pollutant for which the source has the potential to emit (PTE) of 100 tons per year or more. Calculations of PTE have been included for all criteria pollutants. The source has PTE exceeding 100 tons per year for NOx, CO and VOC.

C6. Potential (equal to actual) emission calculations for HAPs.

C10. The following plans and their references in the existing ROP:

- Blue Lake, Cold Springs 1, and Cold Springs 12 Emission Test and LDAR Assessment of Small Glycol Dehydration Units (referenced in EU CS12HHH Conditions VI.5 and VI.6);
- Cold Springs 12 40 CFR Part 63 Subpart HHH Site Monitoring Plan (referenced in EU CS12HHH Condition IX.3); and
- Cold Springs 12, Blue Lake, and Cold Springs 1 Preventative Maintenance / Malfunction Abatement Plan (PM/MAP) (referenced in FG CS12CMPRS Conditions III.2 and IX.1).

Michigan Department of Environmental Quality - Air Quality Division

RENEWABLE OPERATING PERMIT
RENEWAL APPLICATION FORM

This information is required by Article II, Chapter 1, Part 55 (Air Pollution Control) of P.A. 451 of 1994, as amended, and the Federal Clean Air Act of 1990. Failure to obtain a permit required by Part 55 may result in penalties and/or imprisonment. Refer to instructions for additional information to complete the Renewable Operating Permit Renewal Application Form.

GENERAL INSTRUCTIONS

This application form should be submitted as part of an administratively complete application package for renewal of a Renewable Operating Permit (ROP). This application form consists of nine parts. Parts A – H must be completed for all applications and must also be completed for each section of a sectioned ROP. Answer all questions in all parts of the form unless directed otherwise. Detailed instructions for this application form can be found at http://michigan.gov/air (select the Permits Tab, “Renewable Operating Permits (ROP)/Title V”, then “ROP Forms & Templates”).

PART A: GENERAL INFORMATION

Enter information about the source, owner, contact person and the responsible official.

SOURCE INFORMATION

SRN B7198	SIC Code 4922	NAICS Code 486210	Existing ROP Number MI-ROP-B7198-2014a	Section Number (if applicable) 2

Source Name
ANR Storage Company – Blue Lake Gas Storage Company

Street Address
10000 Pflum Road

City Mancelona	State MI	ZIP Code 49659	County Kalkaska

Section/Town/Range (if address not available)

Source Description
The Cold Springs 12/Blue Lake/Cold Springs 1 Compressor Station is a natural gas storage and transmission station which consists of three separate natural gas transmission and compressor stations operating separate natural gas storage fields (Cold Springs 12, Blue Lake, and Cold Springs 1). The Blue Lake Station consists of three natural gas-fired compressor engines, three natural gas-fired generator engines, one glycol dehydration system, one natural gas-fired boiler, two withdrawal gas heaters, a cold cleaner, and various exempt storage tanks. The station is located approximately four miles southeast of Mancelona, Michigan in Kalkaska County.

☐ Check here if any of the above information is different than what appears in the existing ROP. Identify any changes on the marked-up copy of your existing ROP.

OWNER INFORMATION

Owner Name ANR Pipeline Company	Section Number (if applicable) 2

Mailing address (☐ check if same as source address)
700 Louisiana Street, Suite 700

City Houston	State TX	ZIP Code 77002	County Harris	Country USA

☐ Check here if any information in this ROP renewal application is confidential. Confidential information should be identified on an Additional Information (AI-001) Form.

SRN: B7198	Section Number (if applicable): 2

PART A: GENERAL INFORMATION (continued)

At least one contact and responsible official must be identified. Additional contacts and responsible officials may be included if necessary.

CONTACT INFORMATION

Contact 1 Name Mr. Christian Waltman	Title Senior Environmental Specialist

Mailing address (☐ check if same as source address)
N4956 Oakcrest Dr

City Bonduel	State WI	ZIP Code 54107	County Shawano	Country USA

Phone number 715-758-3341	E-mail address chris_waltman@transcanada.com

Contact 2 Name (optional)	Title

Mailing address (☐ check if same as source address)

City	State	ZIP Code	County	Country

Phone number	E-mail address

RESPONSIBLE OFFICIAL INFORMATION

Responsible Official 1 Name Mr. Richard Connor	Title Director, US Pipeline Operations, Great Lakes Region

Mailing address (☐ check if same as source address)
11039 150th Ave

City Big Rapids	State MI	ZIP Code 49307	County Mecosta	Country USA

Phone number 231-527-2122	E-mail address Richard_connor@transcanada.com

Responsible Official 2 Name (optional)	Title

Mailing address (☐ check if same as source address)

City	State	ZIP Code	County	Country

Phone number	E-mail address

☐ Check here if an AI-001 Form is attached to provide more information for Part A. Enter AI-001 Form ID:

SRN: B7198	Section Number (if applicable): 2

PART B: APPLICATION SUBMITTAL and CERTIFICATION by Responsible Official

Identify the items that are included as part of your administratively complete application in the checklist below. For your application to be complete, it must include information necessary to evaluate the source and to determine all applicable requirements. Answer the compliance statements as they pertain to all the applicable requirements to which the source is subject. The source's Responsible Official must sign and date this form.

Listing of ROP Application Contents. Check the box for the items included with your application.

☒ Completed ROP Renewal Application Form (and any AI-001 Forms) (required)	☐ Compliance Plan/Schedule of Compliance
☒ Mark-up copy of existing ROP using official version from the AQD website (required)	☐ Stack information
☐ Copies of all Permit(s) to Install that have not been incorporated into existing ROP (required)	☐ Acid Rain Permit Initial/Renewal Application
☒ HAP/Criteria Pollutant Potential to Emit Calculations	☐ Cross State Air Pollution Rule (CSAPR) Information
☐ MAERS Forms (to report emissions not previously submitted)	☐ Confidential Information
☐ Copies of all Consent Order/Consent Judgments that have not been incorporated into existing ROP	☒ Paper copy of all documentation provided (required)
☐ Compliance Assurance Monitoring (CAM) Plan	☒ Electronic documents provided (optional)
☒ Other Plans (e.g. Malfunction Abatement, Fugitive Dust, Operation and Maintenance, etc.)	☐ Other, explain:

Compliance Statement

This source is in compliance with <u>all</u> of its applicable requirements, including those contained in the existing ROP, Permits to Install that have not yet been incorporated into that ROP, and other applicable requirements not currently contained in the existing ROP.	☒ Yes ☐ No
This source will continue to be in compliance with all of its applicable requirements, including those contained in the existing ROP, Permits to Install that have not yet been incorporated into that ROP, and other applicable requirements not currently contained in the existing ROP.	☒ Yes ☐ No
This source will meet in a timely manner applicable requirements that become effective during the permit term.	☒ Yes ☐ No

The method(s) used to determine compliance for each applicable requirement is/are the method(s) specified in the existing ROP, Permits to Install that have not yet been incorporated into that ROP, and all other applicable requirements not currently contained in the existing ROP.

If any of the above are checked No, identify the emission unit(s) or flexible group(s) affected and the specific condition number(s) or applicable requirement for which the source is or will be out of compliance at the time of issuance of the ROP renewal on an AI-001 Form. Provide a compliance plan and schedule of compliance on an AI-001 Form.

Name and Title of the Responsible Official (Print or Type)

Richard Connor, Director, USPO Great Lakes Region

As a Responsible Official, I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this application are true, accurate, and complete.

12-18-18

Signature of Responsible Official **Date**

SRN: B7198	Section Number (if applicable): 2

PART C: SOURCE REQUIREMENT INFORMATION

Answer the questions below for specific requirements or programs to which the source may be subject.

C1.	Actual emissions and associated data from **all** emission units with applicable requirements (including those identified in the existing ROP, Permits to Install and other equipment that have not yet been incorporated into the ROP) are required to be reported in MAERS. Are there any emissions and associated data that have not been reported in MAERS for the most recent emissions reporting year? If Yes, identify the emission unit(s) that was/were not reported in MAERS on an AI-001 Form. Applicable MAERS form(s) for unreported emission units must be included with this application.	☐ Yes ☒ No
C2.	Is this source subject to the federal regulations on ozone-depleting substances? (40 CFR Part 82)	☒ Yes ☐ No
C3.	Is this source subject to the federal Chemical Accident Prevention Provisions? (Section 112(r) of the Clean Air Act Amendments, 40 CFR Part 68)	☐ Yes ☒ No
	If Yes, a Risk Management Plan (RMP) and periodic updates must be submitted to the USEPA. Has an updated RMP been submitted to the USEPA?	☐ Yes ☐ No
C4.	Does the source belong to one of the source categories that require quantification of fugitive emissions?	☐ Yes ☒ No
	If Yes, identify the category on an AI-001 Form and include the fugitive emissions in the PTE calculations for the source. *See ROP Renewal Application instructions.*	
C5.	Does this stationary source have the potential to emit (PTE) of 100 tons per year or more of any criteria pollutant (PM-10, PM 2.5, VOC, NOx, SO_2, CO, lead)? If Yes, include potential emission calculations for each identified pollutant on an AI-001 Form.	☒ Yes ☐ No
C6.	Does this stationary source emit any hazardous air pollutants (HAPs) regulated by the federal Clean Air Act, Section 112?	☒ Yes ☐ No
	If Yes, include potential and actual emission calculations for HAPs on an AI-001 Form. Fugitive emissions **must** be included in HAP calculations.	
C7.	Are any emission units subject to the Cross State Air Pollution Rule (CSAPR)? If Yes, identify the specific emission unit(s) subject to CSAPR on an AI-001 Form.	☐ Yes ☒ No
C8.	Are any emission units subject to the federal Acid Rain Program? If Yes, identify the specific emission unit(s) subject to the Federal Acid Rain Program on an AI-001 Form.	☐ Yes ☒ No
	Is an Acid Rain Permit Renewal Application included with this application?	☐ Yes ☒ No
C9.	Are any emission units identified in the existing ROP subject to compliance assurance monitoring (CAM)?	☐ Yes ☒ No
	If Yes, identify the specific emission unit(s) subject to CAM on an AI-001 Form. If a CAM plan has not been previously submitted to the MDEQ, one must be included with the ROP renewal application on an AI-001 Form.	
	Is a CAM plan included with this application?	☐ Yes ☒ No
C10.	Does the source have any plans such as a malfunction abatement plan, fugitive dust plan, operation/maintenance plan, or any other monitoring plan that is referenced in an existing ROP, Permit to Install requirement, or any other applicable requirement?	☒ Yes ☐ No
	If Yes, then a copy must be submitted as part of the ROP renewal application.	
C11.	Are there any specific requirements that the source proposes to be identified in the ROP as non-applicable?	☐ Yes ☒ No
	If Yes, then a description of the requirement and justification must be submitted as part of the ROP renewal application on an AI-001 Form.	

☒ Check here if an AI-001 Form is attached to provide more information for Part C. Enter AI-001 Form ID: **AI-**002

SRN: B7198	Section Number (if applicable): 2

PART D: PERMIT TO INSTALL (PTI) EXEMPT EMISSION UNIT INFORMATION

Review all emission units at the source and answer the question below.

D1. Does the source have any emission units that do not appear in the existing ROP but are required to be listed in the ROP application under R 336.1212(4) (Rule 212(4)) of the Michigan Air Pollution Control Rules? If Yes, identify the emission units in the table below.

☒ Yes ☐ No

If No, go to Part E.

Note: Emission units that are subject to process specific emission limitations or standards, even if identified in Rule 212, must be captured in either Part G or H of this application form. Identical emission units may be grouped (e.g. PTI exempt Storage Tanks).

Emission Unit ID	**Emission Unit Description**	**Rule 201 Exemption Rule Citation** [e.g. Rule 282(2)(b)(i)]	**Rule 212(4) Citation** [e.g. Rule 212(4)(c)]
See Application Text, Section 2.2, Table 1.	See Application Text, Section 2.2, Table 1.	See Application Text, Section 2.2, Table 1.	See Application Text, Section 2.2, Table 1.

Comments:

☐ Check here if an AI-001 Form is attached to provide more information for Part D. Enter AI-001 Form ID: **AI-**

SRN: B7198	Section Number (if applicable): 2

PART E: EXISTING ROP INFORMATION

Review all emission units and applicable requirements (including any source wide requirements) in the existing ROP and answer the questions below as they pertain to **all** emission units and **all** applicable requirements in the existing ROP.

E1. Does the source propose to make any additions, changes or deletions to terms, conditions and underlying applicable requirements as they appear in the existing ROP? If Yes, identify changes and additions on Part F, Part G and/or Part H. See Part H and Section 2.5 of the application text for discussion.	☒ Yes ☐ No
E2. For each emission unit(s) identified in the existing ROP, all stacks with applicable requirements are to be reported in MAERS. Are there any stacks with applicable requirements for emission unit(s) identified in the existing ROP that were not reported in the most recent MAERS reporting year? If Yes, identity the stack(s) that was/were not reported on applicable MAERS form(s).	☐ Yes ☒ No
E3. Have any emission units identified in the existing ROP been modified or reconstructed that required a PTI? If Yes, complete Part F with the appropriate information.	☐ Yes ☒ No
E4. Have any emission units identified in the existing ROP been dismantled? If Yes, identify the emission unit(s) and the dismantle date in the comment area below or on an AI-001 Form.	☐ Yes ☒ No

Comments:

☐ Check here if an AI-001 Form is attached to provide more information for Part E. Enter AI-001 Form ID: **AI-**

SRN: B7198	Section Number (if applicable): 2

PART F: PERMIT TO INSTALL (PTI) INFORMATION

Review all emission units and applicable requirements at the source and answer the following questions as they pertain to **all** emission units with PTIs. Any PTI(s) identified below must be attached to the application.

F1. Has the source obtained any PTIs where the applicable requirements from the PTI have not been incorporated into the existing ROP? If Yes, complete the following table. If No, go to Part G.	☐ Yes ☒ No

Permit to Install Number	Emission Units/Flexible Group ID(s)	Description (*Include Process Equipment, Control Devices and Monitoring Devices*)	Date Emission Unit was Installed/ Modified/ Reconstructed

F2. Do any of the PTIs listed above change, add, or delete terms/conditions to **established emission units** in the existing ROP? If Yes, identify the emission unit(s) or flexible group(s) affected in the comments area below or on an AI-001 Form and identify all changes, additions, and deletions in a mark-up of the existing ROP.	☐ Yes ☐ No
F3. Do any of the PTIs listed above identify **new emission units** that need to be incorporated into the ROP? If Yes, submit the PTIs as part of the ROP renewal application on an AI-001 Form, and include the new emission unit(s) or flexible group(s) in the mark-up of the existing ROP.	☐ Yes ☐ No
F4. Are there any stacks with applicable requirements for emission unit(s) identified in the PTIs listed above that were <u>not</u> reported in MAERS for the most recent emissions reporting year? If Yes, identity the stack(s) that were not reported on the applicable MAERS form(s).	☐ Yes ☐ No
F5. Are there any proposed administrative changes to any of the emission unit names, descriptions or control devices in the PTIs listed above for any emission units not already incorporated into the ROP? If Yes, describe the changes on an AI-001 Form.	☐ Yes ☐ No

Comments:

☐ Check here if an AI-001 Form is attached to provide more information for Part F. Enter AI-001 Form ID: **AI-**

SRN: B7198	Section Number (if applicable): 2

PART G: EMISSION UNITS MEETING THE CRITERIA OF RULES 281(2)(h), 285(2)(r)(iv), 287(2)(c), OR 290

Review all emission units and applicable requirements at the source and answer the following questions.

G1. Does the source have any new and/or existing emission units which do not already appear in the existing ROP and which meet the criteria of Rules 281(2)(h), 285(2)(r)(iv), 287(2)(c), or 290.

If Yes, identify the emission units in the table below. If No, go to Part H. ☐ Yes ☒ No

Note: If several emission units were installed under the same rule above, provide a description of each and an installation/modification/reconstruction date for each.

Origin of Applicable Requirements	**Emission Unit Description – *Provide Emission Unit ID and a description of Process Equipment, Control Devices and Monitoring Devices***	**Date Emission Unit was Installed/ Modified/ Reconstructed**
☐ Rule 281(2)(h) or 285(2)(r)(iv) cleaning operation		
☐ Rule 287(2)(c) surface coating line		
☐ Rule 290 process with limited emissions		

Comments:

☐ Check here if an AI-001 Form is attached to provide more information for Part G. Enter AI-001 Form ID: **AI-**

SRN: B7198	Section Number (if applicable): 2

PART H: REQUIREMENTS FOR ADDITION OR CHANGE

Complete this part of the application form for all proposed additions, changes or deletions to the existing ROP. This includes state or federal regulations that the source is subject to and that must be incorporated into the ROP or other proposed changes to the existing ROP. **Do not include additions or changes that have already been identified in Parts F or G of this application form.** If additional space is needed copy and complete an additional Part H.

Complete a separate Part H for each emission unit with proposed additions and/or changes.

H1. Are there changes that need to be incorporated into the ROP that have not been identified in Parts F and G? If Yes, answer the questions below.	☒ Yes ☐ No
H2. Are there any proposed administrative changes to any of the existing emission unit names, descriptions or control devices in the ROP? If Yes, describe the changes in questions H8 – H16 below and in the affected Emission Unit Table(s) in the mark-up of the ROP.	☐ Yes ☒ No
H3. Does the source propose to add a new emission unit or flexible group to the ROP not previously identified in Parts F or G? If Yes, identify and describe the emission unit name, process description, control device(s), monitoring device(s) and applicable requirements in questions H8 – H16 below and in a new Emission Unit Table in the mark-up of the ROP. See instructions on how to incorporate a new emission unit/flexible group into the ROP.	☐ Yes ☒ No
H4. Does the source propose to add new state or federal regulations to the existing ROP? If Yes, on an AI-001 Form, identify each emission unit/flexible group that the new regulation applies to and identify <u>each</u> state or federal regulation that should be added. Also, describe the new requirements in questions H8 – H16 below and add the specific requirements to existing emission units/flexible groups in the mark-up of the ROP, create a new Emission Unit/Flexible Group Table, or add an AQD template table for the specific state or federal requirement.	☐ Yes ☒ No
H5. Has a Consent Order/Consent Judgment (CO/CJ) been issued where the requirements were not incorporated into the existing ROP? If Yes, list the CO/CJ number(s) below and add or change the conditions and underlying applicable requirements in the appropriate Emission Unit/Flexible Group Tables in the mark-up of the ROP.	☐ Yes ☒ No
H6. Does the source propose to add, change and/or delete **source-wide** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below.	☐ Yes ☒ No
H7. Are you proposing to **streamline** any requirements? If Yes, identify the streamlined and subsumed requirements and the EU ID, and provide a justification for streamlining the applicable requirement below.	☐ Yes ☒ No

SRN: B7198	Section Number (if applicable): 2

PART H: REQUIREMENTS FOR ADDITION OR CHANGE – (continued)

H8. Does the source propose to add, change and/or delete **emission limit** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☐ Yes ☒ No

H9. Does the source propose to add, change and/or delete **material limit** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG BLDDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only.

H10. Does the source propose to add, change and/or delete **process/operational restriction** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG BLDDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only. ANR proposes excluding template language requiring an initial tune-up and Energy Assessment for existing boilers because these conditions have already been satisfied. Any new boilers would have the language from the separate MDEQ template for new boilers and process heaters.

H11. Does the source propose to add, change and/or delete **design/equipment parameter** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☐ Yes ☒ No

H12. Does the source propose to add, change and/or delete **testing/sampling** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG BLDDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only.

H13. Does the source propose to add, change and/or delete **monitoring/recordkeeping** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

EU BLHHH: ANR proposes to correct the numbering of several referenced conditions in this section.

FG BLDDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only.

H14. Does the source propose to add, change and/or delete **reporting** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG BLDDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only. ANR proposes excluding template language requiring submittal of a Notification of Compliance Status following the initial tune-up and Energy Assessment for existing boilers because this condition has already been satisfied. Any new boilers would have the language from the separate MDEQ template for new boilers and process heaters.

SRN: B7198 | Section Number (if applicable): 2

PART H: REQUIREMENTS FOR ADDITION OR CHANGE – (continued)

H15. Does the source propose to add, change and/or delete **stack/vent restrictions**? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☐ Yes ☒ No

H16. Does the source propose to add, change and/or delete any **other** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG BLDDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only. ANR proposes excluding template language containing the initial compliance date because the condition has already been satisfied. Any new boilers would have the language from the separate MDEQ template for new boilers and process heaters.

H17. Does the source propose to add terms and conditions for an alternative operating scenario or intra-facility trading of emissions? If Yes, identify the proposed conditions in a mark-up of the corresponding section of the ROP and provide a justification below. ☐ Yes ☒ No

☐ Check here if an AI-001 Form is attached to provide more information for Part H. Enter AI-001 Form ID: **AI-**

Michigan Department of Environmental Quality - Air Quality Division

RENEWABLE OPERATING PERMIT APPLICATION

AI-001: ADDITIONAL INFORMATION

This information is required by Article II, Chapter 1, part 55 (Air Pollution Control) of P.A. 451 of 1994, as amended, and the Federal Clean Air Act of 1990. Failure to obtain a permit required by Part 55 may result in penalties and/or imprisonment. Please type or print clearly. Refer to instructions for additional information to complete this form.

SRN: B7198

Section Number (if applicable): 2

1. Additional Information ID
AI-002

Additional Information

2. Is This Information Confidential? ☐ Yes ☒ No

As Required by Part C: Source Requirement Information of the ROP Renewal Application Form, the following documents have been included as part of either Appendix B (Emissions Calculations) or Appendix D (Plans referenced in the ROP) of the application:

C5. Potential emission calculations for each criteria pollutant for which the source has the potential to emit (PTE) of 100 tons per year or more. Calculations of PTE have been included for all criteria pollutants. The source has PTE exceeding 100 tons per year for NOx, CO and VOC.

C6. Potential (equal to actual) emission calculations for HAPs.

C10. The following plans and their references in the existing ROP:

- Blue Lake, Cold Springs 1, and Cold Springs 12 Emission Test and LDAR Assessment of Small Glycol Dehydration Units (referenced in EU BLHHH Conditions VI.5 and VI.6);
- Blue Lake 40 CFR Part 63 Subpart HHH Site Monitoring Plan (referenced in EU BLHHH Condition IX.3); and
- Cold Springs 12, Blue Lake, and Cold Springs 1 Preventative Maintenance / Malfunction Abatement Plan (PM/MAP) (referenced in FG BLCMPRS Conditions III.6 and IX.1 and FG BLGENS Conditions III.6 and IX.1).

Michigan Department of Environmental Quality - Air Quality Division

RENEWABLE OPERATING PERMIT
RENEWAL APPLICATION FORM

This information is required by Article II, Chapter 1, Part 55 (Air Pollution Control) of P.A. 451 of 1994, as amended, and the Federal Clean Air Act of 1990. Failure to obtain a permit required by Part 55 may result in penalties and/or imprisonment. Refer to instructions for additional information to complete the Renewable Operating Permit Renewal Application Form.

GENERAL INSTRUCTIONS

This application form should be submitted as part of an administratively complete application package for renewal of a Renewable Operating Permit (ROP). This application form consists of nine parts. Parts A – H must be completed for all applications and must also be completed for each section of a sectioned ROP. Answer all questions in all parts of the form unless directed otherwise. Detailed instructions for this application form can be found at http://michigan.gov/air (select the Permits Tab, "Renewable Operating Permits (ROP)/Title V", then "ROP Forms & Templates").

PART A: GENERAL INFORMATION

Enter information about the source, owner, contact person and the responsible official.

SOURCE INFORMATION

SRN	SIC Code	NAICS Code	Existing ROP Number	Section Number (if applicable)
B7198	4922	486210	MI-ROP-B7198-2014a	3

Source Name
ANR Storage Company – Cold Springs 1 Compressor Station

Street Address
10000 Pflum Road

City	State	ZIP Code	County
Mancelona	MI	49659	Kalkaska

Section/Town/Range (if address not available)

Source Description
The Cold Springs 12/Blue Lake/Cold Springs 1 Compressor Station is a natural gas storage and transmission station which consists of three separate natural gas transmission and compressor stations operating separate natural gas storage fields (Cold Springs 12, Blue Lake, and Cold Springs 1). The processes at the Cold Springs 1 Station consist of three components: a natural gas electric compression system, a glycol dehydration system, and a liquid stabilization system. The station is located approximately four miles southeast of Mancelona, Michigan in Kalkaska County.

☐ Check here if any of the above information is different than what appears in the existing ROP. Identify any changes on the marked-up copy of your existing ROP.

OWNER INFORMATION

Owner Name	Section Number (if applicable)
ANR Pipeline Company	3

Mailing address (☐ check if same as source address)
700 Louisiana Street, Suite 700

City	State	ZIP Code	County	Country
Houston	TX	77002	Harris	USA

☐ Check here if any information in this ROP renewal application is confidential. Confidential information should be identified on an Additional Information (AI-001) Form.

SRN: B7198	Section Number (if applicable): 3

PART A: GENERAL INFORMATION (continued)

At least one contact and responsible official must be identified. Additional contacts and responsible officials may be included if necessary.

CONTACT INFORMATION

Contact 1 Name: Mr. Christian Waltman
Title: Senior Environmental Specialist
Mailing address (☐ check if same as source address): N4956 Oakcrest Dr
City: Bonduel
State: WI
ZIP Code: 54107
County: Shawano
Country: USA
Phone number: 715-758-3341
E-mail address: chris_waltman@transcanada.com

Contact 2 Name (optional):
Title:
Mailing address (☐ check if same as source address):
City:
State:
ZIP Code:
County:
Country:
Phone number:
E-mail address:

RESPONSIBLE OFFICIAL INFORMATION

Responsible Official 1 Name: Mr. Richard Connor
Title: Director, US Pipeline Operations, Great Lakes Region
Mailing address (☐ check if same as source address): 11039 150th Ave
City: Big Rapids
State: MI
ZIP Code: 49307
County: Mecosta
Country: USA
Phone number: 231-527-2122
E-mail address: Richard_connor@transcanada.com

Responsible Official 2 Name (optional):
Title:
Mailing address (☐ check if same as source address):
City:
State:
ZIP Code:
County:
Country:
Phone number:
E-mail address:

☐ Check here if an AI-001 Form is attached to provide more information for Part A. Enter AI-001 Form ID:

SRN: B7198	Section Number (if applicable): 3

PART B: APPLICATION SUBMITTAL and CERTIFICATION by Responsible Official

Identify the items that are included as part of your administratively complete application in the checklist below. For your application to be complete, it must include information necessary to evaluate the source and to determine all applicable requirements. Answer the compliance statements as they pertain to all the applicable requirements to which the source is subject. The source's Responsible Official must sign and date this form.

Listing of ROP Application Contents. Check the box for the items included with your application.

☒ Completed ROP Renewal Application Form (and any AI-001 Forms) (required)	☐ Compliance Plan/Schedule of Compliance
☒ Mark-up copy of existing ROP using official version from the AQD website (required)	☐ Stack information
☐ Copies of all Permit(s) to Install that have not been incorporated into existing ROP (required)	☐ Acid Rain Permit Initial/Renewal Application
☒ HAP/Criteria Pollutant Potential to Emit Calculations	☐ Cross State Air Pollution Rule (CSAPR) Information
☐ MAERS Forms (to report emissions not previously submitted)	☐ Confidential Information
☐ Copies of all Consent Order/Consent Judgments that have not been incorporated into existing ROP	☒ Paper copy of all documentation provided (required)
☐ Compliance Assurance Monitoring (CAM) Plan	☒ Electronic documents provided (optional)
☒ Other Plans (e.g. Malfunction Abatement, Fugitive Dust, Operation and Maintenance, etc.)	☐ Other, explain:

Compliance Statement

This source is in compliance with **all** of its applicable requirements, including those contained in the existing ROP, Permits to Install that have not yet been incorporated into that ROP, and other applicable requirements not currently contained in the existing ROP. ☒ Yes ☐ No

This source will continue to be in compliance with all of its applicable requirements, including those contained in the existing ROP, Permits to Install that have not yet been incorporated into that ROP, and other applicable requirements not currently contained in the existing ROP. ☒ Yes ☐ No

This source will meet in a timely manner applicable requirements that become effective during the permit term. ☒ Yes ☐ No

The method(s) used to determine compliance for each applicable requirement is/are the method(s) specified in the existing ROP, Permits to Install that have not yet been incorporated into that ROP, and all other applicable requirements not currently contained in the existing ROP.

If any of the above are checked No, identify the emission unit(s) or flexible group(s) affected and the specific condition number(s) or applicable requirement for which the source is or will be out of compliance at the time of issuance of the ROP renewal on an AI-001 Form. Provide a compliance plan and schedule of compliance on an AI-001 Form.

Name and Title of the Responsible Official (Print or Type)

Richard Connor, Director, USPO Great Lakes Region

As a Responsible Official, I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this application are true, accurate, and complete.

12-18-18

Signature of Responsible Official **Date**

SRN: B7198	Section Number (if applicable): 3

PART C: SOURCE REQUIREMENT INFORMATION

Answer the questions below for specific requirements or programs to which the source may be subject.

C1.	Actual emissions and associated data from **all** emission units with applicable requirements (including those identified in the existing ROP, Permits to Install and other equipment that have not yet been incorporated into the ROP) are required to be reported in MAERS. Are there any emissions and associated data that have not been reported in MAERS for the most recent emissions reporting year? If Yes, identify the emission unit(s) that was/were not reported in MAERS on an AI-001 Form. Applicable MAERS form(s) for unreported emission units must be included with this application.	☐ Yes ☒ No
C2.	Is this source subject to the federal regulations on ozone-depleting substances? (40 CFR Part 82)	☒ Yes ☐ No
C3.	Is this source subject to the federal Chemical Accident Prevention Provisions? (Section 112(r) of the Clean Air Act Amendments, 40 CFR Part 68)	☐ Yes ☒ No
	If Yes, a Risk Management Plan (RMP) and periodic updates must be submitted to the USEPA. Has an updated RMP been submitted to the USEPA?	☐ Yes ☐ No
C4.	Does the source belong to one of the source categories that require quantification of fugitive emissions?	☐ Yes ☒ No
	If Yes, identify the category on an AI-001 Form and include the fugitive emissions in the PTE calculations for the source. *See ROP Renewal Application instructions.*	
C5.	Does this stationary source have the potential to emit (PTE) of 100 tons per year or more of any criteria pollutant (PM-10, PM 2.5, VOC, NOx, SO_2, CO, lead)? If Yes, include potential emission calculations for each identified pollutant on an AI-001 Form.	☒ Yes ☐ No
C6.	Does this stationary source emit any hazardous air pollutants (HAPs) regulated by the federal Clean Air Act, Section 112?	☒ Yes ☐ No
	If Yes, include potential and actual emission calculations for HAPs on an AI-001 Form. Fugitive emissions **must** be included in HAP calculations.	
C7.	Are any emission units subject to the Cross State Air Pollution Rule (CSAPR)? If Yes, identify the specific emission unit(s) subject to CSAPR on an AI-001 Form.	☐ Yes ☒ No
C8.	Are any emission units subject to the federal Acid Rain Program? If Yes, identify the specific emission unit(s) subject to the Federal Acid Rain Program on an AI-001 Form.	☐ Yes ☒ No
	Is an Acid Rain Permit Renewal Application included with this application?	☐ Yes ☒ No
C9.	Are any emission units identified in the existing ROP subject to compliance assurance monitoring (CAM)? If Yes, identify the specific emission unit(s) subject to CAM on an AI-001 Form. If a CAM plan has not been previously submitted to the MDEQ, one must be included with the ROP renewal application on an AI-001 Form.	☐ Yes ☒ No
	Is a CAM plan included with this application?	☐ Yes ☒ No
C10.	Does the source have any plans such as a malfunction abatement plan, fugitive dust plan, operation/maintenance plan, or any other monitoring plan that is referenced in an existing ROP, Permit to Install requirement, or any other applicable requirement?	☒ Yes ☐ No
	If Yes, then a copy must be submitted as part of the ROP renewal application.	
C11.	Are there any specific requirements that the source proposes to be identified in the ROP as non-applicable?	☐ Yes ☒ No
	If Yes, then a description of the requirement and justification must be submitted as part of the ROP renewal application on an AI-001 Form.	

☒ Check here if an AI-001 Form is attached to provide more information for Part C. Enter AI-001 Form ID: **AI-**003

SRN: B7198	Section Number (if applicable): 3

PART D: PERMIT TO INSTALL (PTI) EXEMPT EMISSION UNIT INFORMATION

Review all emission units at the source and answer the question below.

D1. Does the source have any emission units that do not appear in the existing ROP but are required to be listed in the ROP application under R 336.1212(4) (Rule 212(4)) of the Michigan Air Pollution Control Rules? If Yes, identify the emission units in the table below. ☒ Yes ☐ No

If No, go to Part E.

Note: Emission units that are subject to process specific emission limitations or standards, even if identified in Rule 212, must be captured in either Part G or H of this application form. Identical emission units may be grouped (e.g. PTI exempt Storage Tanks).

Emission Unit ID	**Emission Unit Description**	**Rule 201 Exemption Rule Citation** [e.g. Rule 282(2)(b)(i)]	**Rule 212(4) Citation** [e.g. Rule 212(4)(c)]
See Application Text, Section 3.2, Table 1.	See Application Text, Section 3.2, Table 1.	See Application Text, Section 3.2, Table 1.	See Application Text, Section 3.2, Table 1.

Comments:

☐ Check here if an AI-001 Form is attached to provide more information for Part D. Enter AI-001 Form ID: **AI-**

SRN: B7198	Section Number (if applicable): 3

PART E: EXISTING ROP INFORMATION

Review all emission units and applicable requirements (including any source wide requirements) in the existing ROP and answer the questions below as they pertain to **all** emission units and **all** applicable requirements in the existing ROP.

E1. Does the source propose to make any additions, changes or deletions to terms, conditions and underlying applicable requirements as they appear in the existing ROP? If Yes, identify changes and additions on Part F, Part G and/or Part H. See Part H and Section 3.5 of the application text for discussion.	☒ Yes ☐ No
E2. For each emission unit(s) identified in the existing ROP, all stacks with applicable requirements are to be reported in MAERS. Are there any stacks with applicable requirements for emission unit(s) identified in the existing ROP that were not reported in the most recent MAERS reporting year? If Yes, identity the stack(s) that was/were not reported on applicable MAERS form(s).	☐ Yes ☒ No
E3. Have any emission units identified in the existing ROP been modified or reconstructed that required a PTI? If Yes, complete Part F with the appropriate information.	☐ Yes ☒ No
E4. Have any emission units identified in the existing ROP been dismantled? If Yes, identify the emission unit(s) and the dismantle date in the comment area below or on an AI-001 Form.	☐ Yes ☒ No
Comments:	

☐ Check here if an AI-001 Form is attached to provide more information for Part E. Enter AI-001 Form ID: **AI-**

SRN: B7198	Section Number (if applicable): 3

PART F: PERMIT TO INSTALL (PTI) INFORMATION

Review all emission units and applicable requirements at the source and answer the following questions as they pertain to **all** emission units with PTIs. Any PTI(s) identified below must be attached to the application.

F1. Has the source obtained any PTIs where the applicable requirements from the PTI have not been incorporated into the existing ROP? If Yes, complete the following table. If No, go to Part G. ☐ Yes ☒ No

Permit to Install Number	**Emission Units/Flexible Group ID(s)**	**Description (*Include Process Equipment, Control Devices and Monitoring Devices*)**	**Date Emission Unit was Installed/ Modified/ Reconstructed**

F2. Do any of the PTIs listed above change, add, or delete terms/conditions to **established emission units** in the existing ROP? If Yes, identify the emission unit(s) or flexible group(s) affected in the comments area below or on an AI-001 Form and identify all changes, additions, and deletions in a mark-up of the existing ROP. ☐ Yes ☐ No

F3. Do any of the PTIs listed above identify **new emission units** that need to be incorporated into the ROP? If Yes, submit the PTIs as part of the ROP renewal application on an AI-001 Form, and include the new emission unit(s) or flexible group(s) in the mark-up of the existing ROP. ☐ Yes ☐ No

F4. Are there any stacks with applicable requirements for emission unit(s) identified in the PTIs listed above that were not reported in MAERS for the most recent emissions reporting year? If Yes, identity the stack(s) that were not reported on the applicable MAERS form(s). ☐ Yes ☐ No

F5. Are there any proposed administrative changes to any of the emission unit names, descriptions or control devices in the PTIs listed above for any emission units not already incorporated into the ROP? If Yes, describe the changes on an AI-001 Form. ☐ Yes ☐ No

Comments:

☐ Check here if an AI-001 Form is attached to provide more information for Part F. Enter AI-001 Form ID: **AI-**

SRN: B7198	Section Number (if applicable): 3

PART G: EMISSION UNITS MEETING THE CRITERIA OF RULES 281(2)(h), 285(2)(r)(iv), 287(2)(c), OR 290

Review all emission units and applicable requirements at the source and answer the following questions.

G1. Does the source have any new and/or existing emission units which do not already appear in the existing ROP and which meet the criteria of Rules 281(2)(h), 285(2)(r)(iv), 287(2)(c), or 290.

If Yes, identify the emission units in the table below. If No, go to Part H. ☐ Yes ☒ No

Note: If several emission units were installed under the same rule above, provide a description of each and an installation/modification/reconstruction date for each.

Origin of Applicable Requirements	**Emission Unit Description – *Provide Emission Unit ID and a description of Process Equipment, Control Devices and Monitoring Devices***	**Date Emission Unit was Installed/ Modified/ Reconstructed**
☐ Rule 281(2)(h) or 285(2)(r)(iv) cleaning operation		
☐ Rule 287(2)(c) surface coating line		
☐ Rule 290 process with limited emissions		

Comments:

☐ Check here if an AI-001 Form is attached to provide more information for Part G. Enter AI-001 Form ID: **AI-**

SRN: B7198	Section Number (if applicable): 3

PART H: REQUIREMENTS FOR ADDITION OR CHANGE

Complete this part of the application form for all proposed additions, changes or deletions to the existing ROP. This includes state or federal regulations that the source is subject to and that must be incorporated into the ROP or other proposed changes to the existing ROP. **Do not include additions or changes that have already been identified in Parts F or G of this application form.** If additional space is needed copy and complete an additional Part H.

Complete a separate Part H for each emission unit with proposed additions and/or changes.

H1. Are there changes that need to be incorporated into the ROP that have not been identified in Parts F and G? If Yes, answer the questions below.	☒ Yes ☐ No
H2. Are there any proposed administrative changes to any of the existing emission unit names, descriptions or control devices in the ROP? If Yes, describe the changes in questions H8 – H16 below and in the affected Emission Unit Table(s) in the mark-up of the ROP.	☐ Yes ☒ No
H3. Does the source propose to add a new emission unit or flexible group to the ROP not previously identified in Parts F or G? If Yes, identify and describe the emission unit name, process description, control device(s), monitoring device(s) and applicable requirements in questions H8 – H16 below and in a new Emission Unit Table in the mark-up of the ROP. See instructions on how to incorporate a new emission unit/flexible group into the ROP.	☐ Yes ☒ No
H4. Does the source propose to add new state or federal regulations to the existing ROP? If Yes, on an AI-001 Form, identify each emission unit/flexible group that the new regulation applies to and identify each state or federal regulation that should be added. Also, describe the new requirements in questions H8 – H16 below and add the specific requirements to existing emission units/flexible groups in the mark-up of the ROP, create a new Emission Unit/Flexible Group Table, or add an AQD template table for the specific state or federal requirement.	☐ Yes ☒ No
H5. Has a Consent Order/Consent Judgment (CO/CJ) been issued where the requirements were not incorporated into the existing ROP? If Yes, list the CO/CJ number(s) below and add or change the conditions and underlying applicable requirements in the appropriate Emission Unit/Flexible Group Tables in the mark-up of the ROP.	☐ Yes ☒ No
H6. Does the source propose to add, change and/or delete **source-wide** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below.	☐ Yes ☒ No
H7. Are you proposing to **streamline** any requirements? If Yes, identify the streamlined and subsumed requirements and the EU ID, and provide a justification for streamlining the applicable requirement below.	☐ Yes ☒ No

SRN: B7198	Section Number (if applicable): 3

PART H: REQUIREMENTS FOR ADDITION OR CHANGE – (continued)

H8. Does the source propose to add, change and/or delete **emission limit** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☐ Yes ☒ No

H9. Does the source propose to add, change and/or delete **material limit** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG BLDDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only.

H10. Does the source propose to add, change and/or delete **process/operational restriction** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG BLDDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only. ANR proposes excluding template language requiring an initial tune-up and Energy Assessment for existing boilers because these conditions have already been satisfied. Any new boilers would have the language from the separate MDEQ template for new boilers and process heaters.

H11. Does the source propose to add, change and/or delete **design/equipment parameter** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☐ Yes ☒ No

H12. Does the source propose to add, change and/or delete **testing/sampling** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG BLDDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only.

H13. Does the source propose to add, change and/or delete **monitoring/recordkeeping** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

EU BLHHH: ANR proposes to correct the numbering of several referenced conditions in this section.

FG BLDDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only.

H14. Does the source propose to add, change and/or delete **reporting** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG BLDDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only. ANR proposes excluding template language requiring submittal of a Notification of Compliance Status following the initial tune-up and Energy Assessment for existing boilers because this condition has already been satisfied. Any new boilers would have the language from the separate MDEQ template for new boilers and process heaters.

SRN: B7198	Section Number (if applicable): 3

PART H: REQUIREMENTS FOR ADDITION OR CHANGE – (continued)

H15. Does the source propose to add, change and/or delete **stack/vent restrictions**? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☐ Yes ☒ No

H16. Does the source propose to add, change and/or delete any **other** requirements? If Yes, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below. ☒ Yes ☐ No

FG BLDDDDD: ANR proposes to update language for this flexible group to match updates to MDEQ template language for sources subject to NESHAP Subpart DDDDD using the template for Existing Major Sources with Existing Boiler/Process Heater firing Natural Gas Only. ANR proposes excluding template language containing the initial compliance date because the condition has already been satisfied. Any new boilers would have the language from the separate MDEQ template for new boilers and process heaters.

H17. Does the source propose to add terms and conditions for an alternative operating scenario or intra-facility trading of emissions? If Yes, identify the proposed conditions in a mark-up of the corresponding section of the ROP and provide a justification below. ☐ Yes ☒ No

☐ Check here if an AI-001 Form is attached to provide more information for Part H. Enter AI-001 Form ID: **AI-**

Michigan Department of Environmental Quality - Air Quality Division

RENEWABLE OPERATING PERMIT APPLICATION
AI-001: ADDITIONAL INFORMATION

This information is required by Article II, Chapter 1, part 55 (Air Pollution Control) of P.A. 451 of 1994, as amended, and the Federal Clean Air Act of 1990. Failure to obtain a permit required by Part 55 may result in penalties and/or imprisonment. Please type or print clearly. Refer to instructions for additional information to complete this form.

SRN: B7198

Section Number (if applicable): 3

1. Additional Information ID
AI-003

Additional Information

2. Is This Information Confidential? ☐ Yes ☒ No

As Required by Part C: Source Requirement Information of the ROP Renewal Application Form, the following documents have been included as part of either Appendix B (Emissions Calculations) or Appendix D (Plans referenced in the ROP) of the application:

C5. Potential emission calculations for each criteria pollutant for which the source has the potential to emit (PTE) of 100 tons per year or more. Calculations of PTE have been included for all criteria pollutants. Although Cold Springs 1 Compressor Station does not have PTE exceeding 100 tons per year for any criteria pollutants, the source (including Cold Springs 12 Compressor Station and Blue Lake Station) has PTE exceeding 100 tons per year for NOx, CO and VOC.

C6. Potential (equal to actual) emission calculations for HAPs.

C10. The following plans and their references in the existing ROP:

- Blue Lake, Cold Springs 1, and Cold Springs 12 Emission Test and LDAR Assessment of Small Glycol Dehydration Units (referenced in EU CS1HHH Conditions VI.5 and VI.6);
- Cold Springs 1 40 CFR Part 63 Subpart HHH Site Monitoring Plan (referenced in EU CS1HHH Condition IX.3); and
- Cold Springs 12, Blue Lake, and Cold Springs 1 Preventative Maintenance / Malfunction Abatement Plan (PM/MAP) (referenced in FG CS1CNDTANKS Conditions III.1 and IX.1).

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Michigan Department of Environmental Quality
Air Quality Division

EFFECTIVE DATE: July 23, 2014

REVISION DATE: November 21, 2014

ISSUED TO

ANR Storage Company

State Registration Number (SRN): B7198

LOCATED AT

10000 Pflum Road, Mancelona, Kalkaska County, Michigan 49659

RENEWABLE OPERATING PERMIT

Permit Number: MI-ROP-B7198-2014a

Expiration Date: July 23, 2019

Administratively Complete ROP Renewal Application Due Between
January 23, 2018 and January 23, 2019

This Renewable Operating Permit (ROP) is issued in accordance with and subject to Section 5506(3) of Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451). Pursuant to Michigan Air Pollution Control Rule 210(1), this ROP constitutes the permittee's authority to operate the stationary source identified above in accordance with the general conditions, special conditions and attachments contained herein. Operation of the stationary source and all emission units listed in the permit are subject to all applicable future or amended rules and regulations pursuant to Act 451 and the federal Clean Air Act.

SOURCE-WIDE PERMIT TO INSTALL

Permit Number: MI-PTI-B7198-2014a

This Permit to Install (PTI) is issued in accordance with and subject to Section 5505(5) of Act 451. Pursuant to Michigan Air Pollution Control Rule 214a, the terms and conditions herein, identified by the underlying applicable requirement citation of Rule 201(1)(a), constitute a federally enforceable PTI. The PTI terms and conditions do not expire and remain in effect unless the criteria of Rule 201(6) are met. Operation of all emission units identified in the PTI is subject to all applicable future or amended rules and regulations pursuant to Act 451 and the federal Clean Air Act.

Michigan Department of Environmental Quality

____
Janis Ransom, Cadillac District Supervisor

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AUTHORITY AND ENFORCEABILITY

For the purpose of this permit, the **permittee** is defined as any person who owns or operates an emission unit at a stationary source for which this permit has been issued. The **department** is defined in Rule 104(d) as the Director of the Michigan Department of Environmental Quality (MDEQ) or his or her designee.

The permittee shall comply with all specific details in the permit terms and conditions and the cited underlying applicable requirements. All terms and conditions in this ROP are both federally enforceable and state enforceable unless otherwise footnoted. Certain terms and conditions are applicable to most stationary sources for which an ROP has been issued. These general conditions are included in Part A of this ROP. Other terms and conditions may apply to a specific emission unit, several emission units which are represented as a flexible group, or the entire stationary source which is represented as a source-wide group. Special conditions are identified in Parts B, C, D and/or the appendices.

In accordance with Rule 213(2)(a), all underlying applicable requirements will be identified for each ROP term or condition. All terms and conditions that are included in a PTI are streamlined or subsumed, or is state only enforceable will be noted as such.

In accordance with Section 5507 of Act 451, the permittee has included in the ROP application a compliance certification, a schedule of compliance, and a compliance plan. For applicable requirements with which the source is in compliance, the source will continue to comply with these requirements. For applicable requirements with which the source is not in compliance, the source will comply with the detailed schedule of compliance requirements that are incorporated as an appendix in this ROP. Furthermore, for any applicable requirements effective after the date of issuance of this ROP, the stationary source will meet the requirements on a timely basis, unless the underlying applicable requirement requires a more detailed schedule of compliance.

Issuance of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.

SECTION 1 – COLD SPRINGS 12 COMPRESSOR STATION

A. GENERAL CONDITIONS

Permit Enforceability

- All conditions in this permit are both federally enforceable and state enforceable unless otherwise noted. **(R 336.1213(5))**

- Those conditions that are hereby incorporated in a state-only enforceable Source-Wide PTI pursuant to Rule 201(2)(d) are designated by footnote one. **(R 336.1213(5)(a), R 336.1214a(5))**

- Those conditions that are hereby incorporated in a federally enforceable Source-Wide PTI pursuant to Rule 201(2)(c) are designated by footnote two. **(R 336.1213(5)(b), R 336.1214a(3))**

General Provisions

1. The permittee shall comply with all conditions of this ROP. Any ROP noncompliance constitutes a violation of Act 451, and is grounds for enforcement action, for ROP revocation or revision, or for denial of the renewal of the ROP. All terms and conditions of this ROP that are designated as federally enforceable are enforceable by the Administrator of the United States Environmental Protection Agency (USEPA) and by citizens under the provisions of the federal Clean Air Act (CAA). Any terms and conditions based on applicable requirements which are designated as "state-only" are not enforceable by the USEPA or citizens pursuant to the CAA. **(R 336.1213(1)(a))**

2. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this ROP. **(R 336.1213(1)(b))**

3. This ROP may be modified, revised, or revoked for cause. The filing of a request by the permittee for a permit modification, revision, or termination, or a notification of planned changes or anticipated noncompliance does not stay any ROP term or condition. This does not supersede or affect the ability of the permittee to make changes, at the permittee's own risk, pursuant to Rule 215 and Rule 216. **(R 336.1213(1)(c))**

4. The permittee shall allow the department, or an authorized representative of the department, upon presentation of credentials and other documents as may be required by law and upon stating the authority for and purpose of the investigation, to perform any of the following activities **(R 336.1213(1)(d))**:
   a. Enter, at reasonable times, a stationary source or other premises where emissions-related activity is conducted or where records must be kept under the conditions of the ROP.
   b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of the ROP.
   c. Inspect, at reasonable times, any of the following:
      i. Any stationary source.
      ii. Any emission unit.
      iii. Any equipment, including monitoring and air pollution control equipment.
      iv. Any work practices or operations regulated or required under the ROP.
   d. As authorized by Section 5526 of Act 451, sample or monitor at reasonable times substances or parameters for the purpose of assuring compliance with the ROP or applicable requirements.

5. The permittee shall furnish to the department, within a reasonable time, any information the department may request, in writing, to determine whether cause exists for modifying, revising, or revoking the ROP or to determine compliance with this ROP. Upon request, the permittee shall also furnish to the department copies

of any records that are required to be kept as a term or condition of this ROP. For information which is claimed by the permittee to be confidential, consistent with the requirements of the 1976 PA 442, MCL §15.231 et seq., and known as the Freedom of Information Act, the person may also be required to furnish the records directly to the USEPA together with a claim of confidentiality. **(R 336.1213(1)(e))**

6. A challenge by any person, the Administrator of the USEPA, or the department to a particular condition or a part of this ROP shall not set aside, delay, stay, or in any way affect the applicability or enforceability of any other condition or part of this ROP. **(R 336.1213(1)(f))**

7. The permittee shall pay fees consistent with the fee schedule and requirements pursuant to Section 5522 of Act 451. **(R 336.1213(1)(g))**

8. This ROP does not convey any property rights or any exclusive privilege. **(R 336.1213(1)(h))**

Equipment & Design

9. Any collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in Rule 370(2). **(R 336.1370)**

10. Any air cleaning device shall be installed, maintained, and operated in a satisfactory manner and in accordance with the Michigan Air Pollution Control rules and existing law. **(R 336.1910)**

Emission Limits

11. Unless otherwise specified in this ROP, the permittee shall comply with Rule 301, which states, in part, "Except as provided in subrules 2, 3, and 4 of this rule, a person shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of a density greater than the most stringent of the following: **(R 336.1301(1))**
    a. A 6-minute average of 20 percent opacity, except for one 6-minute average per hour of not more than 27 percent opacity.
    b. A limit specified by an applicable federal new source performance standard.

    The grading of visible emissions shall be determined in accordance with Rule 303.

12. The permittee shall not cause or permit the emission of an air contaminant or water vapor in quantities that cause, alone or in reaction with other air contaminants, either of the following:
    a. Injurious effects to human health or safety, animal life, plant life of significant economic value, or property.[1] **(R 336.1901(a))**
    b. Unreasonable interference with the comfortable enjoyment of life and property.[1] **(R 336.1901(b))**

Testing/Sampling

13. The department may require the owner or operator of any source of an air contaminant to conduct acceptable performance tests, at the owner's or operator's expense, in accordance with Rule 1001 and Rule 1003, under any of the conditions listed in Rule 1001(1). **(R 336.2001)**

14. Any required performance testing shall be conducted in accordance with Rule 1001(2), Rule 1001(3) and Rule 1003. **(R 336.2001(2), R 336.2001(3), R 336.2003(1))**

15. Any required test results shall be submitted to the Air Quality Division (AQD) in the format prescribed by the applicable reference test method within 60 days following the last date of the test. **(R 336.2001(5))**

Monitoring/Recordkeeping

16. Records of any periodic emission or parametric monitoring required in this ROP shall include the following information specified in Rule 213(3)(b)(i), where appropriate **(R 336.1213(3)(b))**:
    a. The date, location, time, and method of sampling or measurements.
    b. The dates the analyses of the samples were performed.
    c. The company or entity that performed the analyses of the samples.
    d. The analytical techniques or methods used.
    e. The results of the analyses.
    f. The related process operating conditions or parameters that existed at the time of sampling or measurement.

17. All required monitoring data, support information and all reports, including reports of all instances of deviation from permit requirements, shall be kept and furnished to the department upon request for a period of not less than 5 years from the date of the monitoring sample, measurement, report or application. Support information includes all calibration and maintenance records and all original strip-chart recordings, or other original data records, for continuous monitoring instrumentation and copies of all reports required by the ROP. **(R 336.1213(1)(e), R 336.1213(3)(b)(ii))**

Certification & Reporting

18. Except for the alternate certification schedule provided in Rule 213(3)(c)(iii)(B), any document required to be submitted to the department as a term or condition of this ROP shall contain an original certification by a Responsible Official which states that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete. **(R 336.1213(3)(c))**

19. A Responsible Official shall certify to the appropriate AQD District Office and to the USEPA that the stationary source is and has been in compliance with all terms and conditions contained in the ROP except for deviations that have been or are being reported to the appropriate AQD District Office pursuant to Rule 213(3)(c). This certification shall include all the information specified in Rule 213(4)(c)(i) through (v) and shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the certification are true, accurate, and complete. The USEPA address is: USEPA, Air Compliance Data - Michigan, Air and Radiation Division, 77 West Jackson Boulevard, Chicago, Illinois 60604. **(R 336.1213(4)(c))**

20. The certification of compliance shall be submitted annually for the term of this ROP as detailed in the special conditions, or more frequently if specified in an applicable requirement or in this ROP. **(R 336.1213(4)(c))**

21. The permittee shall promptly report any deviations from ROP requirements and certify the reports. The prompt reporting of deviations from ROP requirements is defined in Rule 213(3)(c)(ii) as follows, unless otherwise described in this ROP. **(R 336.1213(3)(c))**
    a. For deviations that exceed the emissions allowed under the ROP, prompt reporting means reporting consistent with the requirements of Rule 912 as detailed in Condition 25. All reports submitted pursuant to this paragraph shall be promptly certified as specified in Rule 213(3)(c)(iii).
    b. For deviations which exceed the emissions allowed under the ROP and which are not reported pursuant to Rule 912 due to the duration of the deviation, prompt reporting means the reporting of all deviations in the semiannual reports required by Rule 213(3)(c)(i). The report shall describe reasons for each deviation and the actions taken to minimize or correct each deviation.
    c. For deviations that do not exceed the emissions allowed under the ROP, prompt reporting means the reporting of all deviations in the semiannual reports required by Rule 213(3)(c)(i). The report shall describe the reasons for each deviation and the actions taken to minimize or correct each deviation.

22. For reports required pursuant to Rule 213(3)(c)(ii), prompt certification of the reports is described in Rule 213(3)(c)(iii) as either of the following **(R 336.1213(3)(c))**:
    a. Submitting a certification by a Responsible Official with each report which states that, based on information and belief formed after reasonable inquiry, the statements and information in the report are true, accurate, and complete.
    b. Submitting, within 30 days following the end of a calendar month during which one or more prompt reports of deviations from the emissions allowed under the ROP were submitted to the department pursuant to Rule 213(3)(c)(ii), a certification by a Responsible Official which states that, "based on information and belief formed after reasonable inquiry, the statements and information contained in each of the reports submitted during the previous month were true, accurate, and complete". The certification shall include a listing of the reports that are being certified. Any report submitted pursuant to Rule 213(3)(c)(ii) that will be certified on a monthly basis pursuant to this paragraph shall include a statement that certification of the report will be provided within 30 days following the end of the calendar month.

23. Semiannually for the term of the ROP as detailed in the special conditions, or more frequently if specified, the permittee shall submit certified reports of any required monitoring to the appropriate AQD District Office. All instances of deviations from ROP requirements during the reporting period shall be clearly identified in the reports. **(R 336.1213(3)(c)(i))**

24. On an annual basis, the permittee shall report the actual emissions, or the information necessary to determine the actual emissions, of each regulated air pollutant as defined in Rule 212(6) for each emission unit utilizing the emissions inventory forms provided by the department. **(R 336.1212(6))**

25. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the appropriate AQD District Office. The notice shall be provided not later than two business days after the start-up, shutdown, or discovery of the abnormal conditions or malfunction. Notice shall be by any reasonable means, including electronic, telephonic, or oral communication. Written reports, if required under Rule 912, must be submitted to the appropriate AQD District Supervisor within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal conditions or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5) and shall be certified by a Responsible Official in a manner consistent with the CAA. **(R 336.1912)**

Permit Shield

26. Compliance with the conditions of the ROP shall be considered compliance with any applicable requirements as of the date of ROP issuance, if either of the following provisions is satisfied. **(R 336.1213(6)(a)(i), R 336.1213(6)(a)(ii))**
    a. The applicable requirements are included and are specifically identified in the ROP.
    b. The permit includes a determination or concise summary of the determination by the department that other specifically identified requirements are not applicable to the stationary source.

    Any requirements identified in Part E of this ROP have been identified as non-applicable to this ROP and are included in the permit shield.

27. Nothing in this ROP shall alter or affect any of the following:
    a. The provisions of Section 303 of the CAA, emergency orders, including the authority of the USEPA under Section 303 of the CAA. **(R 336.1213(6)(b)(i))**
    b. The liability of the owner or operator of this source for any violation of applicable requirements prior to or at the time of this ROP issuance. **(R 336.1213(6)(b)(ii))**
    c. The applicable requirements of the acid rain program, consistent with Section 408(a) of the CAA. **(R 336.1213(6)(b)(iii))**

    d. The ability of the USEPA to obtain information from a source pursuant to Section 114 of the CAA. **(R 336.1213(6)(b)(iv))**

28. The permit shield shall not apply to provisions incorporated into this ROP through procedures for any of the following:
    a. Operational flexibility changes made pursuant to Rule 215. **(R 336.1215(5))**
    b. Administrative Amendments made pursuant to Rule 216(1)(a)(i)-(iv). **(R 336.1216(1)(b)(iii))**
    c. Administrative Amendments made pursuant to Rule 216(1)(a)(v) until the amendment has been approved by the department. **(R 336.1216(1)(c)(iii))**
    d. Minor Permit Modifications made pursuant to Rule 216(2). **(R 336.1216(2)(f))**
    e. State-Only Modifications made pursuant to Rule 216(4) until the changes have been approved by the department. **(R 336.1216(4)(e))**

29. Expiration of this ROP results in the loss of the permit shield. If a timely and administratively complete application for renewal is submitted not more than 18 months, but not less than 6 months, before the expiration date of the ROP, but the department fails to take final action before the end of the ROP term, the existing ROP does not expire until the renewal is issued or denied, and the permit shield shall extend beyond the original ROP term until the department takes final action. **(R 336.1217(1)(c), R 336.1217(1)(a))**

Revisions

30. For changes to any process or process equipment covered by this ROP that do not require a revision of the ROP pursuant to Rule 216, the permittee must comply with Rule 215. **(R 336.1215, R 336.1216)**

31. A change in ownership or operational control of a stationary source covered by this ROP shall be made pursuant to Rule 216(1). **(R 336.1219(2))**

32. For revisions to this ROP, an administratively complete application shall be considered timely if it is received by the department in accordance with the time frames specified in Rule 216. **(R 336.1210(9))**

33. Pursuant to Rule 216(1)(b)(iii), Rule 216(2)(d) and Rule 216(4)(d), after a change has been made, and until the department takes final action, the permittee shall comply with both the applicable requirements governing the change and the ROP terms and conditions proposed in the application for the modification. During this time period, the permittee may choose to not comply with the existing ROP terms and conditions that the application seeks to change. However, if the permittee fails to comply with the ROP terms and conditions proposed in the application during this time period, the terms and conditions in the ROP are enforceable. **(R 336.1216(1)(c)(iii), R 336.1216(2)(d), R 336.1216(4)(d))**

Reopenings

34. A ROP shall be reopened by the department prior to the expiration date and revised by the department under any of the following circumstances:
    a. If additional requirements become applicable to this stationary source with three or more years remaining in the term of the ROP, but not if the effective date of the new applicable requirement is later than the ROP expiration date. **(R 336.1217(2)(a)(i))**
    b. If additional requirements pursuant to Title IV of the CAA become applicable to this stationary source. **(R 336.1217(2)(a)(ii))**
    c. If the department determines that the ROP contains a material mistake, information required by any applicable requirement was omitted, or inaccurate statements were made in establishing emission limits or the terms or conditions of the ROP. **(R 336.1217(2)(a)(iii))**
    d. If the department determines that the ROP must be revised to ensure compliance with the applicable requirements. **(R 336.1217(2)(a)(iv))**

Renewals

35. For renewal of this ROP, an administratively complete application shall be considered timely if it is received by the department not more than 18 months, but not less than 6 months, before the expiration date of the ROP. **(R 336.1210(7))**

Stratospheric Ozone Protection

36. If the permittee is subject to Title 40 of the Code of Federal Regulations (CFR), Part 82 and services, maintains, or repairs appliances except for motor vehicle air conditioners (MVAC), or disposes of appliances containing refrigerant, including MVAC and small appliances, or if the permittee is a refrigerant reclaimer, appliance owner or a manufacturer of appliances or recycling and recovery equipment, the permittee shall comply with all applicable standards for recycling and emissions reduction pursuant to 40 CFR, Part 82, Subpart F.

37. If the permittee is subject to 40 CFR, Part 82, and performs a service on motor (fleet) vehicles when this service involves refrigerant in the MVAC, the permittee is subject to all the applicable requirements as specified in 40 CFR, Part 82, Subpart B, Servicing of Motor Vehicle Air Conditioners. The term “motor vehicle” as used in Subpart B does not include a vehicle in which final assembly of the vehicle has not been completed by the original equipment manufacturer. The term MVAC as used in Subpart B does not include the air-tight sealed refrigeration system used for refrigerated cargo or an air conditioning system on passenger buses using Hydrochlorofluorocarbon-22 refrigerant.

Risk Management Plan

38. If subject to Section 112(r) of the CAA and 40 CFR, Part 68, the permittee shall register and submit to the USEPA the required data related to the risk management plan for reducing the probability of accidental releases of any regulated substances listed pursuant to Section 112(r)(3) of the CAA as amended in 40 CFR, Part 68.130. The list of substances, threshold quantities, and accident prevention regulations promulgated under 40 CFR, Part 68, do not limit in any way the general duty provisions under Section 112(r)(1).

39. If subject to Section 112(r) of the CAA and 40 CFR, Part 68, the permittee shall comply with the requirements of 40 CFR, Part 68, no later than the latest of the following dates as provided in 40 CFR, Part 68.10(a):
    a. June 21, 1999,
    b. Three years after the date on which a regulated substance is first listed under 40 CFR, Part 68.130, or
    c. The date on which a regulated substance is first present above a threshold quantity in a process.

40. If subject to Section 112(r) of the CAA and 40 CFR, Part 68, the permittee shall submit any additional relevant information requested by any regulatory agency necessary to ensure compliance with the requirements of 40 CFR, Part 68.

41. If subject to Section 112(r) of the CAA and 40 CFR, Part 68, the permittee shall annually certify compliance with all applicable requirements of Section 112(r) as detailed in Rule 213(4)(c)). **(40 CFR, Part 68)**

Emission Trading

42. Emission averaging and emission reduction credit trading are allowed pursuant to any applicable interstate or regional emission trading program that has been approved by the Administrator of the USEPA as a part of Michigan’s State Implementation Plan. Such activities must comply with Rule 215 and Rule 216. **(R 336.1213(12))**

Permit To Install (PTI)

43. The process or process equipment included in this permit shall not be reconstructed, relocated, or modified unless a PTI authorizing such action is issued by the department, except to the extent such action is exempt from the PTI requirements by any applicable rule. [2] **(R 336.1201(1))**

44. The department may, after notice and opportunity for a hearing, revoke PTI terms or conditions if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of the PTI or is violating the department's rules or the CAA. [2] **(R 336.1201(8), Section 5510 of Act 451)**

45. The terms and conditions of a PTI shall apply to any person or legal entity that now or hereafter owns or operates the process or process equipment at the location authorized by the PTI. If a new owner or operator submits a written request to the department pursuant to Rule 219 and the department approves the request, this PTI will be amended to reflect the change of ownership or operational control. The request must include all of the information required by Subrules (1)(a), (b) and (c) of Rule 219. The written request shall be sent to the appropriate AQD District Supervisor, MDEQ. [2] **(R 336.1219)**

46. If the installation, reconstruction, relocation, or modification of the equipment for which PTI terms and conditions have been approved has not commenced within 18 months of the original PTI issuance date, or has been interrupted for 18 months, the applicable terms and conditions from that PTI, as incorporated into the ROP, shall become void unless otherwise authorized by the department. Furthermore, the person to whom that PTI was issued, or the designated authorized agent, shall notify the department via the Supervisor, Permit Section, MDEQ, AQD, P. O. Box 30260, Lansing, Michigan 48909, if it is decided not to pursue the installation, reconstruction, relocation, or modification of the equipment allowed by the terms and conditions from that PTI. [2] **(R 336.1201(4))**

Footnotes:

[1] This condition is state-only enforceable and was established pursuant to Rule 201(1)(b).

[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

B. SOURCE-WIDE CONDITIONS

Part B outlines the Source-Wide Terms and Conditions that apply to this stationary source. The permittee is subject to these special conditions for the stationary source in addition to the general conditions in Part A and any other terms and conditions contained in this ROP.

The permittee shall comply with all specific details in the special conditions and the underlying applicable requirements cited. If a specific condition type does not apply to this source, NA (not applicable) has been used in the table. If there are no Source-Wide Conditions, this section will be left blank.

C. EMISSION UNIT CONDITIONS

Part C outlines terms and conditions that are specific to individual emission units listed in the Emission Unit Summary Table. The permittee is subject to the special conditions for each emission unit in addition to the General Conditions in Part A and any other terms and conditions contained in this ROP.

The permittee shall comply with all specific details in the special conditions and the underlying applicable requirements cited. If a specific condition type does not apply, NA (not applicable) has been used in the table. If there are no conditions specific to individual emission units, this section will be left blank.

EMISSION UNIT SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date/ Modification Date	Flexible Group ID
EU CS12GLYDHY	The glycol dehydration system operates in two modes (glycol injection and glycol absorption) to remove water from the natural gas withdrawn from the storage reservoir. The glycol dehydrator has a condenser and thermal oxidizer as control devices.	01/01/89	NA
EU CS12HHH	40 CFR, Part 63, Subpart HHH establishes national emission limitations and operating limitations for natural gas transmission and storage facilities that are major sources of HAP emissions. The rule affects facilities that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final user. Subpart HHH is applicable to EU CS12GLYDHY. The glycol dehydrator has the option of using a condenser and/or thermal oxidizer to comply with this regulation.	10/15/15 Compliance date	NA
EU CS12HEATER-A	A natural gas-fired Sivalls 7.5 MMBtu/hr indirect gas withdrawal heater. The emission unit does not have a control device.	Before 6/4/2010	FG CS12DDDDD
EU CS12HEATER-B	A natural gas-fired Sivalls 7.5 MMBtu/hr indirect gas withdrawal heater. The emission unit does not have a control device.	Before 6/4/2010	FG CS12DDDDD
EU CS12BOILER	A natural gas-fired Cleaver-Brooks 2.51 MMBtu/hr Boiler used for building and comfort heating throughout the facility. The emission unit does not have a control device.	Before 6/4/2010	FG CS12DDDDD

Emission Unit ID	**Emission Unit Description** **(Including Process Equipment & Control Device(s))**	**Installation Date/ Modification Date**	**Flexible Group ID**
EU CS12CMPR-A	A natural gas-fired, 3,750, HP 4-stroke lean burn Ingersoll Rand 410 KVR IC compressor engine used to compress natural gas into the storage reservoir during injection, and into the pipeline during withdrawal. The emission unit does not have a control device.	01/01/1980	FG CS12CMPRS
EU CS12CMPR-B	A natural gas-fired, 3,750, HP 4-stroke lean burn Ingersoll Rand 410 KVR IC compressor engine used to compress natural gas into the storage reservoir during injection, and into the pipeline during withdrawal. The emission unit does not have a control device.	01/01/1980	FG CS12CMPRS
EU CS12CMPR-C	A natural gas-fired, 3,750, HP 4-stroke lean burn Ingersoll Rand 410 KVR IC compressor engine used to compress natural gas into the storage reservoir during injection, and into the pipeline during withdrawal. The emission unit does not have a control device.	01/01/1980	FG CS12CMPRS
~~EU CS12EMRGEN-A~~	~~A 580 horsepower 4-stroke rich burn Waukesha VHP5108G emergency generator.~~ ~~The emission unit does not have a control device.~~	~~1979~~	~~FG CS12ZZZZ~~
EU CS12EMRGEN-B	A 580 horsepower 4-stroke rich burn Waukesha VHP5108G emergency generator. The emission unit does not have a control device.	1979	FG CS12ZZZZ

EU CS12GLYDHY
EMISSION UNIT CONDITIONS

DESCRIPTION

The glycol dehydration system can operate in two modes. Glycol injection occurs when a process called low temperature separation is used to remove liquids from the gas stream. Di-ethylene glycol (DEG) is injected into the gas stream and mixes with the liquids to prevent freezing during low temperature separation. Glycol absorption is used when low temperature separation does not adequately remove the liquids from the gas stream. DEG is circulated through a contactor tower countercurrent to the gas stream. The DEG absorbs the liquid from the gas stream during the glycol absorption process. During both modes of operation, the glycol enriched gas stream liquid is regenerated in a reboiler for continual use.

POLLUTION CONTROL EQUIPMENT: Condenser and thermal oxidizer.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period/ Operating Scenario	Equipment	Monitoring/ Testing Method	Underlying Applicable Requirements
1. Benzene	Less than 1 tpy[2]	12 month rolling time period as determined at the end of each calendar month.	EU CS12GLYDHY	V.1, VI.1, VI.3, VI.4	**R 336.1702(a), R 336.1205(1)**
2. VOC	86 lbs/day[2]		EU CS12GLYDHY	V.1, VI.2, VI.3, VI.4	**R 336.1702(a)**
3. VOC	15.7 tpy[2]	12 month rolling time period as determined at the end of each calendar month.	EU CS12GLYDHY	V.1, VI.1, VI.3, VI.4,	**R 336.1702(a)**

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee shall not use any stripping gas in EU CS12GLYDHY.[2] **(R 336.1702(a), R 336.1901)**
2. The permittee shall not operate EU CS12GLYDHY unless the glycol flash tank is installed and operating properly. A properly operating flash tank will volatilize organic compounds out of the rich glycol stream and route the VOCs to the glycol regenerator re-boiler burner or thermal oxidizer for destruction.[2] **(R 336.1702(a))**
3. Except as provided in the condition below, the permittee shall not operate EU CS12GLYDHY unless the thermal oxidizer is installed and operating properly. Proper operation includes but is not limited to maintaining a minimum operating temperature of 1400°F, a minimum residence time of 0.5 seconds, and a VOC destruction efficiency of at least 95 percent by weight.[2] **(R 336.1702(a))**
4. If the thermal oxidizer malfunctions, the permittee may operate EU CS12GLYDHY provided the condenser is installed and operating properly. Proper operation includes maintaining a maximum condenser exhaust gas temperature of 120°F.[2] **(R 336.1702(a))**

5. Sweet natural gas shall be the only fuel supplied to and fired in EU CS12GLYDHY. Sweet gas is defined as any gas containing no more than 1 grain of hydrogen sulfide or 10 grains of total sulfur per 100 standard cubic feet. The permittee may also incinerate emissions from the glycol-flash tank in the glycol reboiler burner[2] **(R 336.1119(i) and (dd))**

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. EU CS12GLYDHY shall be equipped with a thermal oxidizer. **(R 336.1702(a))**
2. EU CS12GLYDHY shall be equipped with a condenser. **(R 336.1702(a))**
3. EU CS12GLYDHY shall be equipped with a flash tank. **(R 336.1702(a))**
4. EU CS12GLYDHY thermal oxidizer and condenser shall each be equipped with working temperature monitors to continuously monitor thermal oxidizer and condenser operating temperatures.[2] **(R 336.1702(a))**
5. EU CS12GLYDHY thermal oxidizer and condenser temperature monitor systems shall each be designed and equipped with alarm systems that will alarm if the operating temperature is less than 1400°F for the thermal oxidizer and greater than 120°F for the condenser. **(R 336.1911, R 336.1213(3))**

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. Once every five years the permittee shall analyze the pre-dehydration natural gas processed in EU CS12GLYDHY to determine its non-methane VOC and Benzene content and composition using a method or methods standard in the natural gas industry, subject to approval by the AQD.[2] **(R 336.1205)**

2. Once every five years the permittee shall analyze the sweet natural gas fuel supplied to and fired in EU CS12GLYDHY for grains of hydrogen sulfide or grains of total sulfur per 100 standard cubic feet.[2] **(R 336.1119(i) and (d))**

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall calculate and record, in a satisfactory manner, monthly and 12–month rolling time period Benzene and VOC emission calculation records in tons from EU CS12GLYDHY. The emissions calculations shall be available to the AQD upon request by 15th of the following month.[2] **(R 336.1205(1), R 336.702(a), R 336.1901)**

2. The permittee shall calculate and record, in a satisfactory manner, VOC emissions in pounds per calendar day from EU CS12GLYDHY. The emissions calculations shall be available to the AQD upon request by the 15th of the following month.[2] **(R 336.1702(a), R336.1901)**
3. The permittee may calculate and record the Benzene and VOC emissions from EU CS12GLYDHY by using the GRI-GLYCalc (tm) computer model, version 3.0 or later or other method acceptable to the AQD District Supervisor. Inputs to the model shall be representative of actual operating conditions of EU CS12GLYDHY.[2] **(R 336.1213(3) R 336.1702(a), R 336.1901))**
4. The permittee shall recalculate the Benzene and VOC emission rates in Condition 3 above each time the natural gas is analyzed to determine its Benzene and VOC content. **(R 336.1213(3)(a))**
5. When EU CS12GLYDHY is operating, the permittee shall continuously monitor, and record daily, the temperature of the control device in use (condenser or thermal oxidizer).[2] **(R 336.1205(1), R 336.1702(a), R 336.1901)**
6. The permittee shall monitor and record the alarm events actuated because the temperature limit of the condenser or thermal oxidizer was not met. The permittee shall record the action taken in response to an alarm event. **(R 336.1702(a))**
7. The permittee shall maintain in a manner acceptable to the AQD calculations showing the VOC destruction efficiency of the thermal oxidizer is at least 95 percent by weight. **(R 336.1213(3))**
8. The permittee shall monitor and record the amount of natural gas processed through EU CS12GLYDHY for each calendar day EU CS12GLYDHY operates.[2] **(R336.1205(1), R336.1702(a), R336.1901)**
9. Each calendar day EU CS12GLYDHY operates, the permittee shall monitor and record the total hours of

operation of EU CS12GLYDHY.[2] **(R336.1205(1), R336.1702(a), R336.1901)**

10. The permittee shall monitor and record the number of hours EU BLGLYDHY operated with the condenser only. **(R 336.1213(3))**

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

4. The permittee shall submit a complete analysis plan (for the sweet natural gas fuel) to the AQD District Supervisor for approval at least 30 days prior to the anticipated analysis date.[2] **(R 336.1205, R 336.1119(i) and (dd))**

5. The permittee shall submit a complete report of the analysis results to the AQD District Supervisor, within 60 days following the last date of the analysis.[2] **(R 336.1205, R 336.1119(i) and (dd))**

See Appendix 8

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	Maximum Exhaust Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
1. SV-010A (Thermal Oxidizer)	NA	17[1]	**R 336.1901**
2. SV-010B (Condenser)	3[1]	17[1]	**R 336.1901**

IX. OTHER REQUIREMENT(S)

NA

Footnotes:

[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).
[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

EU CS12HHH
EMISSION UNIT CONDITIONS

DESCRIPTION

One glycol dehydration system operates in two modes (glycol injection and glycol absorption) to remove water from the natural gas withdrawn from the storage reservoir. The glycol dehydration system meets the definition in 40 CFR 63.1271 and was constructed prior to August 23, 2011 and must attain compliance with the requirements in 40 CFR, Part 63, Subpart HHH by October 15, 2015.

Emission Units: EUCS12GLYDHY

POLLUTION CONTROL EQUIPMENT Condenser and/or Thermal Oxidizer.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period/ Operating Scenario	Equipment	Monitoring/ Testing Method	Underlying Applicable Requirements
1. BTEX	Calculated using the equation in Appendix 7A	Annual	EU CS12GLYDHY	V.2, V.4, V.5, VI.9	**40 CFR 63.1275(b)(1)(iii)**

See Appendix 7A

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The process vent from EU CS12GLYDHY shall be vented to a control device or a combination of control devices through a closed-vent system. **(40 CFR 63.1275(b)(1)(iii)(A))**

2. The control device(s) shall be one of those specified below and must be designed and operated in accordance with the following requirements: **(40 CFR 63.1281(f)(1))**
   a. A thermal oxidizer that reduces the concentration of BTEX to meet the emission limit in I.1, or the TOC or total HAP concentration in the exhaust gases at the outlet of the oxidizer is reduced to a level equal to or less than 20 ppmv on a dry basis corrected to 3 percent oxygen.
   b. A condenser or other non-destructive control device that is designed and operated to reduce the mass content of BTEX in the gases vented by 95 percent.

3. The permittee shall control HAP emissions from each GCG separator (flash tank) vent unless BTEX emissions from the reboiler vent and the flash tank are reduced to a level less than the limit in Condition I.1. **(40 CFR 63.1275(c)(3))**

4. The permittee shall operate and maintain EU CS12HHH, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. **(40 CFR 63.1274(h))**

5. The permittee shall operate each control device in accordance with the requirements specified below: **(40 CFR 63.1281(f)(2))**

   a. Each control device used to comply with this subpart shall be operating at all times. More than one unit may be vented to a control device.
   b. For each control device monitored in accordance with the requirements of Conditions VI.~~8~~ 7 - ~~13~~12, the permittee shall demonstrate compliance according to the requirements of VI.2 (§ 63.1282(e)).

6. When using a condenser to demonstrate continuous compliance with emission limits, the control device shall be operated at a maximum operating temperature established in accordance with the requirements of VI.8. When using a thermal oxidizer to demonstrate continuous compliance with emission limits the control device shall be operated at the minimum operating temperature established in accordance with the requirements of VI.8 or a minimum of 1400°F. **(40 CFR 63.1282(e)(1))**

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. The closed vent system shall be designed and operated in accordance with the following requirements: **(40 CFR 63.1281(c), 40 CFR 63.1283(c)(2)(iii))**
   a. The closed-vent system shall route all gases, vapors, and fumes emitted from the material in and emission unit to a control device that meets the requirements specified in Condition III.2.
   b. The closed-vent system shall be designed and operated with no detectable emissions.
   c. Any bypass devices in the closed-vent system that could divert emissions from entering the control device shall be equipped with a flow indicator at the inlet to the bypass device that takes readings every 15 minutes, and that sounds an alarm when the bypass device is open; or the bypass device valve at the inlet to the bypass device shall be secured using a car-seal or lock and key.

2. Each continuous parameter monitoring system (CPMS) shall meet the following specifications and requirements: **(40 CFR 63.1283(d)(1))**
   a. Each CPMS shall measure data values at least once every hour and record either:
      i Each measured data value; or
      ii Each block average value for each 1-hour period or shorter periods calculated from all measured data values during each period. If values are measured more frequently than once per minute, a single value for each minute may be used to calculate the hourly (or shorter period) block average instead of all measured values.

3. The permittee shall install a device equipped with a continuous recorder to measure the values of operating parameters appropriate for the control device as specified below. **(40 CFR 63.1283(d)(3))**
   a. For a thermal oxidizer, the temperature monitoring device shall have a minimum accuracy of ±2 percent of the temperature being monitored in °C, or ±2.5°C, whichever value is greater. The temperature sensor shall be installed at a location representative of the combustion zone temperature
   b. For a condenser, the temperature monitoring device shall have a minimum accuracy of ±2 percent of the temperature being monitored in °C, or ±2.5°C, whichever value is greater. The temperature sensor shall be installed at a location in the exhaust vent stream from the condenser.

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. Determination of the actual flow rate of natural gas to EU CS12GLYDHY shall be made using either of the following procedures: **(40 CFR 63.1282(a)(1))**
   a. Install and operate a monitoring instrument that directly measures natural gas flow rate to EU CS12GLYDHY with an accuracy of ± 2 percent or better. The annual natural gas flow rate shall be converted to a daily average by dividing the annual flow rate by the number of days per year each EU processed natural gas.
   b. Document to the AQD's satisfaction, the actual annual average natural gas flow rate to EU CS12GLYDHY.

2. Determination of the actual average BTEX emissions from EU CS12GLYDHY with condenser and/or thermal oxidizer control device shall be made using the following procedure: **(40 CFR 63.1282(a)(2))**
   a. Use GRI-GLYCalc™, Version 3.0 or higher. Inputs to the model shall be representative of actual operating conditions of each glycol dehydration unit.

3. The Permittee shall perform “no detectable emissions” testing for closed vent systems using the test methods and procedures specified in 40 CFR 63.1282(b). **(40 CFR 63.1282(b))**

4. If the permittee chooses to conduct a performance test to demonstrate that a control device meets the requirements of III.2 (40 CFR 1281(f)(1)) the permittee shall conduct emissions testing for compliance with the BTEX emission limit calculated using Equation 1 or the 20 ppmv TOC or Total HAP exhaust gas concentration reduction requirement using the following test methods and procedures: **(40 CFR 63.1282(d)(3)**
   a. Method 1 or 1A, 40 CFR, Part 60, Appendix A, as appropriate, shall be used for selection of the sampling sites. The sampling site shall be located at the outlet of the combustion device.
   b. The gas volumetric flow rate shall be determined using Method 2, 2A, 2C, or 2D, 40 CFR, Part 60, Appendix A, as appropriate.
   c. To determine compliance with the BTEX emission limit or the 20 ppmv TOC or Total HAP exhaust gas concentration reduction requirement, the permittee shall use one of the following methods: Method 18, 40 CFR, Part60, Appendix A; ASTM D64200-99 (Reapproved 2004); or any other method or data that have been validated according to the applicable procedures in Method 301, 40 CFR, Part 63, Appendix A.
   d. The permittee shall conduct performance tests according to the following schedule:
      i. An initial performance test shall be conducted no later than October 15, 2015.
      ii. The first periodic performance test shall be conducted not later than 60 months after the initial performance test. Subsequent periodic performance tests shall be conducted at intervals no longer than 60 months following the previous periodic performance test or whenever a source desires to establish a new operating limit. Combustion control devices meeting either of the following criteria are not required to conduct periodic performance tests;
         A. A control device whose model is tested under, and meets the criteria of manufacturers performance test in 40 CFR 63.1282(g).
         B. A combustion control device demonstrating during the performance test that combustion zone temperature is an indicator of destruction efficiency and operates at a minimum temperature of 1400 degrees F.

5. As an alternative to the performance test referenced in V.4 the permittee may elect to use the procedures documented in the GRI report entitled “Atmospheric Rich/Lean method for Determining Glycol Dehydrator Emissions” (GRI-95/0368.1) as inputs for the model GRI-GLYCalc™, version 3.0 or higher, to generate a condenser performance curve. **(40 CFR 63.1282(d)(5))**

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall maintain records of the annual facility natural gas throughput each year. **(40 CFR 63.1270(a)(3))**

2. The permittee shall continuously monitor and record the temperature on the thermal oxidizer or condenser and calculate the daily average temperature for each operating day. **(40 CFR 63.1282(e), 40 CFR 63.1283(d)(4))**
   a. Establish a site specific maximum (condenser) or minimum (thermal oxidizer) temperature to define the conditions at which the control device must be operated to continuously achieve compliance with the emission limit.
   b. Calculate the daily average of the temperature readings in accordance with Condition VI.~~8~~7.
   c. Compliance is achieved when the daily average of the temperature readings calculated under 2.b. is either equal to or greater than the minimum or equal to or less than the maximum monitoring value established under 2.a.

3. When using a condenser as the control device the permittee may demonstrate compliance with BTEX emission reductions by complying with the following requirements: **(40 CFR 63.1282(f))**
   a. The permittee shall establish a site-specific condenser performance curve according to the procedures specified in Condition VI.~~10~~9.
   b. The permittee must calculate the daily average condenser outlet temperature in accordance with Condition VI.~~10~~9.

   c. The permittee shall determine the condenser efficiency for the current operating day using the daily average condenser outlet temperature and the condenser performance curve.

d. At the end of each operating day the permittee shall calculate the 30-day average BTEX emission reduction from the condenser efficiencies for the preceding 30 operating days.
e. Compliance is achieved if the average BTEX emission reduction is equal to or greater than the minimum percent reduction established in Condition VI.~~10~~9.

4. For each closed-vent system, the permittee shall comply with the following requirements:
(40 CFR 63.1283(c)(2-4))
a. Except for parts of the closed-vent system or cover that are designated unsafe to inspect or difficult to inspect, each closed-vent system and each bypass device shall be inspected according to the procedures specified below according the following schedule:
i. For each closed-vent system joints, seams, or other connections that are permanently or semi-permanently sealed (e.g., a welded joint between two sections of hard piping or a bolted or gasketed ducting flange):
A. Conduct an initial inspection to demonstrate that the closed-vent system operates with no detectable emissions.
B. Conduct annual visual inspections for defects that could result in air emissions. Defects include, but are not limited to, visible cracks, holes, or gaps in piping; loose connections; or broken or missing caps or other closure devices.
ii. For closed-vent system components other than those specified in VI.5.a.i above:
A. Conduct an initial inspection to demonstrate that the closed-vent system operates with no detectable emissions.
B. Conduct annual inspections to demonstrate that the components or connections operate with no detectable emissions.
C. Conduct annual visual inspections for defects that could result in air emissions. Defects include, but are not limited to, visible cracks, holes, or gaps in ductwork; loose connections; or broken or missing caps or other closure devices.
iii. For each bypass device, except low leg drains, high point bleeds, analyzer vents, open-ended valves or lines, and safety devices, the permittee shall either:
A. At the inlet to the bypass device that could divert the steam away from the control device to the atmosphere, set the flow indicator to take a reading at least once every 15 minutes; or
B. If the bypass device valve installed at the inlet to the bypass device is secured in the non-diverting position using a car-seal or a lock-and-key type configuration, visually inspect the seal or closure mechanism at least once every month to verify that the valve is maintained in the non-diverting position and the vent stream is not diverted through the bypass device.
b. In the event that a leak or defect is detected, the permittee shall repair the leak or defect as soon as practicable, except as provided in VI.~~5~~4.c.
i A first attempt at repair shall be made no later than 5 calendar days after the leak is detected.
ii Repair shall be completed no later than 15 calendar days after the leak is detected.
c. Delay of repair of a closed-vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, as defined in § 63.1271, or if the permittee determines that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. Repair of such equipment shall be completed by the end of the next shutdown.

5. Any parts of the closed-vent system or cover that are designated, as described below, as unsafe to inspect are exempt from the inspection requirements of Condition VI.4~~5~~ if: **(40 CFR 63.1283(c)(5))**
a. The permittee determines that the equipment is unsafe to inspect because inspecting personnel would be exposed to an imminent or potential danger as a consequence of complying with Condition VI.5.a.i or ii.
b. The permittee has a written plan that requires inspection of the equipment as frequently as practicable during safe-to-inspect times.

6. Any parts of the closed-vent system or cover that are designated, as described below, as difficult to inspect are exempt from the inspection requirements of Condition VI.~~5~~ 4 if: **(40 CFR 63.1283(c)(6))**
a. The permittee determines that the equipment cannot be inspected without elevating the inspecting personnel more than 2 meters above a support surface; and

b. The permittee has a written plan that requires inspection of the equipment at least once every 5 years.

7. Using the data recorded by the monitoring system, except for inlet gas flow rate, the permittee must calculate the daily average value for each monitored operating parameter for each operating day. If the emissions unit operation is continuous, the operating day is a 24-hour period. If the emissions unit operation is not continuous, the operating day is the total number of hours of control device operation per 24-hour period. Valid data points must be available for 75 percent of the operating hours in an operating day to compute the daily average. **(40 CFR 63.1283(d)(4))**

8. For the control devices used to comply with 40 CFR, Part 63, Subpart HHH, the permittee shall establish a minimum operating parameter value or a maximum operating parameter value, as appropriate for the control device, to define the conditions at which the control device must be operated to continuously achieve the emission limits in Section I of FGMACTHHH. Each minimum or maximum operating parameter value shall be established as follows: **(40 CFR 63.1283(d)(5)(i))**
    a. If the permittee conducts performance tests to demonstrate that the control device achieves the applicable performance requirements, then the minimum operating parameter value or the maximum operating parameter value shall be established based on values measured during the performance test and supplemented, as necessary, by a condenser design analysis or control device manufacturer's recommendations or a combination of both.
    b. If the permittee uses a condenser design analysis to demonstrate that the control device achieves the applicable performance requirements, then the minimum operating parameter value or the maximum operating parameter value shall be established based on the condenser design analysis and may be supplemented by the condenser manufacturer's recommendations.
    c. If the permittee operates a control device where the performance test requirement was met under manufacturers' performance test to demonstrate that the control device achieves the applicable performance requirements, then the maximum inlet gas flow rate shall be established based on the performance test and supplemented, as necessary, by the manufacturer recommendations.

9. When using condensers as the control device the permittee shall also establish a condenser performance curve showing the relationship between condenser outlet temperature and condenser control efficiency. The curve shall be established using the procedures documented in the GRI report entitled, "Atmospheric Rich/Lean Method for Determining Glycol Dehydrator Emissions" (GRI-95/0368.1) as inputs for the model GRI-GLYCalc^{tm}, Version 3.0 or higher, to generate a condenser performance curve. **(40 CFR 63.1283(d)(5)(ii))**

10. A deviation for a control device is determined to have occurred when the monitoring data or lack of monitoring data result in any one of the criteria specified below being met. When multiple operating parameters are monitored for the same control device and during the same operating day, and more than one of these operating parameters meets an excursion criterion specified below, then a single excursion is determined to have occurred for the control device for that operating day. **(40 CFR 63.1283(d)(6)(i-iii))**
    a. When the daily average value of a monitored operating parameter is less than the minimum operating parameter limit (or, if applicable, greater than the maximum operating parameter limit) established for the operating parameter.
    b. When the 30-day average condenser efficiency calculated according to the requirements of Condition VI.3.d is less than the identified 30-day required percent reduction.
    c. When the monitoring data are not available for at least 75 percent of the operating hours in a day.

11. A deviation occurs for a closed-vent system containing one or more bypass devices that could be used to divert all or a portion of the gases, vapors, or fumes from entering the control device when: **(40 CFR 63.1283(d)(6)(iv))**
    a. The flow indicator indicates that flow has been detected and that the stream has been diverted away from the control device to the atmosphere.
    b. If the seal or closure mechanism has been broken, the bypass line valve position has a changed, the key for the lock-and-key type lock has been checked out, or the car-seal has broken.

12. For each deviation, the permittee shall be deemed to have failed to have applied control in a manner that achieves the required operating parameter limits. Failure to achieve the required operating parameter limits is a violation of this standard. **(40 CFR 63.1283(d)(7))**

13. Nothing in Conditions VI.7~~8~~ through VI.~~13~~ 12 shall be construed to allow or excuse a monitoring parameter deviation caused by any activity that violates other applicable provisions of this subpart. **(40 CFR 63.1283(d)(9))**

14. The permittee shall maintain the records specified in 40 CFR 63.10(b)(2). **(40 CFR 63.1284(b)(2))**

15. The permittee shall maintain the following records: **(40 CFR 63.1284(b)(4), 40 CFR 63.1284(g))**
    a. Continuous records of the equipment operating parameters specified to be monitored in Conditions VI.8-10.
    b. Records of the daily average value of each continuously monitored parameter for each operating day determined according to the procedures specified in Condition VI.~~8~~7.
    c. For condensers using reduction efficiency for compliance, records of the annual 30-day rolling average condenser efficiency determined in Condition VI.3.d shall be kept in addition to the daily averages.
    d. The following records for a control device whose model is tested under the manufacturers' performance test:
        i All visible emission readings and flow rate calculations made during the compliance determination
        ii All hourly records and other recorded periods when the pilot flame is absent.
    e. Hourly records of the times and durations of all periods when the vent stream is diverted from the control device or the device is not operating.
    f. Where a seal or closure mechanism is used to comply with the closed vent bypass, hourly records of flow are not required. In such cases, the owner or operator shall record that the monthly visual inspection of the seals or closure mechanism has been done, and shall record the duration of all periods when the seal mechanism is broken, the bypass line valve position has changed, or the key for a lock-and-key type lock has been checked out, and records of any car-seal that has broken.

16. The permittee shall maintain records identifying all parts of the closed-vent system that are designated as unsafe to inspect in accordance with Condition VI.~~6~~5, an explanation of why the equipment is unsafe to inspect, and the plan for inspecting the equipment. **(40 CFR 63.1284(b)(5))**

17. The permittee shall maintain records identifying all parts of the closed-vent system that are designated as difficult to inspect in accordance with Condition VI.~~7~~6, an explanation of why the equipment is difficult to inspect, and the plan for inspecting the equipment. **(40 CFR 63.1284(b)(6))**

18. The permittee shall maintain the following records for each inspection conducted in accordance with Condition VI.~~5~~ 4 during which a leak or defect is detected. **(40 CFR 63.1284(b)(7))**
    g. The instrument identification numbers, operator name or initials, and identification of the equipment.
    h. The date the leak or defect was detected and the date of the first attempt to repair the leak or defect.
    i. Maximum instrument reading measured by the method specified in Condition V.3 after the leak or defect is successfully repaired or determined to be non-repairable.
    j. "Repair delayed" and the reason for the delay if a leak or defect is not repaired within 15 calendar days after discovery of the leak or defect.
    k. The name, initials, or other form of identification of the permittee (or designee) whose decision it was that repair could not be affected without a shutdown.
    l. The expected date of successful repair of the leak or defect if a leak or defect is not repaired within 15 calendar days.
    m. Dates of shutdowns that occur while the equipment is unrepaired.
    n. The date of successful repair of the leak or defect.

19. For each inspection conducted in accordance with Condition VI.~~5~~ 4 during which no leaks or defects are detected, the permittee shall maintain a record that the inspection was performed, the date of the inspection, and a statement that no leaks or defects were detected. **(40 CFR 63.1284(b)(8))**

20. The permittee shall maintain records of the occurrence and duration of each malfunction of process equipment or the air pollution control equipment and monitoring equipment. The permittee shall maintain records of actions taken during periods of malfunction to minimize emissions in accordance with Condition III.4 including corrective actions to restore malfunctioning process and air pollution control and monitoring equipment to its normal or usual manner of operation. **(40 CFR 63.1284(f))**

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

4. The permittee shall submit the notification of the planned date of a performance test and site–specific test plan at least 60 days before the test. **(40 CFR 63.1285(b)(3))**

5. The permittee shall submit a Notification of Compliance Status Report as required under § 63.9(h) within 180 days after October 15, 2015. In addition to the information required under § 63.9(h) the Notification of Compliance Status Report shall include the information specified in paragraphs 5.a. through l. of this section. If an owner or operator submits the required information at different times, and/or different submittals, subsequent submittals may refer to previous submittals instead of duplicating and resubmitting the previously submitted information. **(40 CFR 63.1285(d))**
   a. If a closed-vent system and a control device other than a flare are used to comply with § 63.1274, the owner or operator shall submit the information in Condition 5.a.iii and the information in either paragraph 5.a.i. or ii.
      i. The condenser design analysis documentation specified in § 63.1282(d)(4) if the owner or operator elects to prepare a design analysis; or
      ii. If the owner or operator is required to conduct a performance test, the performance test results including the information specified in Condition 5.a.ii.A and B Results of a performance test conducted prior to the compliance date of this subpart can be used provided that the test was conducted using the methods specified in § 63.1282(d)(3), and that the test conditions are representative of current operating conditions. If the owner or operator operates a combustion control device model tested under § 63.1282(g), an electronic copy of the performance test results shall be submitted via email to *Oil_and_Gas_PT@EPA.GOV* unless the test results for that model of combustion control device are posted at the following Web site: *epa.gov/air quality/oil and gas*.
         A. The percent reduction of HAP or TOC, or the outlet concentration of HAP or TOC (parts per million by volume on a dry basis), determined as specified in § 63.1282(d)(3); and
         B. The value of the monitored parameters specified in § 63.1283(d), or a site-specific parameter approved by the permitting agency, averaged over the full period of the performance test.
      iii. The results of the closed-vent system initial inspections performed according to the requirements in § 63.1283(c)(2)(i) and (ii).
   b. The owner or operator shall submit one complete test report for each test method used for a particular source.
      i. For additional tests performed using the same test method, the results specified in Condition 5.a.ii shall be submitted, but a complete test report is not required.
      ii. A complete test report shall include a sampling site description, description of sampling and analysis procedures and any modifications to standard procedures, quality assurance procedures, record of operating conditions during the test, record of preparation of standards, record of calibrations, raw data sheets for field sampling, raw data sheets for field and laboratory analyses, documentation of calculations, and any other information required by the test method.
   c. For each control device other than a flare used to meet the requirements of § 63.1274, the owner or operator shall submit the information specified in Condition 5.d.i. through iv for each operating parameter required to be monitored in accordance with the requirements of § 63.1283(d).
      i. The minimum operating parameter value or maximum operating parameter value, as appropriate for the control device, established by the owner or operator to define the conditions at which the control

device must be operated to continuously achieve the applicable performance requirements of § 63.1281(d)(1) or (e)(3)(ii).

ii. An explanation of the rationale for why the owner or operator selected each of the operating parameter values established in § 63.1283(d)(5). This explanation shall include any data and calculations used to develop the value, and a description of why the chosen value indicates that the control device is operating in accordance with the applicable requirements of § 63.1281(d)(1), (e)(3)(ii), or (f)(1).

iii. A definition of the source's operating day for purposes of determining daily average values of monitored parameters. The definition shall specify the times at which an operating day begins and ends.

d. Results of any continuous monitoring system performance evaluations shall be included in the Notification of Compliance Status Report.

e. The owner or operator shall comply with all requirements for compliance status reports contained in the source's title V permit, including reports required under 40 CFR, Part 63, Subpart HHH. Each time a notification of compliance status is required under this subpart, the owner or operator of such source shall submit the notification of compliance status to the appropriate permitting authority following completion of the relevant compliance demonstration activity specified in this subpart.

f. The owner or operator shall submit an analysis demonstrating whether an affected source is a major source using the maximum throughput calculated according to § 63.1270(a).

g. The owner or operator shall submit a statement as to whether the source has complied with the requirements of this subpart.

h. If the owner or operator installs a combustion control device model tested under the manufacturer's performance test procedures in § 6**3**.1282(g), the Notification of Compliance Status Report shall include the data listed under § 63.1282(g)(8).

i. For each combustion control device model tested under § 63.1282(g), the information listed in paragraphs 5.i.i. through vi of this section.
   i. Name, address and telephone number of the control device manufacturer.
   ii. Control device model number.
   iii. Control device serial number.
   iv. Date the model of control device was tested by the manufacturer.
   v. Manufacturer's HAP destruction efficiency rating.
   vi. Control device operating parameters, maximum allowable inlet gas flow rate.

6. The permittee shall prepare Periodic Reports in accordance with a. and b. below and submit them to the Administrator. **(40 CFR 63.1285(e))**
   a. The permittee shall submit Periodic Reports semiannually beginning 60 calendar days after the end of the applicable reporting period. The first report shall be submitted no later than 240 days after the date the Notification of Compliance Status Report is due and shall cover the 6-month period beginning on the date the Notification of Compliance Status Report is due. The report shall include certification by a responsible official of truth, accuracy, and completeness.
   b. The permittee shall include the following information and any other information as applicable in §63.1285(e)(2).
      i. A description of all deviations as defined in Conditions VI.12-14 that have occurred during the 6-month reporting period, and the information described in §63.1285(e)(2)(ii).
      ii. For each inspection conducted in accordance with Condition VI.5 during which a leak or defect is detected, the records described in Condition VI.21 must be included in the next Periodic Report.
      iii. For each closed-vent system with a bypass line, records required under Condition VI.18.e and f.
      iv. A statement identifying if there were no deviations during the reporting period.
      v. Any change in compliance methods as described in §63.1282(e).
      vi. The results of any periodic test conducted during the reporting period.

7. Whenever a process change is made, or a change in any of the information submitted in the Notification of Compliance Status Report, the permittee shall submit a report within 180 days after the process change is made or as a part of the next Periodic Report, whichever is sooner. The report shall include: **(40 CFR 63.1285(f))**
   a. A brief description of the process change;
   b. A description of any modification to standard procedures or quality assurance procedures;
   c. Revisions to any of the information reported in the original Notification of Compliance Status Report under Condition VII.5

d. Information required by the Notification of Compliance Status Report under Condition VII.5 for changes involving the addition of processes or equipment.

8. Within 60 days after the date of completing a performance test (defined in § 63.2) you must submit the results of the performance tests to EPA's WebFIRE database by using the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) (*www.epa.gov/cdx*). Performance test data must be submitted in the file format generated through use of EPA's Electronic Reporting Tool (ERT) (see *http://www.epa.gov/ttn/chief/ert/index.html*). Only data collected using test methods on the ERT Web site are subject to this requirement for submitting reports electronically to WebFIRE. All reports required by this subpart not subject to the above electronic reporting requirements must be sent to the Administrator at the appropriate address. The Administrator may request a report in any form suitable for the specific case (e.g., by commonly used electronic media such as Excel spreadsheet, on CD or hard copy). The Administrator retains the right to require submittal of reports in paper format. **(40 CFR 63.1285(g))**

9. The permittee shall notify the AQD Technical Programs Unite Supervisor and the district Supervisor no less than 7 days prior to the anticipated test date. **(R 336.2001(4))**

See Appendix 8

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted.

Stack & Vent ID	Maximum Exhaust Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
NA	NA	NA	NA

IX. OTHER REQUIREMENT(S)

1. The permittee shall determine major source status using the maximum annual facility natural gas throughput calculated according to 40 CFR 63.1270(a)(1)(i) through (a)(1)(iv). As an alternative to calculating the maximum natural gas throughput, the owner or operator of a new or existing source may use the facility design maximum natural gas throughput to estimate the maximum potential emissions. **(40 CFR 63.1270(a)(1))**

2. The permittee shall determine the maximum values for other parameters used to calculate potential emissions as the maximum over the same period for which maximum throughput is determined. These parameters shall be based on an annual average or the highest single measured value. For estimating maximum potential emissions from glycol dehydration units, the glycol circulation rate used in the calculation shall be the unit’s maximum rate under its physical and operational design consistent with the definition of potential to emit in 40 CFR 63.2. **(40 CFR 63.1270(a)(4))**

3. A site-specific monitoring plan must be prepared that addresses the monitoring system design, data collection, and the quality assurance and quality control elements. Each CPMS must be installed, calibrated, operated, and maintained in accordance with the procedures in your approved site-specific monitoring plan. The permittee may request approval of monitoring system quality assurance and quality control procedures alternative to those specified below and in your site-specific monitoring plan. **(40 CFR 63.1283(d)(1)(ii-iv))**
   a. The performance criteria and design specifications for the monitoring system equipment, including the sample interface, detector signal analyzer, and data acquisition and calculations;
   b. Sampling interface (e.g., thermocouple) location such that the monitoring system will provide representative measurements;
   c. Equipment performance checks, system accuracy audits, or other audit procedures;
   d. Ongoing operation and maintenance procedures in accordance with provisions in § 63.8(c)(1) and (c)(3);

   e. Ongoing reporting and recordkeeping procedures in accordance with provisions in § 63.10(c), (e)(1), and (e)(2)(i).
   f. The permittee must conduct the CPMS equipment performance checks, system accuracy audits, or other audit procedures specified in the site-specific monitoring plan at least once every 12 months.
   g. The permittee must conduct a performance evaluation of each CPMS in accordance with the site-specific monitoring plan.

4. The permittee shall comply with all applicable provisions of the National Emission Standards for Hazardous Air Pollutants, as specified in 40 CFR, Part 63, Subpart A and Subpart HHH, for Natural Gas Transmission and Storage Facilities by October 15, 2015. **(40 CFR, Part 63, Subparts A and HHH)**

Footnotes:

[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

D. FLEXIBLE GROUP CONDITIONS

Part D outlines the terms and conditions that apply to more than one emission unit. The permittee is subject to the special conditions for each flexible group in addition to the General Conditions in Part A and any other terms and conditions contained in this ROP.

The permittee shall comply with all specific details in the special conditions and the underlying applicable requirements cited. If a specific condition type does not apply, NA (not applicable) has been used in the table. If there are no special conditions that apply to more than one emission unit, this section will be left blank.

FLEXIBLE GROUP SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FG CS12DDDDD	Emission Units subject to 40 CFR, Part 63, Subpart DDDDD.	EU CS12HEATER-A, EU CS12HEATER-B, EU CS12BOILER
FG CS12CMPRS	Three natural gas-fired, 3,750, HP 4-stroke lean burn Ingersoll Rand 410 KVR IC compressor engine used to compress natural gas into the storage reservoir during injection, and into the pipeline during withdrawal.	EU CS12CMPR-A, EU CS12CMPR-B, EU CS12CMPR-C
FG CS12ZZZZ	~~Two~~ One 580 horsepower 4-stroke rich burn Waukesha VHP5108G emergency generators. Emission units subject to 40 CFR, Part 63, Subpart ZZZZ.	~~EU CS12EMRGEN-A,~~ EU CS12EMRGEN-B

FG CS12DDDDD
FLEXIBLE GROUP CONDITIONS

DESCRIPTION

Requirements for existing Gas 1, (Natural Gas only) for existing Boilers and Process Heaters at major sources of Hazardous Air Pollutants per 40 CFR Part 63, Subpart DDDDD. These existing boilers or process heaters must comply with this subpart no later than January 31, 2016, except as provided in 40 CFR 63.6(i).

Emission Units:

The collection at a major source of all existing industrial, commercial, and institutional boilers and process heaters within the units designed to burn gas 1 fuel subcategory as defined in 40 CFR 63.7575. At the time of permit renewal:

Less than 5 MMBtu/hr	EU CS12BOILER (2.51 MMBtu/hr)
Equal to or greater than 5 MMBtu/hr and less than 10 MMBtu/hr	EU CS12HEATER-A (7.5 MMBtu/hr), EU CS12HEATER-B (7.5 MMBtu/hr)
Equal to or greater than 10 MMBtu/hr	

POLLUTION CONTROL EQUIPMENT

NA

I. EMISSION LIMIT(S)

NA

II. MATERIAL LIMIT(S)

1. The permittee shall only burn natural gas as defined in 40 CFR 63.7575. **(40 CFR 63.7499(l))**

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee must operate and maintain affected sources in a manner consistent with safety and good air pollution control practices for minimizing emissions. Determination of whether such operation and maintenance

procedures are being used will be based on information available to the Administrator that may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source. **(40 CFR 63.7500(a)(3))**

2. The permittee may obtain approval from the Administrator to use an alternative to the work practice standards noted in SC III.1. **(40 CFR 63.7500(b))**

3. The permittee must:
   a. Complete a tune-up every 5 years (61 months) for boilers/process heaters less than or equal to 5 million Btu per hour. **(40 CFR 63.7500(e), 40 CFR 63.7515(d))**
   b. Complete a tune-up every 2 years (25 months) for boilers greater than 5 million Btu per hour and less than 10 million Btu per hour. **(40 CFR 63.7500(e), 40 CFR 63.7515(d))**
   c. Conduct the tune-up within 30 calendar days of startup, if the unit is not operating on the required date for a tune-up. **(40 CFR 63.7540(a)(13))**
   d. Follow the procedures described in SC IX 3.a through 3.f for all initial and subsequent tune ups.

   (40 CFR 63.7540(a)(10), 40 CFR Part 63, Subpart DDDDD, Table 3)

IV. DESIGN/EQUIPMENT PARAMETER(S)

NA

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

NA

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee must keep a copy of each notification and report submitted to comply with 40 CFR Part 63, Subpart DDDDD, including all documentation supporting any Initial Notification or Notification of Compliance Status or semiannual compliance report that the permittee submitted, according to the requirements in 40 CFR 63.10(b)(2)(xiv). **(40 CFR 63.7555(a)(1))**

2. The permittee must keep each record on site, or they must be accessible from on-site (for example, through a computer network), for at least 2 years after the date of each occurrence, measurement, maintenance, corrective action, report, or record. The permittee can keep the records off site for the remaining 3 years. **(40 CFR 63.7560(a), (b), and (c))**

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

4. Unless the EPA Administrator has approved a different schedule for submission of reports under 40 CFR 63.10(a), the permittee must submit each report, according to paragraph (h) of 40 CFR 63.7550, stated in SC VII.6, by the date in Table 9 of 40 CFR Part 63, Subpart DDDDD and according to the requirements in paragraphs (b)(1) through (4) of 40 CFR 63.7550, as listed below. For units that are subject only to a requirement to conduct a biennial tune-up according to 40 CFR 63.7540(a)(11), stated in SC III.3.b, or 5-year tune-up according to 40 CFR 63.7540(a)(12), stated in SC III.3.a, and not subject to emission limits or operating limits, the permittee may submit only a biennial, or 5-year compliance report, as applicable, as specified in paragraphs (b)(1) through (4) of 40 CFR 63.7550, as listed below, instead of a semi-annual compliance report. **(40 CFR 63.7550(b))**
   a. When submitting a biennial, or 5-year compliance report, the first compliance report must cover the period beginning on January 31, 2016 and ending on December 31 within 2, or 5 years, as applicable, after the compliance date that is specified in 40 CFR 63.7495.

(40 CFR 63.7550(b)(1))

   b. The first biennial, or 5-year compliance report must be postmarked or submitted no later than March 15. **(40 CFR 63.7550(b)(2), 40 CFR 63.7550(b)(5))**
   c. Biennial, and 5-year compliance reports must cover the applicable 2-, or 5-year periods from January 1 to December 31. **(40 CFR 63.7550(b)(3))**
   d. Biennial, and 5-year compliance reports must be postmarked or submitted no later than March 15. **(40 CFR 63.7550(b)(4), 40 CFR 63.7550(b)(5))**

5. The permittee must include the following information in the compliance report. **(40 CFR 63.7550(c), 40 CFR 63.7550(c)(1))**
   a. Company and Facility name and address. **(40 CFR 63.7550(c)(5)(i))**
   b. Process unit information, emissions limitations, and operating parameter limitations. **(40 CFR 63.7550(c)(5)(ii))**
   c. Date of report and beginning and ending dates of the reporting period. **(40 CFR 63.7550(c)(5)(iii))**
   d. Include the date of the most recent tune-up for each unit. Include the date of the most recent burner inspection if it was not done biennially or on a 5-year period and was delayed until the next scheduled or unscheduled unit shutdown. **(40 CFR 63.7550(c)(5)(xiv))**
   e. Statement by a responsible official with that official's name, title, and signature, certifying the truth, accuracy, and completeness of the content of the report. **(40 CFR 63.7550(c)(5)(xvii)**

6. The permittee must submit the reports according to the procedures specified in paragraph (h)(3) of 40 CFR 63.7550, as listed below. **(40 CFR 63.7550(h))**
   a. The permittee must submit all reports required by Table 9 of 40 CFR Part 63, Subpart DDDDD electronically to the EPA via the Compliance and Emissions Data Reporting Interface (CEDRI). (CEDRI can be accessed through the EPA's CDX.) The permittee must use the appropriate electronic report in CEDRI for 40 CFR Part 63, Subpart DDDDD. Instead of using the electronic report in CEDRI for 40 CFR Part 63, Subpart DDDDD, the permittee may submit an alternate electronic file consistent with the XML schema listed on the CEDRI Web site (*http://www.epa.gov/ttn/chief/cedri/index.html*), once the XML schema is available. If the reporting form specific to 40 CFR Part 63, Subpart DDDDD is not available in CEDRI at the time that the report is due, the permittee must submit the report to the Administrator at the appropriate address listed in 40 CFR 63.13. The permittee must begin submitting reports via CEDRI no later than 90-days after the form becomes available in CEDRI. **(40 CFR 63.7550(h)(3))**

See Appendix 8

VIII. STACK/VENT RESTRICTION(S)

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NA

IX. OTHER REQUIREMENT(S)

1. The permittee must be in compliance with the applicable work practice standards. **(40 CFR 63.7505(a))**

2. For affected sources (as defined in 40 CFR 63.7490) that have not operated since the previous compliance demonstration and more than one year has passed since the previous compliance demonstration, the permittee must complete a subsequent tune-up within 30 days of startup by following the procedures described in SC IX 3.a through 3.f. **(40 CFR 63.7515(g))**

3. The permittee must demonstrate continuous compliance with the tune-up requirement by completing the following: **(40 CFR 63.7540(a))**
   a. Inspect the burner, and clean or replace any components of the burner as necessary (the permittee may perform the burner inspection any time prior to tune-up or delay the burner inspection until the next scheduled unit shutdown). At units where entry into a piece of process equipment or into a storage vessel is required to complete the tune-up inspections, inspections are required only during planned entries into the storage vessel or process equipment. **(40 CFR 63.7540(a)(10)(i))**
   b. Inspect the flame pattern, as applicable, and adjust the burner as necessary to optimize the flame pattern. The adjustment should be consistent with the manufacturer's specifications, if available. **(40 CFR 63.7540(a)(10)(ii))**
   c. Inspect the system controlling the air-to-fuel ratio, as applicable, and ensure that it is correctly calibrated and functioning properly (the permittee may delay the inspection until the next scheduled unit shutdown). Units that produce electricity for sale may delay the inspection until the first outage, not to exceed 36 months from the previous inspection. **(40 CFR 63.7540(a)(10)(iii))**
   d. Optimize total emissions of CO. This optimization should be consistent with the manufacturer's specifications, if available, and with any NO_x requirement to which the unit is subject. **(40 CFR 63.7540(a)(10)(iv))**
   e. Measure the concentrations in the effluent stream of CO in parts per million, by volume, and oxygen in volume percent, before and after the adjustments are made (measurements may be either on a dry or wet basis, as long as it is the same basis before and after the adjustments are made). Measurements may be taken using a portable CO analyzer. **(40 CFR 63.7540(a)(10)(v))**
   f. Maintain on-site and submit, if requested by the Administrator, the most recent periodic report containing the information as listed below. **(40 CFR 63.7540(a)(10)(vi))**
      i. The concentrations of CO in the effluent stream in parts per million by volume, and oxygen in volume percent, measured at high fire or typical operating load, before and after the tune-up of the boiler or process heater. **(40 CFR 63.7540(a)(10)(vi)(A))**
      ii. A description of any corrective actions taken as a part of the tune-up. **(40 CFR 63.7540(a)(10)(vi)(B))**
      iii. The type and amount of fuel used over the 12 months prior to the tune-up, but only if the unit was physically and legally capable of using more than one type of fuel during that period. Units sharing a fuel meter may estimate the fuel used by each unit. **(40 CFR 63.7540(a)(10)(vi)(C))**

4. If the boiler or process heater has a heat input capacity of less than or equal to 5 million Btu per hour, the permittee may delay the burner inspection specified in SC IX 3.a until the next scheduled or unscheduled unit shutdown, but the permittee must inspect each burner at least once every 72 months. If an oxygen trim system is utilized on a unit without emission standards to reduce the tune-up frequency to once every 5 years, set the oxygen level no lower than the oxygen concentration measured during the most recent tune-up.
(40 CFR 63.7540(a)(12))

Footnotes:

[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

~~DESCRIPTION~~

~~EU CS12HEATER-A (7.5 MMBtu/hr), EU CS12HEATER-B (7.5 MMBtu/hr), and EU CS12BOILER (2.51 MMBtu/hr) are subject to 40 CFR, Part 63, Subpart DDDDD National Emission Standard for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters.~~

~~Emission Unit:~~
~~EU CS12HEATER-A, EU CS12HEATER-B and EU CS12BOILER.~~

~~POLLUTION CONTROL EQUIPMENT~~ NA

~~I. EMISSION LIMIT(S)~~

~~Pollutant~~	~~Limit~~	~~Time Period/ Operating Scenario~~	~~Equipment~~	~~Monitoring/ Testing Method~~	~~Underlying Applicable Requirements~~
~~NA~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~

~~II. MATERIAL LIMIT(S)~~

~~Material~~	~~Limit~~	~~Time Period/ Operating Scenario~~	~~Equipment~~	~~Monitoring/ Testing Method~~	~~Underlying Applicable Requirements~~
~~NA~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~

~~III. PROCESS/OPERATIONAL RESTRICTION(S)~~

~~NA~~

~~IV. DESIGN/EQUIPMENT PARAMETER(S)~~

~~NA~~

~~V. TESTING/SAMPLING~~

~~Records shall be maintained on file for a period of five years.~~ **~~(R 336.1213(3)(b)(ii))~~**

1. ~~The permittee must conduct an initial performance tune-up no later than January 31, 2016 for EU CS12HEATER-A and EU CS12HEATER-B according to § 63.7540(a)(11). Subsequent biennial tune-ups must be conducted no more than 25 months after the previous tune-up.~~ **~~(40 CFR 63.7510(e), 40 CFR 63.7515(d), 40 CFR 63.7540(a)(11), 40 CFR, Part 63, Subpart DDDDD, Table 3.2)~~**

2. ~~The permittee must conduct an initial performance tune-up no later than January 31, 2016 for EU CS12BOILER according to § 63.7540(a)(12). Subsequent 5-year tune-ups must be conducted no more than 61 months after the previous tune-up.~~ **~~(40 CFR 63.7510(e), 40 CFR 63.7515(d), 40 CFR 63.7540(a)(12), 40 CFR, Part 63, Subpart DDDDD, Table 3.1)~~**

~~3. The permittee shall complete a one-time energy assessment specified in Table 3.4 (a) through (h) no later than January 31, 2016 for all Emission Units in FG CS12DDDDD. An energy assessment completed on or after January 1, 2008, that meets or is amended to meet the energy assessment requirements, satisfies the energy assessment requirement. A facility that operates under an energy management program compatible with ISO 50001 that includes the affected units also satisfies the energy assessment requirement. The energy assessment must include the following:~~
   - ~~a. A visual inspection of the boiler or process heater system.~~
   - ~~b. An evaluation of operating characteristics of the boiler or process heater systems, specifications of energy using systems, operating and maintenance procedures, and unusual operating constraints.~~
   - ~~c. An inventory of major energy use systems consuming energy from affected boilers and process heaters and which are under the control of the boiler/process heater owner/operator.~~
   - ~~d. A review of available architectural and engineering plans, facility operation and maintenance procedures and logs, and fuel usage.~~
   - ~~e. A review of the facility's energy management, and provide recommendations for improvements consistent with the definition of energy management practices, if identified.~~
   - ~~f. A list of cost-effective energy conservation measures that are within the facility's control.~~
   - ~~g. A list of the energy savings potential of the energy conservation measures identified.~~
   - ~~h. A comprehensive report detailing the ways to improve efficiency, the cost of specific improvements, benefits, and the time frame for recouping those investments.~~
     ~~**(40 CFR 63.7510(e), 40 CFR, Part 63, Subpart DDDDD, Table 3.4)**~~

~~VI. MONITORING/RECORDKEEPING~~

~~Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**~~

~~1. The permittee shall maintain a copy of each notification and report submitted to comply with 40 CFR, Part 63, Subpart DDDDD including all documentation supporting any Initial Notification or Notification of Compliance Status or Semiannual Compliance report that was submitted, according to the requirements in § 63.10(b)(2)(xiv) and any records of performance tests, fuel analyses, or other compliance demonstrations and performance evaluations as required in § 63.10(b)(2)(viii). **(40 CFR 63.7555)**~~

~~VII. REPORTING~~

~~1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**~~

~~2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**~~

~~3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**~~

~~4. A compliance report containing the information below shall be submitted with the annual certification of compliance in VII.3 above. The compliance report for EU CS12HEATER-A and EU CS12HEATER-B is due every two years starting in 2018. The compliance report for CS12BOILER is due every five years starting in 2021. **(40 CFR 63.7550(B), 40 CFR 63.7550(c)(5))**~~
   - ~~a. Company and Facility name and address.~~
   - ~~b. Process unit information, emissions limitations, and operating parameter limitations.~~
   - ~~c. Date of report and beginning and ending dates of the reporting period.~~
   - ~~d. The total operating time during the reporting period.~~
   - ~~e. Include the date of the most recent tune-up for EURC01, EURC025, EURC016, EURC017 and EURC018. Include the date of the most recent burner inspection if it was not done annually, biennially, or on a 5-year period and was delayed until the next scheduled or unscheduled unit shutdown.~~

~~5. The permittee shall submit a Notification of Compliance Status (NOCS) following the initial compliance demonstration. The NOCS must contain the following: **(40 CFR 63.7530(d),(e), and (f), 40 CFR 63.7545(e))**~~
   ~~a. A description of each Emission Unit including identification of which subcategories the EU is in and the design heat input capacity of the EU~~
   ~~b. The following certifications of compliance, as applicable, and signed by a responsible official:~~
      ~~i. "This facility complies with the required initial tune-up according to the procedures in § 63.7540(a)(10)(i) through (vi)."~~
      ~~ii. "This facility has had an energy assessment performed according to § 63.7530(e) and is an accurate depiction of the facility at the time of the assessment."~~

~~**See Appendix 8**~~

~~VIII. STACK/VENT RESTRICTION(S)~~

~~The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:~~

~~**Stack & Vent ID**~~	~~**Maximum Exhaust Dimensions (inches)**~~	~~**Minimum Height Above Ground (feet)**~~	~~**Underlying Applicable Requirements**~~
~~NA~~	~~NA~~	~~NA~~	~~NA~~

~~IX. OTHER REQUIREMENT(S)~~

~~1. The permittee shall comply with all applicable provisions of the National Emission Standards for Hazardous Air Pollutants, as specified in 40 CFR, Part 63, Subpart A and Subpart DDDDD: Industrial, Commercial, and Institutional Boilers and Process Heaters no later than January 31, 2016. **(40 CFR, Part 63, Subpart DDDDD, 40 CFR 63.7495(b))**~~

~~**Footnotes:**~~
~~[1]This condition is state-only enforceable and was established pursuant to Rule 201(1)(b).~~
~~[2]This condition is federally enforceable and was established pursuant to Rule 201(1)(a).~~

FG CS12CMPRS
FLEXIBLE GROUP CONDITIONS

DESCRIPTION

Three natural gas-fired, 3,750, HP 4-stroke lean burn Ingersoll Rand 410 KVR IC compressor engine used to compress natural gas into the storage reservoir during injection, and into the pipeline during withdrawal.

Emission Units: EU CS12CMPR-A, EU CS12CMPR-B, EU CS12CMPR-C

POLLUTION CONTROL EQUIPMENT: Clean burn/lean burn system.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period/ Operating Scenario	Equipment	Monitoring/ Testing Method	Underlying Applicable Requirements
1. NOx	99.2 pph[2]	Test Protocol*	EU CS12CMPR-A, EU CS12CMPR-B, EU CS12CMPR-C (The limit applies to each individual compressor engine.)	V.1, VI.3, VI.4	**40 CFR 52.21, R 336.2802**

*Test protocol shall specify averaging time.

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The natural gas used as fuel for the compressor engines shall not contain more than 20 grains of total sulfur per 100 cubic feet of natural gas.[2] **(R 336.2803. R 336.2804, 40 CFR 52.21(c) and (d))**

2. The permittee shall operate the FG CS12CMPRS per the AQD approved malfunction abatement plan. **(R 336.1911)**

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. The NOx emission rate from the compressor engines shall not exceed 12 grams per brake horsepower hour at 100 percent speed and 100 percent torque.[2] **(40 CFR 52.21, R 336.1802)**

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. Once every five years the permittee shall conduct a stack test of NOx emissions on EU CS12CMPR-A, EU CS12CMPR-B, and EU CS12CMPR-C. **(R 336.1213(3)(a))** All testing, sampling analytical and calibration procedures used for any stack test program shall be performed in accordance with 40 CFR, Part 60, Appendix A, Methods 2, 3A, and 7E, or other acceptable reference methods approved by the AQD. **(R 336.1213(3)(a))**
3. Once every five years the permittee shall demonstrate compliance of the grains of total sulfur in the compressor engine fuel by testing the fuel. **(R 336.1119(i) and (dd))**

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall record the total fuel consumption for each compressor engine in FG CS12CMPRS for each calendar month. **(R 336.1213(3)(b))**

2. The permittee shall record the total engine hours of operation for each compressor engine in FG CS12CMPRS for each calendar month. **(R 336.1213(3)(b))**

3. The permittee shall calculate and record the NOx emissions in pounds per hour for each compressor engine in FG CS12CMPRS using the equation in Appendix 7B, or an alternate equation approved by the AQD, in conjunction with monitoring, testing or recordkeeping data. The permittee may calculate NOx emissions from each engine in FG CS12CMPRS by using an emission factor based on stack tests of the compressor engines. The emissions calculations shall be available to the AQD upon request by 15th of the following month. **(R 336.1213)**

4. The permittee shall recalculate the emission factor following the verification of emission rates from stack testing required in V. Testing. **(R 336.1213(3)(a))**

See Appendix 7B

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

4. The permittee shall submit two complete test protocols to the AQD, one to the Technical Programs Unit Supervisor and one to the District Supervisor for approval at least 30 days prior to the anticipated test date. The protocol shall describe the test method(s) and the maximum routine operating conditions, including targets for key operational parameters associated with air pollution control equipment to be monitored and recorded during testing.[2] **(R 336.12001(3))**

5. The permittee shall notify the AQD Technical Programs Unit Supervisor and the District Supervisor no less than 7 days prior to the anticipated test date. **(R 336.2001(4))**

6. The permittee shall submit two complete test reports of the test results to the AQD, one to the Technical Programs Unit Supervisor and one to the District Supervisor, within 60 days following the last date of the test. [2] **(R 336.2001(5))**

7. The permittee shall submit a complete analysis plan to the AQD District Supervisor for approval at least 30 days prior to the anticipated analysis date. **(R 336.1119(i) and (dd))**

8. The permittee shall submit a complete report of the analysis results to the AQD District Supervisor, within 60 days following the last date of the test. **(R 336.1119(i) and (dd))**

See Appendix 8

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	Maximum Exhaust Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
1. SV001 (EU CS12CMPR-A)	30[2]	49.2[2]	**40 CFR 52.21, R 336.2802**
2. SV002 (EU CS12CMPR-B*)*	30[2]	49.2[2]	**40 CFR 52.21, R 336.2802**
3. SV003 (EU CS12CMPR-C)	30[2]	49.2[2]	**40 CFR 52.21, R 336.2802**

IX. OTHER REQUIREMENT(S)

1. The permittee shall maintain a malfunction abatement plan approved by the AQD District Supervisor in accordance with Rule 336.1911 for FG CS12CMPRS.[2] **(R 336.1911)**

Footnotes:

[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b)

[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a)

FG CS12ZZZZ EMERGENCY GENERATOR~~S~~
FLEXIBLE GROUP CONDITIONS

DESCRIPTION:

~~Two~~ One 580 horsepower 4-stroke rich burn Waukesha VHP5108G emergency generator~~s~~. The emission unit~~s~~ ~~are~~ is subject to 40 CFR, Part 63, Subpart ZZZZ.

Emission Units: ~~EU CS12EMRGEN-A and~~ EU CS12EMRGEN-B

POLLUTION CONTROL EQUIPMENT NA

I. EMISSION LIMIT(S)

NA

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee shall operate ~~EU CS12EMRGEN-A and~~ EU CS12EMRGEN-B in a manner consistent with safety and good air pollution control practices for minimizing emissions. Determination of whether such operation and maintenance procedures are being used will be based on information available to the AQD which may include, but is not limited to, monitoring results, review of operations and maintenance procedures, review of operation and maintenance records, and inspections of the source. **(40 CFR 63.6605(b))**

2. The permittee has no time limit on the use of ~~EU CS12EMRGEN-A and~~ EU CS12EMRGEN-B in emergency situations. **(40 CFR 63.6640(f)(1))**

3. The permittee may operate ~~EU CS12EMRGEN-A and~~ EU CS12EMRGEN-B for any combination of purposes specified below for a maximum of 100 hours per calendar year. **(40 CFR 63.6640(f)(2))**
   a. For maintenance checks and readiness testing, provided that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. The permittee may petition the AQD for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the permittee maintains records indicating that federal, state, or local standards require maintenance and testing of emergency reciprocating internal combustion engines (RICE) beyond 100 hours per calendar year.
   b. Emergency stationary RICE may be operated for emergency demand response for periods in which the Reliability Coordinator under the North American Electric Reliability Corporation (NERC) Reliability Standard EOP–002–3, Capacity and Energy Emergencies or other authorized entity as determined by the Reliability Coordinator, has declared an Energy Emergency Alert Level 2.
   c. Emergency stationary RICE may be operated for periods where there is a deviation of voltage or frequency of 5 percent or greater below standard voltage or frequency.

4. The permittee may operate ~~EU CS12EMRGEN-A and~~ EU CS12EMRGEN-B for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing and emergency demand response provided in III.3 above. The 50 hours per year for non-emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to supply power to an electric grid or otherwise supply power as part of a financial arrangement with another entity. **(40 CFR 63.6640(f)(3))**

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. The permittee shall equip ~~EU CS12EMRGEN-A and~~ EU CS12EMRGEN-B with a non-resettable hour meter. **(R 336.1213(3))**

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

NA

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall record the hours of operation of ~~EU CS12EMRGEN-A and~~ EU CS12EMRGEN-B per calendar year. **(R 336.1213(3))**

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**
2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**
3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**
4. If ~~EU CS12EMRGEN-A and~~ EU CS12EMRGEN-B operates or ~~are~~ is contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in Condition III.3 b or c, the permittee shall submit an annual report according to the requirements below. **(40 CFR 63.6650(h)(1)(2)(3))**
   a. The report must contain the following information:
      i. Company name and address where the engine is located.
      ii. Date of the report and beginning and ending dates of the reporting period.5
      iii. Engine site rating and model year.
      iv. Latitude and longitude of the engine in decimal degrees reported to the fifth decimal place.
      v. Hours operated for purposes in Condition III.3 b or c, including the date, start time, and end time for engine operation.
      vi. Number of hours the engine is contractually obligated to be available for purposes in Condition III.3 b or c.
      vii. Hours spent for operation for purposes in Condition III.3 b or c, including the date, start time, and end time for engine operation. The report must also identify the entity that dispatched the engine and the situation that necessitated the dispatch of the engine.
   b. The first annual report must cover the calendar year 2015 and must be submitted no later than March 31, 2016. Subsequent annual reports for each calendar year must be submitted no later than March 31 of the following calendar year.
   c. The annual report must be submitted electronically using the subpart specific reporting form in the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) (www.epa.gov/cdx). However, if the reporting form specific to this subpart is not available in CEDRI at the time that the report is due, the written report must be submitted to the Administrator at the appropriate address listed in 40 CFR 63.13.

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted.

Stack & Vent ID	Maximum Exhaust Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
NA	NA	NA	NA

IX. OTHER REQUIREMENT(S)

1. The permittee shall comply with all applicable provisions of the National Emission Standards for Hazardous Air Pollutants as specified in 40 CFR, Part 63, Subparts A and ZZZZ, as they apply to ~~EUSCGEN001~~EU CS12EMRGEN-B. **(40 CFR, Part 63, Subparts A and ZZZZ)**

Footnotes:

[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).
[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

E. NON-APPLICABLE REQUIREMENTS

At the time of the ROP issuance, the AQD has determined that no non-applicable requirements have been identified for incorporation into the permit shield provision set forth in the General Conditions in Part A pursuant to Rule 213(6)(a)(ii).

APPENDICES

Appendix 1-S1. Abbreviations and Acronyms

AQD	Air Quality Division	MM	Million
acfm	Actual cubic feet per minute	MSDS	Material Safety Data Sheet
BACT	Best Available Control Technology	MW	Megawatts
BTU	British Thermal Unit	NA	Not Applicable
°C	Degrees Celsius	NAAQS	National Ambient Air Quality Standards
CAA	Federal Clean Air Act	NESHAP	National Emission Standard for Hazardous Air Pollutants
CAM	Compliance Assurance Monitoring	NMOC	Non-methane Organic Compounds
CEM	Continuous Emission Monitoring	NOx	Oxides of Nitrogen
CFR	Code of Federal Regulations	NSPS	New Source Performance Standards
CO	Carbon Monoxide	NSR	New Source Review
COM	Continuous Opacity Monitoring	PM	Particulate Matter
department	Michigan Department of Environmental Quality	PM-10	Particulate Matter less than 10 microns in diameter
dscf	Dry standard cubic foot	pph	Pound per hour
dscm	Dry standard cubic meter	ppm	Parts per million
EPA	United States Environmental Protection Agency	ppmv	Parts per million by volume
EU	Emission Unit	ppmw	Parts per million by weight
°F	Degrees Fahrenheit	PS	Performance Specification
FG	Flexible Group	PSD	Prevention of Significant Deterioration
GACS	Gallon of Applied Coating Solids	psia	Pounds per square inch absolute
GC	General Condition	psig	Pounds per square inch gauge
gr	Grains	PeTE	Permanent Total Enclosure
HAP	Hazardous Air Pollutant	PTI	Permit to Install
Hg	Mercury	RACT	Reasonable Available Control Technology
hr	Hour	ROP	Renewable Operating Permit
HP	Horsepower	SC	Special Condition
H_2S	Hydrogen Sulfide	scf	Standard cubic feet
HVLP	High Volume Low Pressure *	sec	Seconds
ID	Identification (Number)	SCR	Selective Catalytic Reduction
IRSL	Initial Risk Screening Level	SO_2	Sulfur Dioxide
ITSL	Initial Threshold Screening Level	SRN	State Registration Number
LAER	Lowest Achievable Emission Rate	TAC	Toxic Air Contaminant
lb	Pound	Temp	Temperature
m	Meter	THC	Total Hydrocarbons
MACT	Maximum Achievable Control Technology	tpy	Tons per year
MAERS	Michigan Air Emissions Reporting System	µg	Microgram
MAP	Malfunction Abatement Plan	VE	Visible Emissions
MDEQ	Michigan Department of Environmental Quality	VOC	Volatile Organic Compounds
mg	Milligram	yr	Year
mm	Millimeter		

*For HVLP applicators, the pressure measured at the gun air cap shall not exceed 10 pounds per square inch gauge (psig).

Appendix 2-S1. Schedule of Compliance

The permittee certified in the ROP application that this stationary source is in compliance with all applicable requirements and the permittee shall continue to comply with all terms and conditions of this ROP. A Schedule of Compliance is not required. **(R 336.1213(4)(a), R 336.1119(a)(ii))**

Appendix 3-S1. Monitoring Requirements

Specific monitoring requirement procedures, methods or specifications are detailed in Part A or the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, this appendix is not applicable.

Appendix 4-S1. Recordkeeping

Specific recordkeeping requirement formats and procedures are detailed in Part A or the appropriate source-wide, emission unit and/or flexible group special conditions. Therefore, this appendix is not applicable.

Appendix 5-S1. Testing Procedures

Specific testing requirement plans, procedures, and averaging times are detailed in the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, this appendix is not applicable.

Appendix 6-S1. Permits to Install

The following table lists any PTIs issued or ROP revision applications received since the effective date of the previously issued ROP No. MI-ROP-B7198-2008. Those ROP revision applications that are being issued concurrently with this ROP renewal are identified by an asterisk (*). Those revision applications not listed with an asterisk were processed prior to this renewal.

Source-Wide PTI No MI-PTI-B7198-2008 is being reissued as Source-Wide PTI No. MI-PTI-B7198-2014

Permit to Install Number	ROP Revision Application Number	Description of Equipment or Change	Corresponding Emission Unit(s) or Flexible Group(s)
79-97B	201300051	EU CS12GLYDHY Define sweet natural gas as containing no more than 1 grain of hydrogen sulfide or 10 grains of total sulfur per 100 standard cubic feet. Require analysis of the pre-dehydration natural gas to determine its non-methane VOC content and composition once every five years. Require compliance with applicable conditions from 40 CFR, Part 63, Subpart HHH. FG CS12CMPRS Define natural gas used as not containing more than 20 grains of total sulfur per 100 cubic feet of natural gas.	EU CS12GLYDHY, FG CS12CMPRS

Appendix 7-S1. Emission Calculations

Appendix 7A. EU CS12HHH

The permittee shall use the following equation, or alternate equation approved by the AQD, in conjunction with monitoring, testing or recordkeeping data to determine compliance with the emission limit of BTEX referenced in EU CS12HHH-S1, I.1, BTEX emissions (40 CFR 63.1275 equation 1).

$$EL_{BTEX} = 3.10x10^{-4} * Throughput * C_{i,BTEX} * 365\ \frac{days}{yr} * \frac{1\ Mg}{1x10^{6}\ grams} \qquad \text{Equation 1}$$

Where:

EL_{BTEX} = Unit-specific BTEX emission limit, megagrams per year;

3.10×10^{-4} = BTEX emission limit, grams BTEX/standard cubic meter-ppmv;

Throughput = Annual average daily natural gas throughput, standard cubic meters per day;

$C_{i,BTEX}$ = Annual average BTEX concentration of the natural gas at the inlet to the glycol dehydration unit, ppmv.

Appendix 7B. FG CS12CMPRS

The permittee shall calculate and record the NOx emissions in pounds per hour for each engine in FG CS12CMPRS using this equation, or an alternate equation approved by the AQD, in conjunction with monitoring, testing or recordkeeping data. The permittee may calculate NOx emissions from each engine in FG CS12CMPRS by using an emission factor based on stack tests of the compressor engines.

NOX (lb/hr) = natural gas usage (mmscf/month)/engine operation (hrs/month) X EF (lb NOx/mmscf)

Where:

mmscf is million standard cubic feet

EF is an emission factor expressed as pounds of NOx emitted per million cubic feet of gas used as fuel. EF shall be periodically recalculated as more current stack tests become available. The recalculated EF is subject to approval by the District Supervisor of the AQD.

Appendix 8-S1. Reporting

A. Annual, Semiannual, and Deviation Certification Reporting

The permittee shall use the MDEQ Report Certification form (EQP 5736) and MDEQ Deviation Report form (EQP 5737) for the annual, semiannual and deviation certification reporting referenced in the Reporting Section of the Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Alternative formats must meet the provisions of Rule 213(4)(c) and Rule 213(3)(c)(i), respectively, and be approved by the AQD District Supervisor.

B. Other Reporting

Specific reporting requirement formats and procedures are detailed in Part A or the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, Part B of this appendix is not applicable.

SECTION 2 – BLUE LAKE GAS STORAGE COMPANY

A. GENERAL CONDITIONS

Permit Enforceability

- All conditions in this permit are both federally enforceable and state enforceable unless otherwise noted. **(R 336.1213(5))**

- Those conditions that are hereby incorporated in a state-only enforceable Source-Wide PTI pursuant to Rule 201(2)(d) are designated by footnote one. **(R 336.1213(5)(a), R 336.1214a(5))**

- Those conditions that are hereby incorporated in a federally enforceable Source-Wide PTI pursuant to Rule 201(2)(c) are designated by footnote two. **(R 336.1213(5)(b), R 336.1214a(3))**

General Provisions

1. The permittee shall comply with all conditions of this ROP. Any ROP noncompliance constitutes a violation of Act 451, and is grounds for enforcement action, for ROP revocation or revision, or for denial of the renewal of the ROP. All terms and conditions of this ROP that are designated as federally enforceable are enforceable by the Administrator of the United States Environmental Protection Agency (USEPA) and by citizens under the provisions of the federal Clean Air Act (CAA). Any terms and conditions based on applicable requirements which are designated as “state-only” are not enforceable by the USEPA or citizens pursuant to the CAA. **(R 336.1213(1)(a))**

2. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this ROP. **(R 336.1213(1)(b))**

3. This ROP may be modified, revised, or revoked for cause. The filing of a request by the permittee for a permit modification, revision, or termination, or a notification of planned changes or anticipated noncompliance does not stay any ROP term or condition. This does not supersede or affect the ability of the permittee to make changes, at the permittee’s own risk, pursuant to Rule 215 and Rule 216. **(R 336.1213(1)(c))**

4. The permittee shall allow the department, or an authorized representative of the department, upon presentation of credentials and other documents as may be required by law and upon stating the authority for and purpose of the investigation, to perform any of the following activities **(R 336.1213(1)(d))**:
   a. Enter, at reasonable times, a stationary source or other premises where emissions-related activity is conducted or where records must be kept under the conditions of the ROP.
   b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of the ROP.
   c. Inspect, at reasonable times, any of the following:
      i. Any stationary source.
      ii. Any emission unit.
      iii. Any equipment, including monitoring and air pollution control equipment.
      iv. Any work practices or operations regulated or required under the ROP.
   d. As authorized by Section 5526 of Act 451, sample or monitor at reasonable times substances or parameters for the purpose of assuring compliance with the ROP or applicable requirements.

5. The permittee shall furnish to the department, within a reasonable time, any information the department may request, in writing, to determine whether cause exists for modifying, revising, or revoking the ROP or to determine compliance with this ROP. Upon request, the permittee shall also furnish to the department copies of any records that are required to be kept as a term or condition of this ROP. For information which is claimed by the permittee to be confidential, consistent with the requirements of the 1976 PA 442, MCL §15.231 et seq.,

and known as the Freedom of Information Act, the person may also be required to furnish the records directly to the USEPA together with a claim of confidentiality. **(R 336.1213(1)(e))**

6. A challenge by any person, the Administrator of the USEPA, or the department to a particular condition or a part of this ROP shall not set aside, delay, stay, or in any way affect the applicability or enforceability of any other condition or part of this ROP. **(R 336.1213(1)(f))**

7. The permittee shall pay fees consistent with the fee schedule and requirements pursuant to Section 5522 of Act 451. **(R 336.1213(1)(g))**

8. This ROP does not convey any property rights or any exclusive privilege. **(R 336.1213(1)(h))**

Equipment & Design

9. Any collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in Rule 370(2). **(R 336.1370)**

10. Any air cleaning device shall be installed, maintained, and operated in a satisfactory manner and in accordance with the Michigan Air Pollution Control rules and existing law. **(R 336.1910)**

Emission Limits

11. Unless otherwise specified in this ROP, the permittee shall comply with Rule 301, which states, in part, "Except as provided in subrules 2, 3, and 4 of this rule, a person shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of a density greater than the most stringent of the following: **(R 336.1301(1))**
    a. A 6-minute average of 20 percent opacity, except for one 6-minute average per hour of not more than 27 percent opacity.
    b. A limit specified by an applicable federal new source performance standard.

    The grading of visible emissions shall be determined in accordance with Rule 303.

12. The permittee shall not cause or permit the emission of an air contaminant or water vapor in quantities that cause, alone or in reaction with other air contaminants, either of the following:
    a. Injurious effects to human health or safety, animal life, plant life of significant economic value, or property.[1] **(R 336.1901(a))**
    b. Unreasonable interference with the comfortable enjoyment of life and property.[1] **(R 336.1901(b))**

Testing/Sampling

13. The department may require the owner or operator of any source of an air contaminant to conduct acceptable performance tests, at the owner's or operator's expense, in accordance with Rule 1001 and Rule 1003, under any of the conditions listed in Rule 1001(1). **(R 336.2001)**

14. Any required performance testing shall be conducted in accordance with Rule 1001(2), Rule 1001(3) and Rule 1003. **(R 336.2001(2), R 336.2001(3), R 336.2003(1))**

15. Any required test results shall be submitted to the Air Quality Division (AQD) in the format prescribed by the applicable reference test method within 60 days following the last date of the test. **(R 336.2001(5))**

Monitoring/Recordkeeping

16. Records of any periodic emission or parametric monitoring required in this ROP shall include the following information specified in Rule 213(3)(b)(i), where appropriate **(R 336.1213(3)(b))**:
    a. The date, location, time, and method of sampling or measurements.
    b. The dates the analyses of the samples were performed.
    c. The company or entity that performed the analyses of the samples.
    d. The analytical techniques or methods used.
    e. The results of the analyses.
    f. The related process operating conditions or parameters that existed at the time of sampling or measurement.

17. All required monitoring data, support information and all reports, including reports of all instances of deviation from permit requirements, shall be kept and furnished to the department upon request for a period of not less than 5 years from the date of the monitoring sample, measurement, report or application. Support information includes all calibration and maintenance records and all original strip-chart recordings, or other original data records, for continuous monitoring instrumentation and copies of all reports required by the ROP. **(R 336.1213(1)(e), R 336.1213(3)(b)(ii))**

Certification & Reporting

18. Except for the alternate certification schedule provided in Rule 213(3)(c)(iii)(B), any document required to be submitted to the department as a term or condition of this ROP shall contain an original certification by a Responsible Official which states that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete. **(R 336.1213(3)(c))**

19. A Responsible Official shall certify to the appropriate AQD District Office and to the USEPA that the stationary source is and has been in compliance with all terms and conditions contained in the ROP except for deviations that have been or are being reported to the appropriate AQD District Office pursuant to Rule 213(3)(c). This certification shall include all the information specified in Rule 213(4)(c)(i) through (v) and shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the certification are true, accurate, and complete. The USEPA address is: USEPA, Air Compliance Data - Michigan, Air and Radiation Division, 77 West Jackson Boulevard, Chicago, Illinois 60604. **(R 336.1213(4)(c))**

20. The certification of compliance shall be submitted annually for the term of this ROP as detailed in the special conditions, or more frequently if specified in an applicable requirement or in this ROP. **(R 336.1213(4)(c))**

21. The permittee shall promptly report any deviations from ROP requirements and certify the reports. The prompt reporting of deviations from ROP requirements is defined in Rule 213(3)(c)(ii) as follows, unless otherwise described in this ROP. **(R 336.1213(3)(c))**
    a. For deviations that exceed the emissions allowed under the ROP, prompt reporting means reporting consistent with the requirements of Rule 912 as detailed in Condition 25. All reports submitted pursuant to this paragraph shall be promptly certified as specified in Rule 213(3)(c)(iii).
    b. For deviations which exceed the emissions allowed under the ROP and which are not reported pursuant to Rule 912 due to the duration of the deviation, prompt reporting means the reporting of all deviations in the semiannual reports required by Rule 213(3)(c)(i). The report shall describe reasons for each deviation and the actions taken to minimize or correct each deviation.
    c. For deviations that do not exceed the emissions allowed under the ROP, prompt reporting means the reporting of all deviations in the semiannual reports required by Rule 213(3)(c)(i). The report shall describe the reasons for each deviation and the actions taken to minimize or correct each deviation.

22. For reports required pursuant to Rule 213(3)(c)(ii), prompt certification of the reports is described in Rule 213(3)(c)(iii) as either of the following **(R 336.1213(3)(c))**:

   a. Submitting a certification by a Responsible Official with each report which states that, based on information and belief formed after reasonable inquiry, the statements and information in the report are true, accurate, and complete.
   b. Submitting, within 30 days following the end of a calendar month during which one or more prompt reports of deviations from the emissions allowed under the ROP were submitted to the department pursuant to Rule 213(3)(c)(ii), a certification by a Responsible Official which states that, “based on information and belief formed after reasonable inquiry, the statements and information contained in each of the reports submitted during the previous month were true, accurate, and complete”. The certification shall include a listing of the reports that are being certified. Any report submitted pursuant to Rule 213(3)(c)(ii) that will be certified on a monthly basis pursuant to this paragraph shall include a statement that certification of the report will be provided within 30 days following the end of the calendar month.

23. Semiannually for the term of the ROP as detailed in the special conditions, or more frequently if specified, the permittee shall submit certified reports of any required monitoring to the appropriate AQD District Office. All instances of deviations from ROP requirements during the reporting period shall be clearly identified in the reports. **(R 336.1213(3)(c)(i))**

24. On an annual basis, the permittee shall report the actual emissions, or the information necessary to determine the actual emissions, of each regulated air pollutant as defined in Rule 212(6) for each emission unit utilizing the emissions inventory forms provided by the department. **(R 336.1212(6))**

25. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the appropriate AQD District Office. The notice shall be provided not later than two business days after the start-up, shutdown, or discovery of the abnormal conditions or malfunction. Notice shall be by any reasonable means, including electronic, telephonic, or oral communication. Written reports, if required under Rule 912, must be submitted to the appropriate AQD District Supervisor within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal conditions or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5) and shall be certified by a Responsible Official in a manner consistent with the CAA. **(R 336.1912)**

Permit Shield

26. Compliance with the conditions of the ROP shall be considered compliance with any applicable requirements as of the date of ROP issuance, if either of the following provisions is satisfied. **(R 336.1213(6)(a)(i), R 336.1213(6)(a)(ii))**
   a. The applicable requirements are included and are specifically identified in the ROP.
   b. The permit includes a determination or concise summary of the determination by the department that other specifically identified requirements are not applicable to the stationary source.

   Any requirements identified in Part E of this ROP have been identified as non-applicable to this ROP and are included in the permit shield.

27. Nothing in this ROP shall alter or affect any of the following:
   a. The provisions of Section 303 of the CAA, emergency orders, including the authority of the USEPA under Section 303 of the CAA. **(R 336.1213(6)(b)(i))**
   b. The liability of the owner or operator of this source for any violation of applicable requirements prior to or at the time of this ROP issuance. **(R 336.1213(6)(b)(ii))**

   c. The applicable requirements of the acid rain program, consistent with Section 408(a) of the CAA. **(R 336.1213(6)(b)(iii))**
   d. The ability of the USEPA to obtain information from a source pursuant to Section 114 of the CAA. **(R 336.1213(6)(b)(iv))**

28. The permit shield shall not apply to provisions incorporated into this ROP through procedures for any of the following:
    a. Operational flexibility changes made pursuant to Rule 215. **(R 336.1215(5))**
    b. Administrative Amendments made pursuant to Rule 216(1)(a)(i)-(iv). **(R 336.1216(1)(b)(iii))**
    c. Administrative Amendments made pursuant to Rule 216(1)(a)(v) until the amendment has been approved by the department. **(R 336.1216(1)(c)(iii))**
    d. Minor Permit Modifications made pursuant to Rule 216(2). **(R 336.1216(2)(f))**
    e. State-Only Modifications made pursuant to Rule 216(4) until the changes have been approved by the department. **(R 336.1216(4)(e))**

29. Expiration of this ROP results in the loss of the permit shield. If a timely and administratively complete application for renewal is submitted not more than 18 months, but not less than 6 months, before the expiration date of the ROP, but the department fails to take final action before the end of the ROP term, the existing ROP does not expire until the renewal is issued or denied, and the permit shield shall extend beyond the original ROP term until the department takes final action. **(R 336.1217(1)(c), R 336.1217(1)(a))**

Revisions

30. For changes to any process or process equipment covered by this ROP that do not require a revision of the ROP pursuant to Rule 216, the permittee must comply with Rule 215. **(R 336.1215, R 336.1216)**

31. A change in ownership or operational control of a stationary source covered by this ROP shall be made pursuant to Rule 216(1). **(R 336.1219(2))**

32. For revisions to this ROP, an administratively complete application shall be considered timely if it is received by the department in accordance with the time frames specified in Rule 216. **(R 336.1210(9))**

33. Pursuant to Rule 216(1)(b)(iii), Rule 216(2)(d) and Rule 216(4)(d), after a change has been made, and until the department takes final action, the permittee shall comply with both the applicable requirements governing the change and the ROP terms and conditions proposed in the application for the modification. During this time period, the permittee may choose to not comply with the existing ROP terms and conditions that the application seeks to change. However, if the permittee fails to comply with the ROP terms and conditions proposed in the application during this time period, the terms and conditions in the ROP are enforceable. **(R 336.1216(1)(c)(iii), R 336.1216(2)(d), R 336.1216(4)(d))**

Reopenings

34. A ROP shall be reopened by the department prior to the expiration date and revised by the department under any of the following circumstances:
    a. If additional requirements become applicable to this stationary source with three or more years remaining in the term of the ROP, but not if the effective date of the new applicable requirement is later than the ROP expiration date. **(R 336.1217(2)(a)(i))**
    b. If additional requirements pursuant to Title IV of the CAA become applicable to this stationary source. **(R 336.1217(2)(a)(ii))**
    c. If the department determines that the ROP contains a material mistake, information required by any applicable requirement was omitted, or inaccurate statements were made in establishing emission limits or the terms or conditions of the ROP. **(R 336.1217(2)(a)(iii))**
    d. If the department determines that the ROP must be revised to ensure compliance with the applicable requirements. **(R 336.1217(2)(a)(iv))**

Renewals

35. For renewal of this ROP, an administratively complete application shall be considered timely if it is received by the department not more than 18 months, but not less than 6 months, before the expiration date of the ROP. **(R 336.1210(7))**

Stratospheric Ozone Protection

36. If the permittee is subject to Title 40 of the Code of Federal Regulations (CFR), Part 82 and services, maintains, or repairs appliances except for motor vehicle air conditioners (MVAC), or disposes of appliances containing refrigerant, including MVAC and small appliances, or if the permittee is a refrigerant reclaimer, appliance owner or a manufacturer of appliances or recycling and recovery equipment, the permittee shall comply with all applicable standards for recycling and emissions reduction pursuant to 40 CFR, Part 82, Subpart F.

37. If the permittee is subject to 40 CFR, Part 82, and performs a service on motor (fleet) vehicles when this service involves refrigerant in the MVAC, the permittee is subject to all the applicable requirements as specified in 40 CFR, Part 82, Subpart B, Servicing of Motor Vehicle Air Conditioners. The term “motor vehicle” as used in Subpart B does not include a vehicle in which final assembly of the vehicle has not been completed by the original equipment manufacturer. The term MVAC as used in Subpart B does not include the air-tight sealed refrigeration system used for refrigerated cargo or an air conditioning system on passenger buses using Hydrochlorofluorocarbon-22 refrigerant.

Risk Management Plan

38. If subject to Section 112(r) of the CAA and 40 CFR, Part 68, the permittee shall register and submit to the USEPA the required data related to the risk management plan for reducing the probability of accidental releases of any regulated substances listed pursuant to Section 112(r)(3) of the CAA as amended in 40 CFR, Part 68.130. The list of substances, threshold quantities, and accident prevention regulations promulgated under 40 CFR, Part 68, do not limit in any way the general duty provisions under Section 112(r)(1).

39. If subject to Section 112(r) of the CAA and 40 CFR, Part 68, the permittee shall comply with the requirements of 40 CFR, Part 68, no later than the latest of the following dates as provided in 40 CFR, Part 68.10(a):
    a. June 21, 1999,
    b. Three years after the date on which a regulated substance is first listed under 40 CFR, Part 68.130, or
    c. The date on which a regulated substance is first present above a threshold quantity in a process.

40. If subject to Section 112(r) of the CAA and 40 CFR, Part 68, the permittee shall submit any additional relevant information requested by any regulatory agency necessary to ensure compliance with the requirements of 40 CFR, Part 68.

41. If subject to Section 112(r) of the CAA and 40 CFR, Part 68, the permittee shall annually certify compliance with all applicable requirements of Section 112(r) as detailed in Rule 213(4)(c)). **(40 CFR, Part 68)**

Emission Trading

42. Emission averaging and emission reduction credit trading are allowed pursuant to any applicable interstate or regional emission trading program that has been approved by the Administrator of the USEPA as a part of Michigan’s State Implementation Plan. Such activities must comply with Rule 215 and Rule 216. **(R 336.1213(12))**

Permit To Install (PTI)

43. The process or process equipment included in this permit shall not be reconstructed, relocated, or modified unless a PTI authorizing such action is issued by the department, except to the extent such action is exempt from the PTI requirements by any applicable rule. ^{2} **(R 336.1201(1))**

44. The department may, after notice and opportunity for a hearing, revoke PTI terms or conditions if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of the PTI or is violating the department's rules or the CAA. ^{2} **(R 336.1201(8), Section 5510 of Act 451)**

45. The terms and conditions of a PTI shall apply to any person or legal entity that now or hereafter owns or operates the process or process equipment at the location authorized by the PTI. If a new owner or operator submits a written request to the department pursuant to Rule 219 and the department approves the request, this PTI will be amended to reflect the change of ownership or operational control. The request must include all of the information required by Subrules (1)(a), (b) and (c) of Rule 219. The written request shall be sent to the appropriate AQD District Supervisor, MDEQ. ^{2} **(R 336.1219)**

46. If the installation, reconstruction, relocation, or modification of the equipment for which PTI terms and conditions have been approved has not commenced within 18 months of the original PTI issuance date, or has been interrupted for 18 months, the applicable terms and conditions from that PTI, as incorporated into the ROP, shall become void unless otherwise authorized by the department. Furthermore, the person to whom that PTI was issued, or the designated authorized agent, shall notify the department via the Supervisor, Permit Section, MDEQ, AQD, P. O. Box 30260, Lansing, Michigan 48909, if it is decided not to pursue the installation, reconstruction, relocation, or modification of the equipment allowed by the terms and conditions from that PTI. ^{2} **(R 336.1201(4))**

Footnotes:
[1] This condition is state-only enforceable and was established pursuant to Rule 201(1)(b).
[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

B. SOURCE-WIDE CONDITIONS

Part B outlines the Source-Wide Terms and Conditions that apply to this stationary source. The permittee is subject to these special conditions for the stationary source in addition to the general conditions in Part A and any other terms and conditions contained in this ROP.

The permittee shall comply with all specific details in the special conditions and the underlying applicable requirements cited. If a specific condition type does not apply to this source, NA (not applicable) has been used in the table. If there are no Source-Wide Conditions, this section will be left blank.

C. EMISSION UNIT CONDITIONS

Part C outlines terms and conditions that are specific to individual emission units listed in the Emission Unit Summary Table. The permittee is subject to the special conditions for each emission unit in addition to the General Conditions in Part A and any other terms and conditions contained in this ROP.

The permittee shall comply with all specific details in the special conditions and the underlying applicable requirements cited. If a specific condition type does not apply, NA (not applicable) has been used in the table. If there are no conditions specific to individual emission units, this section will be left blank.

EMISSION UNIT SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date/ Modification Date	Flexible Group ID
EU BLGLYDHY	The glycol dehydration system operates in ~~two modes (glycol injection and glycol absorption)~~glycol injection mode to remove water from the natural gas withdrawn from the storage reservoir. The glycol dehydrator has a condenser and a thermal oxidizer as control devices.	04/27/1994	NA
EU BLHHH	40 CFR, Part 63, Subpart HHH establishes national emission limitations and operating limitations for natural gas transmission and storage facilities that are major sources of HAP emissions. The rule affects facilities that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final user. Subpart HHH is applicable to EU BLGLYDHY. The glycol dehydrator has the option of using a condenser and/or thermal oxidizer to comply with this regulation.	10/15/15 Compliance date	NA
EU BLHEATER-A	A natural gas-fired Sivalls 16 MMBtu/hr indirect gas withdrawal heater. The emission unit does not have a control device.	04/27/1994	FG BLDDDDD
EU BLHEATER-B	A natural gas-fired Sivalls 16 MMBtu/hr indirect gas withdrawal heater. The emission unit does not have a control device.	04/27/1994	FG BLDDDDD

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date/ Modification Date	Flexible Group ID
EU BLBOILER	A natural gas-fired Cleaver-Brooks 4.184 MMBtu/hr boiler used for building and comfort heating throughout the facility. The emission unit does not have a control device.	Before 6/4/2010	FG BLDDDDD
EU BLCMPR-A	A natural gas-fired, 6,000, HP 2-stroke lean burn Dresser Rand TCVD-12 compressor engine used to compress natural gas into the storage reservoir during injection, and into the pipeline during withdrawal. Emission control includes a clean burn combustion system on the compressor engine.	04/27/1994	FG BLCMPRS
EU BLCMPR-B	A natural gas-fired, 6,000, HP 2-stroke lean burn Dresser Rand TCVD-12 compressor engine used to compress natural gas into the storage reservoir during injection, and into the pipeline during withdrawal. Emission control includes a clean burn combustion system on the compressor engine.	04/27/1994	FG BLCMPRS
EU BLCMPR-C	A natural gas-fired, 6,000 HP 2-stroke lean burn Dresser Rand TCVD-12 compressor engine used to compress natural gas into the storage reservoir during injection and into the pipeline during withdrawal. Emission control includes a clean burn combustion system on the compressor engine.	04/27/1994	FG BLCMPRS
EU BLGEN-A	A natural gas-fired 1,125 HP, 4-stroke lean burn Caterpillar 3516 generator engine used to provide primary power to the compressor station in the event of a power outage, and can produce a maximum of 800 KW of energy. The emission unit uses a catalyst as a control device.	04/27/1994	FG BLGENS
EU BLGEN-B	A natural gas-fired 1,125 HP, 4-stroke lean burn Caterpillar 3516 generator engine used to provide primary power to the compressor station in the event of a power outage, and can produce a maximum of 800 KW of energy. The emission unit uses a catalyst as a control device.	04/27/1994	FG BLGENS

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date/ Modification Date	Flexible Group ID
EU BLGEN-C	A natural gas-fired 1,125 HP, 4-stroke lean burn Caterpillar 3516 generator engine used to provide primary power to the compressor station in the event of a power outage, and can produce a maximum of 800 KW of energy. The emission unit uses a catalyst as a control device.	04/27/1994	FG BLGENS
EU BLCLEANER	Any parts washer/cold cleaner that is grandfathered or exempt from Rule 201 pursuant to Rule 278 and Rule 281(h) or Rule 285(r)(iv). Existing cold cleaners where placed into operation prior to July 1, 1979. New cold cleaners were placed into operation on or after July 1, 1979.	04/27/1994	FG BLCLEANERS

EU BLGLYDHY
EMISSION UNIT CONDITIONS

DESCRIPTION

The glycol dehydration system ~~can operate in two modes~~operates in glycol injection mode. Glycol injection occurs when a process called low temperature separation is used to remove liquids from the gas stream. ~~Di-ethylene glycol (DEG)~~Ethylene glycol (EG) is injected into the gas stream and mixes with the liquids to prevent freezing during low temperature separation. ~~Glycol absorption is used when low temperature separation does not adequately remove the liquids from the gas stream. DEG is circulated through a contactor tower countercurrent to the gas stream. The DEG absorbs the liquid from the gas stream during the glycol absorption process. During both modes of operation, the~~ The glycol enriched gas stream liquid is regenerated in a reboiler for continual use.

POLLUTION CONTROL EQUIPMENT Condenser and thermal oxidizer.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period/ Operating Scenario	Equipment	Monitoring/ Testing Method	Underlying Applicable Requirements
1. Benzene	Less than one tpy.^{2}	12 month rolling time period as determined at the end of each calendar month.	EU BLGLYDHY	V.1, VI.1, VI.3, VI.4	**R 336.1205(1), R 336.1702(a), R 336.1901**
2. VOC	28 lbs/day^2		EU BLGLYDHY	V.1, VI.2, VI.3, VI.4	**R 336.1205(1), R 336.1702(a), R 336.1901)**
3. VOC	5 tpy^2	12 month rolling time period as determined at the end of each calendar month.	EU BLGLYDHY	V.1, VI.1, VI.3, VI.4	**R 336.1205(1), R 336.1702(a), R 336.1901**

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S

1. The permittee shall not use stripping gas in EU BLGLYDHY.^{2} **(R 336.1205(1), R 336.1702(a), R 336.1901)**

2. The permittee shall not operate EU BLGLYDHY unless the glycol flash tank is installed and operating properly. A properly operating flash tank will volatilize organic compounds out of the rich glycol stream and route them to the re-boiler burner or thermal oxidizer for destruction.^{2} **(R 336.1205(1), R 336.1702(a), R 336.1901)**

3. Except as provided in the condition below, the permittee shall not operate EU BLGLYDHY unless the thermal oxidizer is installed and operating properly. Proper operation includes but is not limited to maintaining a minimum operating temperature of 1400°F, a minimum residence time of 0.5 seconds, and a VOC destruction

efficiency of at least 95 percent by weight.[2] **(R 336.1205(1), R 336.1702(a), R 336.1901)**

4. If the thermal oxidizer malfunctions, the permittee may operate EU BLGLYDHY provided the condenser is installed and operating properly. Proper operation includes maintaining a maximum condenser exhaust gas temperature of 80°F.[2] **(R 336.1205(1), R 336.1702(a), R 336.1901)**

5. Sweet natural gas shall be the only fuel supplied to and fired in EU BLGLYDHY. Sweet gas is defined as any gas containing no more than 1 grain of hydrogen sulfide or 10 grains of total sulfur per 100 standard cubic feet. However, the permittee may also incinerate emissions from the glycol flash tank in the glycol reboiler burner.[2] **(R 336.1119(i) and (dd))**

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. EU BLGLYDHY shall be equipped with a thermal oxidizer.[2] **(R 336.1702(a))**
2. EU BLGLYDHY shall be equipped with a condenser.[2] **(R 336.1702(a))**
3. EU BLGLYDHY shall be equipped with a flash tank. **(R 336.1702(a))**
4. EU BLGLYDHY thermal oxidizer and condenser shall each be equipped with working temperature monitors to continuously monitor the thermal oxidizer and condenser operating temperatures.[2] **(R 336.1702(a), R 336.1213(3))**
5. EU BLGLYDHY thermal oxidizer and condenser temperature monitor systems shall each be designed and equipped with alarm systems that will alarm if the operating temperature is less than 1400°F for the thermal oxidizer and greater than 80°F for the condenser.[2] **(R 336.1702(a), R 336.1213(3))**
6. The maximum flow rate from the glycol pump shall not exceed 60 gallons per minute.[2] **(R 336.1205(1), R 336.1702(a), R 336.1901)**

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years.[2] **(R 336.1213(3)(b)(ii))**

1. Once every five years the permittee shall analyze the pre-dehydration natural gas processed in EU BLGLYDHY to determine its VOC content and composition. The VOC composition of the natural gas shall be determined by a method or methods standard in the natural gas industry, subject to approval by the AQD.[2] **(R 336.1213(3)(a))**

2. Once every five years the permittee shall analyze the sweet natural gas fuel supplied to and fired in EU BLGLYDHY for grains of hydrogen sulfide or grains of total sulfur per 100 standard cubic feet.[2] **(R 336.1119(i) and (dd))**

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years.[2] **(R 336.1213(3)(b)(ii))**

1. The permittee shall calculate and record, in a satisfactory manner, monthly and 12–month rolling time period Benzene and VOC emissions in tons from EU BLGLYDHY. The emissions calculations shall be available to the AQD upon request by the 15th of the following month.[2] **(R 336.1205(1), R 336.1702(a), R 333.1901)**

2. The permittee shall calculate and record, in a satisfactory manner, VOC emissions in pounds per calendar day from EU CS12GLYDHY. The emissions calculations shall be available to the AQD upon request by the 15th of the following month.[2] **(R 336.1205(1), R 336.1702(a), R 333.1901)**

3. The permittee may calculate the Benzene and VOC emissions from EU BLGLYDHY by using the GRI-GLYCalc (tm) computer model, version 3.0 or later or other method acceptable to the AQD District Supervisor. Inputs to the model shall be representative of actual operating conditions of EU BLGLYDHY.[2] **(R 336.1205(1), R 336.1702(a), R 333.1901)**

4. The permittee shall recalculate the Benzene and VOC emissions each time the natural gas is analyzed to determine its VOC and Benzene content.[2] **(R 336.1205(1), R 336.1702(a), R 333.1901)**

5. When EU BLGLYDHY is operating, the permittee shall continuously monitor, and record daily, the temperature of the condenser and thermal oxidizer.[2] **(R 336.1205(1), R 336.1702(a), R 336.1901)**

6. The permittee shall monitor and record the alarm events actuated because the temperature limit of the condenser or thermal oxidizer was not met. The permittee shall record the action taken in response to an alarm event. (**R 336.1702(a))**

7. The permittee shall maintain, in a manner acceptable to the AQD, calculations showing VOC destruction efficiency of the thermal oxidizer is at least 95 percent by weight.[2] **(R 336.1205(1), R 336.1702(a), R 336.1901)**

8. The permittee shall monitor and record the amount of natural gas processed through EU BLGLYDHY for each calendar day EU BLGLYDHY operates.[2] **(R 336.1205(1), R 336.1702(a), R 336.1901)**

9. Each calendar day EU BLGLYDHY operates, the permittee shall monitor and record the total hours of operation of EU BLGLYDHY.[2] **(R 336.1205(1), R 336.1702(a), R 336.1901)**

10. The permittee shall monitor and record the number of hours EU BLGLYDHY operated with the condenser only.[2] **(R 336.1205(1), R 336.1702(a), R 336.1901)**

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

4. The permittee shall submit a complete analysis plan to the AQD District Supervisor for approval at least 30 days prior to the anticipated analysis date. **(R 336.1205, R 336.1119(i) and (dd))**

5. The permittee shall submit a complete report of the analysis results to the AQD District Supervisor, within 60 days following the last date of the test. **(R 336.1205, R 336.1119(i) and (dd))**

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	**Maximum Exhaust Dimensions (inches)**	**Minimum Height Above Ground (feet)**	**Underlying Applicable Requirements**
1. SV-110 (Reboiler Dehydrator)	16[1]	32.8[1]	**R 336.1901**
2. SV-111C (Condenser)	3.6[1]	25[1]	**R 336.1901**
3. SV-111TI (Thermal Oxidizer)	NA	25[1]	**R 336.1901**

IX. OTHER REQUIREMENT(S)

NA

Footnotes:

[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

EU BLHHH
EMISSION UNIT CONDITIONS

DESCRIPTION

The ~~One g~~glycol dehydration system operates in ~~two~~ injection mode~~s (glycol injection and glycol absorption)~~ to remove water from the natural gas withdrawn from the storage reservoir. The glycol dehydration system meets the definition in 40 CFR 63.1271 and was constructed prior to August 23, 2011 and must attain compliance with the requirements in 40 CFR, Part 63, Subpart HHH by October 15, 2015.

Emission Units: EU BLGLYDHY

POLLUTION CONTROL EQUIPMENT Condenser and/or Thermal Oxidizer.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period/ Operating Scenario	Equipment	Monitoring/ Testing Method	Underlying Applicable Requirements
1. BTEX	Calculated using the equation in Appendix 7A.	Annual	EU BLGLYDHY	V.2, V.4, V.5, VI.9	**40 CFR 63.1275(b)(1)(iii)**

See Appendix 7A

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The process vent from EU BLHHH shall be vented to a control device or a combination of control devices through a closed-vent system. **(40 CFR 63.1275(b)(1)(iii)(A))**

2. The control device(s) shall be one of those specified below and must be designed and operated in accordance with the following requirements: **(40 CFR 63.1281(f)(1))**
   a. A thermal oxidizer that reduces the concentration of BTEX to meet the emission limit in I.1, or the TOC or total HAP concentration in the exhaust gases at the outlet of the oxidizer is reduced to a level equal to or less than 20 ppmv on a dry basis corrected to 3 percent oxygen.
   b. A condenser or other non-destructive control device that is designed and operated to reduce the mass content of BTEX in the gases vented by 95 percent.

3. The permittee shall control HAP emissions from each GCG separator (flash tank) vent unless BTEX emissions from the reboiler vent and the flash tank are reduced to a level less than the limit in condition I.1. **(40 CFR 63.1275(c)(3))**

4. The permittee shall operate and maintain EU BLGLYDHY, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. **(40 CFR 63.1274(h))**

5. The permittee shall operate each control device in accordance with the requirements specified below: **(40 CFR 63.1281(f)(2))**

  a. Each control device used to comply with this subpart shall be operating at all times. More than one unit may be vented to a control device.
  b. For each control device monitored in accordance with the requirements of conditions VI.7~~8~~ - 12~~3~~, the permittee shall demonstrate compliance according to the requirements of VI.2 (§ 63.1282(e)).

6. When using a condenser to demonstrate continuous compliance with emission limits the control device shall be operated at a maximum operating temperature established in accordance with the requirements of VI.8. When using a thermal oxidizer to demonstrate continuous compliance with emission limits the control device shall be operated at the minimum operating temperature established in accordance with the requirements of VI.8 or a minimum of 1400°F. **(40 CFR 63.1282(e)(1))**

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. The closed vent system shall be designed and operated in accordance with the following requirements: **(40 CFR 63.1281(c), 40 CFR 63.1283(c)(2)(iii))**
  a. The closed-vent system shall route all gases, vapors, and fumes emitted from the material in and emission unit to a control device that meets the requirements specified in condition III.2.
  b. The closed-vent system shall be designed and operated with no detectable emissions.
  c. Any bypass devices in the closed-vent system that could divert emissions from entering the control device shall be equipped with a flow indicator at the inlet to the bypass device that takes readings every 15 minutes, and that sounds an alarm when the bypass device is open; or the bypass device valve at the inlet to the bypass device shall be secured using a car-seal or lock and key.

2. Each continuous parameter monitoring system (CPMS) shall meet the following specifications and requirements: **(40 CFR 63.1283(d)(1))**
  a. Each CPMS shall measure data values at least once every hour and record either:
    i Each measured data value; or
    ii Each block average value for each 1-hour period or shorter periods calculated from all measured data values during each period. If values are measured more frequently than once per minute, a single value for each minute may be used to calculate the hourly (or shorter period) block average instead of all measured values.

3. The permittee shall install a device equipped with a continuous recorder to measure the values of operating parameters appropriate for the control device as specified below. **(40 CFR 63.1283(d)(3))**
  a. For a thermal oxidizer, the temperature monitoring device shall have a minimum accuracy of ±2 percent of the temperature being monitored in °C, or ±2.5°C, whichever value is greater. The temperature sensor shall be installed at a location representative of the combustion zone temperature
  b. For a condenser, the temperature monitoring device shall have a minimum accuracy of ±2 percent of the temperature being monitored in °C, or ±2.5°C, whichever value is greater. The temperature sensor shall be installed at a location in the exhaust vent stream from the condenser.

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. Determination of the actual flow rate of natural gas to EU BLGLYDHY shall be made using either of the following procedures: **(40 CFR 63.1282(a)(1))**
  a. Install and operate a monitoring instrument that directly measures natural gas flow rate to EU BLGLYDHY with an accuracy of ± 2 percent or better. The annual natural gas flow rate shall be converted to a daily average by dividing the annual flow rate by the number of days per year each EU processed natural gas.
  b. Document to the AQD's satisfaction, the actual annual average natural gas flow rate to EU BLGLYDHY.

2. Determination of the actual average BTEX emissions from EU BLGLYDHY with condenser and/or thermal oxidizer control device shall be made using the following procedure: **(40 CFR 63.1282(a)(2))**
  a. Use GRI-GLYCalc™, Version 3.0 or higher. Inputs to the model shall be representative of actual operating conditions of each glycol dehydration unit.

3. The Permittee shall perform “no detectable emissions” testing for closed vent systems using the test methods and procedures specified in 40 CFR 63.1282(b). **(40 CFR 63.1282(b))**

4. If the permittee chooses to conduct a performance test to demonstrate that a control device meets the requirements of III.2 (40 CFR 1281(f)(1)) the permittee shall conduct emissions testing for compliance with the BTEX emission limit calculated using Equation 1 or the 20 ppmv TOC or Total HAP exhaust gas concentration reduction requirement using the following test methods and procedures: **(40 CFR 63.1282(d)(3)**
   a. Method 1 or 1A, 40 CFR, Part 60, Appendix A, as appropriate, shall be used for selection of the sampling sites. The sampling site shall be located at the outlet of the combustion device.
   b. The gas volumetric flowrate shall be determined using Method 2, 2A, 2C, or 2D, 40 CFR, Part 60, Appendix A, as appropriate.
   c. To determine compliance with the BTEX emission limit or the 20 ppmv TOC or Total HAP exhaust gas concentration reduction requirement, the permittee shall use one of the following methods: Method 18, 40 CFR, Part 60, Appendix A; ASTM D64200-99 (Reapproved 2004); or any other method or data that have been validated according to the applicable procedures in Method 301, 40 CFR, Part 63, Appendix A.
   d. The permittee shall conduct performance tests according to the following schedule:
      i. An initial performance test shall be conducted no later than October 15, 2015.
      ii. The first periodic performance test shall be conducted not later than 60 months after the initial performance test. Subsequent periodic performance tests shall be conducted at intervals no longer than 60 months following the previous periodic performance test or whenever a source desires to establish a new operating limit. Combustion control devices meeting either of the following criteria are not required to conduct periodic performance tests;
         A. A control device whose model is tested under, and meets the criteria of manufacturers performance test in 40 CFR 63.1282(g).
         B. A combustion control device demonstrating during the performance test that combustion zone temperature is an indicator of destruction efficiency and operates at a minimum temperature of 1400 degrees Fahrenheit.

5. As an alternative to the performance test referenced in V.4 the permittee may elect to use the procedures documented in the GRI report entitled “Atmospheric Rich/Lean method for Determining Glycol Dehydrator Emissions” (GRI-95/0368.1) as inputs for the model GRI-GLYCalc™, version 3.0 or higher, to generate a condenser performance curve. **(40 CFR 63.1282(d)(5))**

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall maintain records of the annual facility natural gas throughput each year. **(40 CFR 63.1270(a)(3))**

2. The permittee shall continuously monitor and record the temperature on the thermal oxidizer or condenser and calculate the daily average temperature for each operating day. **(40 CFR 63.1282(e), 40 CFR 63.1283(d)(4))**
   a. Establish a site specific maximum (condenser) or minimum (thermal oxidizer) temperature to define the conditions at which the control device must be operated to continuously achieve compliance with the emission limit.
   b. Calculate the daily average of the temperature readings in accordance with condition VI.~~8~~7.
   c. Compliance is achieved when the daily average of the temperature readings calculated under 2.b. is either equal to or greater than the minimum or equal to or less than the maximum monitoring value established under 2.a.

3. When using a condenser as the control device the permittee may demonstrate compliance with BTEX emission reductions by complying with the following requirements: **(40 CFR 63.1282(f))**
   a. The permittee shall establish a site-specific condenser performance curve according to the procedures specified in Condition VI.10.
   b. The permittee must calculate the daily average condenser outlet temperature in accordance with Condition VI.10.
   c. The permittee shall determine the condenser efficiency for the current operating day using the daily average condenser outlet temperature and the condenser performance curve.

d. At the end of each operating day the permittee shall calculate the 30-day average BTEX emission reduction from the condenser efficiencies for the preceding 30 operating days.
e. Compliance is achieved if the average BTEX emission reduction is equal to or greater than the minimum percent reduction established in Condition VI.~~10~~9.

4. For each closed-vent system, the permittee shall comply with the following requirements: **(40 CFR 63.1283(c)(2-4))**
   a. Except for parts of the closed-vent system or cover that are designated unsafe to inspect or difficult to inspect, each closed-vent system and each bypass device shall be inspected according to the procedures specified below according the following schedule:
      i. For each closed-vent system joints, seams, or other connections that are permanently or semi-permanently sealed (e.g., a welded joint between two sections of hard piping or a bolted or gasketed ducting flange):
         A. Conduct an initial inspection to demonstrate that the closed-vent system operates with no detectable emissions.
         B. Conduct annual visual inspections for defects that could result in air emissions. Defects include, but are not limited to, visible cracks, holes, or gaps in piping; loose connections; or broken or missing caps or other closure devices.
      ii. For closed-vent system components other than those specified in VI.5.a.i above:
         A. Conduct an initial inspection to demonstrate that the closed-vent system operates with no detectable emissions.
         B. Conduct annual inspections to demonstrate that the components or connections operate with no detectable emissions.
         C. Conduct annual visual inspections for defects that could result in air emissions. Defects include, but are not limited to, visible cracks, holes, or gaps in ductwork; loose connections; or broken or missing caps or other closure devices.
      iii. For each bypass device, except low leg drains, high point bleeds, analyzer vents, open-ended valves or lines, and safety devices, the permittee shall either:
         A. At the inlet to the bypass device that could divert the steam away from the control device to the atmosphere, set the flow indicator to take a reading at least once every 15 minutes; or
         B. If the bypass device valve installed at the inlet to the bypass device is secured in the non-diverting position using a car-seal or a lock-and-key type configuration, visually inspect the seal or closure mechanism at least once every month to verify that the valve is maintained in the non-diverting position and the vent stream is not diverted through the bypass device.
   b. In the event that a leak or defect is detected, the permittee shall repair the leak or defect as soon as practicable, except as provided in VI.~~5~~4.c.
      i A first attempt at repair shall be made no later than 5 calendar days after the leak is detected.
      ii Repair shall be completed no later than 15 calendar days after the leak is detected.
   c. Delay of repair of a closed-vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, as defined in § 63.1271, or if the permittee determines that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. Repair of such equipment shall be completed by the end of the next shutdown.

5. Any parts of the closed-vent system or cover that are designated, as described below, as unsafe to inspect are exempt from the inspection requirements of Condition VI.4~~5~~ if: **(40 CFR 63.1283(c)(5))**
   a. The permittee determines that the equipment is unsafe to inspect because inspecting personnel would be exposed to an imminent or potential danger as a consequence of complying with Condition VI.5.a.i or ii.
   b. The permittee has a written plan that requires inspection of the equipment as frequently as practicable during safe-to-inspect times.

6. Any parts of the closed-vent system or cover that are designated, as described below, as difficult to inspect are exempt from the inspection requirements of Condition VI.4~~5~~ if: **(40 CFR 63.1283(c)(6))**
   a. The permittee determines that the equipment cannot be inspected without elevating the inspecting personnel more than 2 meters above a support surface; and

   b. The permittee has a written plan that requires inspection of the equipment at least once every 5 years.

7. Using the data recorded by the monitoring system, except for inlet gas flow rate, the permittee must calculate the daily average value for each monitored operating parameter for each operating day. If the emissions unit

operation is continuous, the operating day is a 24-hour period. If the emissions unit operation is not continuous, the operating day is the total number of hours of control device operation per 24-hour period. Valid data points must be available for 75 percent of the operating hours in an operating day to compute the daily average. **(40 CFR 63.1283(d)(4))**

8. For the control devices used to comply with 40 CFR, Part 63, Subpart HHH, the permittee shall establish a minimum operating parameter value or a maximum operating parameter value, as appropriate for the control device, to define the conditions at which the control device must be operated to continuously achieve the emission limits in Section I of FGMACTHHH. Each minimum or maximum operating parameter value shall be established as follows: **(40 CFR 63.1283(d)(5)(i))**
   a. If the permittee conducts performance tests to demonstrate that the control device achieves the applicable performance requirements, then the minimum operating parameter value or the maximum operating parameter value shall be established based on values measured during the performance test and supplemented, as necessary, by a condenser design analysis or control device manufacturer's recommendations or a combination of both.
   b. If the permittee uses a condenser design analysis to demonstrate that the control device achieves the applicable performance requirements, then the minimum operating parameter value or the maximum operating parameter value shall be established based on the condenser design analysis and may be supplemented by the condenser manufacturer's recommendations.
   c. If the permittee operates a control device where the performance test requirement was met under manufacturers' performance test to demonstrate that the control device achieves the applicable performance requirements, then the maximum inlet gas flow rate shall be established based on the performance test and supplemented, as necessary, by the manufacturer recommendations.

9. When using condensers as the control device the permittee shall also establish a condenser performance curve showing the relationship between condenser outlet temperature and condenser control efficiency. The curve shall be established using the procedures documented in the GRI report entitled, "Atmospheric Rich/Lean Method for Determining Glycol Dehydrator Emissions" (GRI-95/0368.1) as inputs for the model GRI-GLYCalc^{tm}, Version 3.0 or higher, to generate a condenser performance curve.
   (40 CFR 63.1283(d)(5)(ii))

10. A deviation for a control device is determined to have occurred when the monitoring data or lack of monitoring data result in any one of the criteria specified below being met. When multiple operating parameters are monitored for the same control device and during the same operating day, and more than one of these operating parameters meets an excursion criterion specified below, then a single excursion is determined to have occurred for the control device for that operating day. **(40 CFR 63.1283(d)(6)(i-iii))**
    a. When the daily average value of a monitored operating parameter is less than the minimum operating parameter limit (or, if applicable, greater than the maximum operating parameter limit) established for the operating parameter.
    b. When the 30-day average condenser efficiency calculated according to the requirements of Condition VI.3.d is less than the identified 30-day required percent reduction.
    c. When the monitoring data are not available for at least 75 percent of the operating hours in a day.

11. A deviation occurs for a closed-vent system containing one or more bypass devices that could be used to divert all or a portion of the gases, vapors, or fumes from entering the control device when:
    (40 CFR 63.1283(d)(6)(iv))
    a. The flow indicator indicates that flow has been detected and that the stream has been diverted away from the control device to the atmosphere.
    b. If the seal or closure mechanism has been broken, the bypass line valve position has a changed, the key for the lock-and-key type lock has been checked out, or the car-seal has broken.

12. For each deviation, the permittee shall be deemed to have failed to have applied control in a manner that achieves the required operating parameter limits. Failure to achieve the required operating parameter limits is a violation of this standard. **(40 CFR 63.1283(d)(7))**

13. Nothing in conditions VI.7~~8~~ through VI.12~~3~~ shall be construed to allow or excuse a monitoring parameter deviation caused by any activity that violates other applicable provisions of this subpart. **(40 CFR 63.1283(d)(9))**

14. The permittee shall maintain the records specified in 40 CFR 63.10(b)(2). **(40 CFR 63.1284(b)(2))**

15. The permittee shall maintain the following records: **(40 CFR 63.1284(b)(4), 40 CFR 63.1284(g))**
    o. Continuous records of the equipment operating parameters specified to be monitored in Conditions VI.7~~8~~-9~~10~~.
    p. Records of the daily average value of each continuously monitored parameter for each operating day determined according to the procedures specified in Condition VI.~~8~~9.
    q. For condensers using reduction efficiency for compliance, records of the annual 30-day rolling average condenser efficiency determined in Condition VI.3.d shall be kept in addition to the daily averages.
    r. The following records for a control device whose model is tested under the manufacturers' performance test:
        i All visible emission readings and flow rate calculations made during the compliance determination
        ii All hourly records and other recorded periods when the pilot flame is absent.
    s. Hourly records of the times and durations of all periods when the vent stream is diverted from the control device or the device is not operating.
    t. Where a seal or closure mechanism is used to comply with the closed vent bypass, hourly records of flow are not required. In such cases, the owner or operator shall record that the monthly visual inspection of the seals or closure mechanism has been done, and shall record the duration of all periods when the seal mechanism is broken, the bypass line valve position has changed, or the key for a lock-and-key type lock has been checked out, and records of any car-seal that has broken.

16. The permittee shall maintain records identifying all parts of the closed-vent system that are designated as unsafe to inspect in accordance with Condition VI.~~6~~5, an explanation of why the equipment is unsafe to inspect, and the plan for inspecting the equipment. **(40 CFR 63.1284(b)(5))**

17. The permittee shall maintain records identifying all parts of the closed-vent system that are designated as difficult to inspect in accordance with Condition VI.~~7~~6, an explanation of why the equipment is difficult to inspect, and the plan for inspecting the equipment. **(40 CFR 63.1284(b)(6))**

18. The permittee shall maintain the following records for each inspection conducted in accordance with Condition VI.~~5~~ 4 during which a leak or defect is detected. **(40 CFR 63.1284(b)(7))**
    a. The instrument identification numbers, operator name or initials, and identification of the equipment.
    b. The date the leak or defect was detected and the date of the first attempt to repair the leak or defect.
    c. Maximum instrument reading measured by the method specified in Condition V.3 after the leak or defect is successfully repaired or determined to be non-repairable.
    d. "Repair delayed" and the reason for the delay if a leak or defect is not repaired within 15 calendar days after discovery of the leak or defect.
    e. The name, initials, or other form of identification of the permittee (or designee) whose decision it was that repair could not be affected without a shutdown.
    f. The expected date of successful repair of the leak or defect if a leak or defect is not repaired within 15 calendar days.
    g. Dates of shutdowns that occur while the equipment is unrepaired.
    h. The date of successful repair of the leak or defect.

19. For each inspection conducted in accordance with Condition VI.~~5~~ 4 during which no leaks or defects are detected, the permittee shall maintain a record that the inspection was performed, the date of the inspection, and a statement that no leaks or defects were detected. **(40 CFR 63.1284(b)(8))**

20. The permittee shall maintain records of the occurrence and duration of each malfunction of process equipment or the air pollution control equipment and monitoring equipment. The permittee shall maintain records of actions taken during periods of malfunction to minimize emissions in accordance with Condition III.4 including

corrective actions to restore malfunctioning process and air pollution control and monitoring equipment to its normal or usual manner of operation. **(40 CFR 63.1284(f))**

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

4. The permittee shall submit the notification of the planned date of a performance test and site–specific test plan at least 60 days before the test. **(40 CFR 63.1285(b)(3))**

5. The permittee shall submit a Notification of Compliance Status Report as required under § 63.9(h) within 180 days after October 15, 2015. In addition to the information required under § 63.9(h) the Notification of Compliance Status Report shall include the information specified in paragraphs 5.a. through l. of this section. If an owner or operator submits the required information at different times, and/or different submittals, subsequent submittals may refer to previous submittals instead of duplicating and resubmitting the previously submitted information. **(40 CFR 63.1285(d))**
   a. If a closed-vent system and a control device other than a flare are used to comply with § 63.1274, the owner or operator shall submit the information in condition 5.a.iii. and the information in either paragraph 5.a.i. or ii.
      i. The condenser design analysis documentation specified in § 63.1282(d)(4) if the owner or operator elects to prepare a design analysis; or
      ii. If the owner or operator is required to conduct a performance test, the performance test results including the information specified in condition 5.a.ii.A and B. Results of a performance test conducted prior to the compliance date of this subpart can be used provided that the test was conducted using the methods specified in § 63.1282(d)(3), and that the test conditions are representative of current operating conditions. If the owner or operator operates a combustion control device model tested under § 63.1282(g), an electronic copy of the performance test results shall be submitted via email to *Oil_and_Gas_PT@EPA.GOV* unless the test results for that model of combustion control device are posted at the following Web site: *epa.gov/airquality/oilandgas/* .
         A. The percent reduction of HAP or TOC, or the outlet concentration of HAP or TOC (parts per million by volume on a dry basis), determined as specified in § 63.1282(d)(3); and
         B. The value of the monitored parameters specified in § 63.1283(d), or a site-specific parameter approved by the permitting agency, averaged over the full period of the performance test.
      iii. The results of the closed-vent system initial inspections performed according to the requirements in § 63.1283(c)(2)(i) and (ii).
   b. The owner or operator shall submit one complete test report for each test method used for a particular source.
      i. For additional tests performed using the same test method, the results specified in Condition 5.a.ii. shall be submitted, but a complete test report is not required.
      ii. A complete test report shall include a sampling site description, description of sampling and analysis procedures and any modifications to standard procedures, quality assurance procedures, record of operating conditions during the test, record of preparation of standards, record of calibrations, raw data sheets for field sampling, raw data sheets for field and laboratory analyses, documentation of calculations, and any other information required by the test method.

   c. For each control device other than a flare used to meet the requirements of § 63.1274, the owner or operator shall submit the information specified in Condition 5.d.i. through iv for each operating parameter required to be monitored in accordance with the requirements of § 63.1283(d).
      i. The minimum operating parameter value or maximum operating parameter value, as appropriate for the control device, established by the owner or operator to define the conditions at which the control

device must be operated to continuously achieve the applicable performance requirements of § 63.1281(d)(1) or (e)(3)(ii).

   ii. An explanation of the rationale for why the owner or operator selected each of the operating parameter values established in § 63.1283(d)(5). This explanation shall include any data and calculations used to develop the value, and a description of why the chosen value indicates that the control device is operating in accordance with the applicable requirements of § 63.1281(d)(1), (e)(3)(ii), or (f)(1).
   iii. A definition of the source's operating day for purposes of determining daily average values of monitored parameters. The definition shall specify the times at which an operating day begins and ends.

d. Results of any continuous monitoring system performance evaluations shall be included in the Notification of Compliance Status Report.
e. The owner or operator shall comply with all requirements for compliance status reports contained in the source's title V permit, including reports required under 40 CFR, Part 63, Subpart HHH. Each time a notification of compliance status is required under this subpart, the owner or operator of such source shall submit the notification of compliance status to the appropriate permitting authority following completion of the relevant compliance demonstration activity specified in this subpart.
f. The owner or operator shall submit an analysis demonstrating whether an affected source is a major source using the maximum throughput calculated according to § 63.1270(a).
g. The owner or operator shall submit a statement as to whether the source has complied with the requirements of this subpart.
h. If the owner or operator installs a combustion control device model tested under the manufacturer's performance test procedures in § 6**3**.1282(g), the Notification of Compliance Status Report shall include the data listed under § 63.1282(g)(8).
i. For each combustion control device model tested under § 63.1282(g), the information listed in paragraphs 5.i.i. through vi of this section.
   i. Name, address and telephone number of the control device manufacturer.
   ii. Control device model number.
   iii. Control device serial number.
   iv. Date the model of control device was tested by the manufacturer.
   v. Manufacturer's HAP destruction efficiency rating.
   vi. Control device operating parameters, maximum allowable inlet gas flow rate.

6. The Permittee shall prepare Periodic Reports in accordance with a. and b. below and submit them to the Administrator. **(40 CFR 63.1285(e))**
   a. The permittee shall submit Periodic Reports semiannually beginning 60 calendar days after the end of the applicable reporting period. The first report shall be submitted no later than 240 days after the date the Notification of Compliance Status Report is due and shall cover the 6-month period beginning on the date the Notification of Compliance Status Report is due. The report shall include certification by a responsible official of truth, accuracy, and completeness.
   b. The permittee shall include the following information and any other information as applicable in §63.1285(e)(2).
      i A description of all deviations as defined in Conditions VI.12-14 that have occurred during the 6-month reporting period, and the information described in §63.1285(e)(2)(ii).
      ii For each inspection conducted in accordance with Condition VI.5 during which a leak or defect is detected, the records described in Condition VI.21 must be included in the next Periodic Report.
      iii For each closed-vent system with a bypass line, records required under Condition VI.17.e and f.
      iv A statement identifying if there were no deviations during the reporting period.
      v Any change in compliance methods as described in §63.1282(e).
      vi The results of any periodic test conducted during the reporting period.

7. Whenever a process change is made, or a change in any of the information submitted in the Notification of Compliance Status Report, the permittee shall submit a report within 180 days after the process change is

   made or as a part of the next Periodic Report, whichever is sooner. The report shall include: **(40 CFR 63.1285(f))**
   a. A brief description of the process change;
   b. A description of any modification to standard procedures or quality assurance procedures;
   c. Revisions to any of the information reported in the original Notification of Compliance Status Report under condition VII.5

d. Information required by the Notification of Compliance Status Report under Condition VII.5 for changes involving the addition of processes or equipment.

8. Within 60 days after the date of completing a performance test (defined in § 63.2) you must submit the results of the performance tests to EPA's WebFIRE database by using the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) (*www.epa.gov/cdx*). Performance test data must be submitted in the file format generated through use of EPA's Electronic Reporting Tool (ERT) (see *http://www.epa.gov/ttn/chief/ert/index.html*). Only data collected using test methods on the ERT Web site are subject to this requirement for submitting reports electronically to WebFIRE. All reports required by this subpart not subject to the above electronic reporting requirements must be sent to the Administrator at the appropriate address. The Administrator may request a report in any form suitable for the specific case (e.g., by commonly used electronic media such as Excel spreadsheet, on CD or hard copy). The Administrator retains the right to require submittal of reports in paper format. **(40 CFR 63.1285(g))**

9. The permittee shall notify the AQD Technical Programs Unit Supervisor and the District Supervisor no less than 7 days prior to the anticipated test date. **(R 336.2001(4))**

See Appendix 8

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted.

Stack & Vent ID	Maximum Exhaust Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
NA	NA	NA	NA

IX. OTHER REQUIREMENT(S)

1. The permittee shall determine major source status using the maximum annual facility natural gas throughput calculated according to 40 CFR 63.1270(a)(1)(i) through (a)(1)(iv). As an alternative to calculating the maximum natural gas throughput, the owner or operator of a new or existing source may use the facility design maximum natural gas throughput to estimate the maximum potential emissions. **(40 CFR 63.1270(a)(1))**

2. The permittee shall determine the maximum values for other parameters used to calculate potential emissions as the maximum over the same period for which maximum throughput is determined. These parameters shall be based on an annual average or the highest single measured value. For estimating maximum potential emissions from glycol dehydration units, the glycol circulation rate used in the calculation shall be the unit's maximum rate under its physical and operational design consistent with the definition of potential to emit in 40 CFR 63.2. **(40 CFR 63.1270(a)(4))**

3. A site-specific monitoring plan must be prepared that addresses the monitoring system design, data collection, and the quality assurance and quality control elements. Each CPMS must be installed, calibrated, operated, and maintained in accordance with the procedures in your approved site-specific monitoring plan. The permittee may request approval of monitoring system quality assurance and quality control procedures alternative to those specified below and in your site-specific monitoring plan. **(40 CFR 63.1283(d)(1)(ii-iv))**

    a. The performance criteria and design specifications for the monitoring system equipment, including the sample interface, detector signal analyzer, and data acquisition and calculations;
    b. Sampling interface (e.g., thermocouple) location such that the monitoring system will provide representative measurements;
    c. Equipment performance checks, system accuracy audits, or other audit procedures;
    d. Ongoing operation and maintenance procedures in accordance with provisions in § 63.8(c)(1) and (c)(3);

e. Ongoing reporting and recordkeeping procedures in accordance with provisions in § 63.10(c), (e)(1), and (e)(2)(i).

f. The permittee must conduct the CPMS equipment performance checks, system accuracy audits, or other audit procedures specified in the site-specific monitoring plan at least once every 12 months.

g. The permittee must conduct a performance evaluation of each CPMS in accordance with the site-specific monitoring plan.

4. The permittee shall comply with all applicable provisions of the National Emission Standards for Hazardous Air Pollutants, as specified in 40 CFR, Part 63, Subpart A and Subpart HHH, for Natural Gas Transmission and Storage Facilities by October 15, 2015. **(40 CFR, Part 63, Subparts A and HHH)**

Footnotes:

[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

D. FLEXIBLE GROUP CONDITIONS

Part D outlines the terms and conditions that apply to more than one emission unit. The permittee is subject to the special conditions for each flexible group in addition to the General Conditions in Part A and any other terms and conditions contained in this ROP.

The permittee shall comply with all specific details in the special conditions and the underlying applicable requirements cited. If a specific condition type does not apply, NA (not applicable) has been used in the table. If there are no special conditions that apply to more than one emission unit, this section will be left blank.

FLEXIBLE GROUP SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FG BLDDDDD	Emission Units subject to 40 CFR, Part 63, Subpart DDDDD.	EU BLHEATER-A, EU BLHEATER-B, EU BLBOILER
FG BLCMPRS	Three Dresser Rand 6000 HP, 2-stroke lean burn IC compressor engines with catalytic oxidizers.	EU BLCMPR-A, EU BLCMPR-B, EU BLCMPR-C
FG BLHEATERS	Two Sivalls withdrawal gas heaters, 16 million BTU/hr heat input each.	EU BLHEATER-A, EU BLHEATER-B
FG BLGNRS	Three 3516 Caterpillar 1,125 HP, 4-stroke lean burn IC generator engines with catalytic oxidizers.	EU BLGEN-A, EU BLGEN-B, EU BLGEN-C
FG BLCLEANER	Any parts washer/cold cleaner that is grandfathered or exempt from Rule 201 pursuant to Rule 278 and Rule 281(h) or Rule 285(r)(iv). Existing cold cleaners where placed into operation prior to July 1, 1979. New cold cleaners were placed into operation on or after July 1, 1979.	EU BLCLEANER

FG BLDDDDD
FLEXIBLE GROUP CONDITIONS

DESCRIPTION

Requirements for existing Gas 1, (Natural Gas only) for existing Boilers and Process Heaters at major sources of Hazardous Air Pollutants per 40 CFR Part 63, Subpart DDDDD. These existing boilers or process heaters must comply with this subpart no later than January 31, 2016, except as provided in 40 CFR 63.6(i).

Emission Units:

The collection at a major source of all existing industrial, commercial, and institutional boilers and process heaters within the units designed to burn gas 1 fuel subcategory as defined in 40 CFR 63.7575. At the time of permit renewal:

Less than 5 MMBtu/hr	EU BLBOILER (4.184 MMBtu/hr)
Equal to or greater than 5 MMBtu/hr and less than 10 MMBtu/hr	
Equal to or greater than 10 MMBtu/hr	EU BLHEATER-A (16 MMBtu/hr), EU BLHEATER-B (16 MMBtu/hr)

POLLUTION CONTROL EQUIPMENT

NA

I. EMISSION LIMIT(S)

NA

II. MATERIAL LIMIT(S)

1. The permittee shall only burn natural gas as defined in 40 CFR 63.7575. **(40 CFR 63.7499(l))**

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee must operate and maintain affected sources in a manner consistent with safety and good air pollution control practices for minimizing emissions. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Administrator that may include, but is

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not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source. **(40 CFR 63.7500(a)(3))**

2. The permittee may obtain approval from the Administrator to use an alternative to the work practice standards noted in SC III.1. **(40 CFR 63.7500(b))**

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3. The permittee must:
   a. Complete a tune-up every 5 years (61 months) for boilers/process heaters less than or equal to 5 million Btu per hour. **(40 CFR 63.7500(e), 40 CFR 63.7515(d))**
   b. Complete a tune-up annually (13 months) for boilers greater than 10 million Btu per hour. **(40 CFR 63.7540(a)(10), 40 CFR 63.7515(d))**
   c. Conduct the tune-up within 30 calendar days of startup, if the unit is not operating on the required date for a tune-up. **(40 CFR 63.7540(a)(13))**
   d. Follow the procedures described in SC IX 3.a through 3.f for all initial and subsequent tune ups.

   (40 CFR 63.7540(a)(10), 40 CFR Part 63, Subpart DDDDD, Table 3)

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IV. DESIGN/EQUIPMENT PARAMETER(S)

NA

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

NA

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee must keep a copy of each notification and report submitted to comply with 40 CFR Part 63, Subpart DDDDD, including all documentation supporting any Initial Notification or Notification of Compliance Status or semiannual compliance report that the permittee submitted, according to the requirements in 40 CFR 63.10(b)(2)(xiv). **(40 CFR 63.7555(a)(1))**

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2. The permittee must keep each record on site, or they must be accessible from on-site (for example, through a computer network), for at least 2 years after the date of each occurrence, measurement, maintenance, corrective action, report, or record. The permittee can keep the records off site for the remaining 3 years. **(40 CFR 63.7560(a), (b), and (c))**

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

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2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

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3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

4. Unless the EPA Administrator has approved a different schedule for submission of reports under 40 CFR 63.10(a), the permittee must submit each report, according to paragraph (h) of 40 CFR 63.7550, stated in SC VII.6, by the date in Table 9 of 40 CFR Part 63, Subpart DDDDD and according to the requirements in paragraphs (b)(1) through (4) of 40 CFR 63.7550, as listed below. For units that are subject only to a requirement to conduct an annual tune-up according to 40 CFR 63.7540(a)(10), stated in SC III.3.b, or 5-year tune-up according to 40 CFR 63.7540(a)(12), stated in SC III.3.a, and not subject to emission limits or operating limits, the permittee may submit only an annual, or 5-year compliance report, as applicable, as specified in paragraphs (b)(1) through (4) of 40 CFR 63.7550, as listed below, instead of a semi-annual compliance report.

   (40 CFR 63.7550(b))

   a. When submitting an annual or 5-year compliance report, the first compliance report must cover the period beginning on January 31, 2016 and ending on December 31 within 1, or 5 years, as applicable, after the compliance date that is specified in 40 CFR 63.7495. **(40 CFR 63.7550(b)(1))**
   b. The first annual or 5-year compliance report must be postmarked or submitted no later than March 15. **(40 CFR 63.7550(b)(2), 40 CFR 63.7550(b)(5))**
   c. Annual and 5-year compliance reports must cover the applicable 1-, 2-, or 5-year periods from January 1 to December 31. **(40 CFR 63.7550(b)(3))**
   d. Annual and 5-year compliance reports must be postmarked or submitted no later than March 15. **(40 CFR 63.7550(b)(4), 40 CFR 63.7550(b)(5))**

5. The permittee must include the following information in the compliance report. **(40 CFR 63.7550(c), 40 CFR 63.7550(c)(1))**
   a. Company and Facility name and address. **(40 CFR 63.7550(c)(5)(i))**
   b. Process unit information, emissions limitations, and operating parameter limitations. **(40 CFR 63.7550(c)(5)(ii))**
   c. Date of report and beginning and ending dates of the reporting period. **(40 CFR 63.7550(c)(5)(iii))**
   d. Include the date of the most recent tune-up for each unit. Include the date of the most recent burner inspection if it was not done annually or on a 5-year period and was delayed until the next scheduled or unscheduled unit shutdown. **(40 CFR 63.7550(c)(5)(xiv))**
   e. Statement by a responsible official with that official's name, title, and signature, certifying the truth, accuracy, and completeness of the content of the report. **(40 CFR 63.7550(c)(5)(xvii))**

6. The permittee must submit the reports according to the procedures specified in paragraph (h)(3) of 40 CFR 63.7550, as listed below. **(40 CFR 63.7550(h))**
   a. The permittee must submit all reports required by Table 9 of 40 CFR Part 63, Subpart DDDDD electronically to the EPA via the Compliance and Emissions Data Reporting Interface (CEDRI). (CEDRI can be accessed through the EPA's CDX.) The permittee must use the appropriate electronic report in CEDRI for 40 CFR Part 63, Subpart DDDDD. Instead of using the electronic report in CEDRI for 40 CFR Part 63, Subpart DDDDD, the permittee may submit an alternate electronic file consistent with the XML schema listed on the CEDRI Web site (*http://www.epa.gov/ttn/chief/cedri/index.html*), once the XML schema is available. If the reporting form specific to 40 CFR Part 63, Subpart DDDDD is not available in CEDRI at the time that the report is due, the permittee must submit the report to the Administrator at the appropriate address listed in 40 CFR 63.13. The permittee must begin submitting reports via CEDRI no later than 90-days after the form becomes available in CEDRI. **(40 CFR 63.7550(h)(3))**

See Appendix 8

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VIII. STACK/VENT RESTRICTION(S)

NA

IX. OTHER REQUIREMENT(S)

1. The permittee must be in compliance with the applicable work practice standards. **(40 CFR 63.7505(a))**

2. For affected sources (as defined in 40 CFR 63.7490) that have not operated since the previous compliance demonstration and more than one year has passed since the previous compliance demonstration, the permittee must complete a subsequent tune-up within 30 days of startup by following the procedures described in SC IX 3.a through 3.f. **(40 CFR 63.7515(g))**

3. The permittee must demonstrate continuous compliance with the tune-up requirement by completing the following: **(40 CFR 63.7540(a))**
    a. Inspect the burner, and clean or replace any components of the burner as necessary (the permittee may perform the burner inspection any time prior to tune-up or delay the burner inspection until the next scheduled unit shutdown). At units where entry into a piece of process equipment or into a storage vessel is required to complete the tune-up inspections, inspections are required only during planned entries into the storage vessel or process equipment. **(40 CFR 63.7540(a)(10)(i))**
    b. Inspect the flame pattern, as applicable, and adjust the burner as necessary to optimize the flame pattern. The adjustment should be consistent with the manufacturer's specifications, if available. **(40 CFR 63.7540(a)(10)(ii))**
    c. Inspect the system controlling the air-to-fuel ratio, as applicable, and ensure that it is correctly calibrated and functioning properly (the permittee may delay the inspection until the next scheduled unit shutdown). Units that produce electricity for sale may delay the inspection until the first outage, not to exceed 36 months from the previous inspection. **(40 CFR 63.7540(a)(10)(iii))**
    d. Optimize total emissions of CO. This optimization should be consistent with the manufacturer's specifications, if available, and with any NO_x requirement to which the unit is subject. **(40 CFR 63.7540(a)(10)(iv))**
    e. Measure the concentrations in the effluent stream of CO in parts per million, by volume, and oxygen in volume percent, before and after the adjustments are made (measurements may be either on a dry or wet basis, as long as it is the same basis before and after the adjustments are made). Measurements may be taken using a portable CO analyzer. **(40 CFR 63.7540(a)(10)(v))**
    f. Maintain on-site and submit, if requested by the Administrator, the most recent periodic report containing the information as listed below. **(40 CFR 63.7540(a)(10)(vi))**
        i. The concentrations of CO in the effluent stream in parts per million by volume, and oxygen in volume percent, measured at high fire or typical operating load, before and after the tune-up of the boiler or process heater. **(40 CFR 63.7540(a)(10)(vi)(A))**
        ii. A description of any corrective actions taken as a part of the tune-up. **(40 CFR 63.7540(a)(10)(vi)(B))**
        iii. The type and amount of fuel used over the 12 months prior to the tune-up, but only if the unit was physically and legally capable of using more than one type of fuel during that period. Units sharing a fuel meter may estimate the fuel used by each unit. **(40 CFR 63.7540(a)(10)(vi)(C))**

4. If the boiler or process heater has a heat input capacity of less than or equal to 5 million Btu per hour, the permittee may delay the burner inspection specified in SC IX 3.a until the next scheduled or unscheduled unit shutdown, but the permittee must inspect each burner at least once every 72 months. If an oxygen trim system is utilized on a unit without emission standards to reduce the tune-up frequency to once every 5 years, set the oxygen level no lower than the oxygen concentration measured during the most recent tune-up. **(40 CFR 63.7540(a)(12))**

Footnotes:

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[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

~~DESCRIPTION~~

~~EU BLHEATER-A (16 MMBtu/hr), EU BLHEATER-B (16 MMBtu/hr), and EU BLBOILER (4.184 MMBtu/hr) with heat input values less than 50 MMBtu/hr each are subject to 40 CFR, Part 63, Subpart DDDDD National Emission Standard for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters.~~

~~**Emission Unit:** EU BLHEATER-A, EU BLHEATER-B, and EU BLBOILER~~

~~**POLLUTION CONTROL EQUIPMENT** NA~~

~~I. EMISSION LIMIT(S)~~

~~**Pollutant**~~	~~**Limit**~~	~~**Time Period/ Operating Scenario**~~	~~**Equipment**~~	~~**Monitoring/ Testing Method**~~	~~**Underlying Applicable Requirements**~~
~~NA~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~

~~II. MATERIAL LIMIT(S)~~

~~**Material**~~	~~**Limit**~~	~~**Time Period/ Operating Scenario**~~	~~**Equipment**~~	~~**Monitoring/ Testing Method**~~	~~**Underlying Applicable Requirements**~~
~~NA~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~

~~III. PROCESS/OPERATIONAL RESTRICTION(S)~~

~~NA~~

~~IV. DESIGN/EQUIPMENT PARAMETER(S)~~

~~NA~~

~~V. TESTING/SAMPLING~~

~~Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**~~

1. ~~The permittee must conduct an initial performance tune-up no later than January 31, 2016 for EU BLHEATER-A and EU BLHEATER-B according to § 63.7540(a)(11). Subsequent biennial tune-ups must be conducted no more than 25 months after the previous tune-up. **(40 CFR 63.7510(e), 40 CFR 63.7515(d), 40 CFR 63.7540(a)(11), 40 CFR, Part 63, Subpart DDDDD Table 3.2)**~~

2. ~~The permittee must conduct an initial performance tune-up no later than January 31, 2016 for EU BLBOILER according to § 63.7540(a)(12). Subsequent 5-year tune-ups must be conducted no more than 61 months after the previous tune-up. **(40 CFR 63.7510(e), 40 CFR 63.7515(d), 40 CFR 63.7540(a)(12), 40 CFR, Part 63, Subpart DDDDD, Table 3.1)**~~

3. ~~The permittee shall complete a one-time energy assessment specified in Table 3.4 (a) through (h) no later than January 31, 2016 for all Emission Units in FG BLDDDDD. An energy assessment completed on or after January 1, 2008, that meets or is amended to meet the energy assessment requirements, satisfies the energy assessment requirement. A facility that operates under an energy management program compatible with ISO 50001 that includes the affected units also satisfies the energy assessment requirement. The energy assessment must include the following:~~
   a. ~~A visual inspection of the boiler or process heater system.~~
   b. ~~An evaluation of operating characteristics of the boiler or process heater systems, specifications of energy using systems, operating and maintenance procedures, and unusual operating constraints.~~
   c. ~~An inventory of major energy use systems consuming energy from affected boilers and process heaters and which are under the control of the boiler/process heater owner/operator.~~
   d. ~~A review of available architectural and engineering plans, facility operation and maintenance procedures and logs, and fuel usage.~~
   e. ~~A review of the facility's energy management practice and provide recommendations for improvements consistent with the definition of energy management practices, if identified.~~
   f. ~~A list of cost-effective energy conservation measures that are within the facility's control.~~
   g. ~~A list of the energy savings potential of the energy conservation measures identified.~~
   h. ~~A comprehensive report detailing the ways to improve efficiency, the cost of specific improvements, benefits, and the time frame for recouping those investments.~~
   ~~**(40 CFR 63.7510(e), 40 CFR, Part 63, Subpart DDDDD, Table 3.4)**~~

~~VI. MONITORING/RECORDKEEPING~~

~~Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**~~

1. ~~The permittee shall maintain a copy of each notification and report submitted to comply with 40 CFR, Part 63, Subpart DDDDD including all documentation supporting any Initial Notification or Notification of Compliance Status or Semiannual Compliance report that was submitted, according to the requirements in § 63.10(b)(2)(xiv) and any records of performance tests, fuel analyses, or other compliance demonstrations and performance evaluations as required in § 63.10(b)(2)(viii). **(40 CFR 63.7555)**~~

~~VII. REPORTING~~

1. ~~Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**~~

2. ~~Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**~~

3. ~~Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**~~

4. ~~A compliance report containing the information below shall be submitted with the annual certification of compliance in VII.3 above. The compliance report for EU BLHEATER-A and EU BLHEATER-B is due every two years starting in 2018. The compliance report for EU BLBOILER is due every five years starting in 2021. **(40 CFR 63.7550(B), 40 CFR 63.7550(c)(5))**~~
   a. ~~Company and Facility name and address.~~
   b. ~~Process unit information, emissions limitations, and operating parameter limitations.~~
   c. ~~Date of report and beginning and ending dates of the reporting period.~~
   d. ~~The total operating time during the reporting period.~~
   e. ~~Include the date of the most recent tune-up for EU BLHEATER-A, EU BLHEATER-B, and EU BLBOILER. Include the date of the most recent burner inspection if it was not done annually, biennially, or on a 5-year period and was delayed until the next scheduled or unscheduled unit shutdown.~~

5. ~~The permittee shall submit a Notification of Compliance Status (NOCS) following the initial compliance demonstration. The NOCS must contain the following:~~ ~~**(40 CFR 63.7530(d),(e), and (f), 40 CFR 63.7545(e))**~~
    a. ~~A description of each Emission Unit including identification of which subcategories the EU is in and the design heat input capacity of the EU~~
    b. ~~The following certifications of compliance, as applicable, and signed by a responsible official:~~
        i. ~~"This facility complies with the required initial tune-up according to the procedures in § 63.7540(a)(10)(i) through (vi)."~~
        ii. ~~"This facility has had an energy assessment performed according to § 63.7530(e) and is an accurate depiction of the facility at the time of the assessment."~~

~~**See Appendix 8**~~

~~VIII. STACK/VENT RESTRICTION(S)~~

~~The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:~~

~~**Stack & Vent ID**~~	~~**Maximum Exhaust Dimensions (inches)**~~	~~**Minimum Height Above Ground (feet)**~~	~~**Underlying Applicable Requirements**~~
~~NA~~	~~NA~~	~~NA~~	~~NA~~

~~IX. OTHER REQUIREMENT(S)~~

1. ~~The permittee shall comply with all applicable provisions of the National Emission Standards for Hazardous Air Pollutants, as specified in 40 CFR, Part 63, Subpart A and Subpart DDDDD: Industrial, Commercial, and Institutional Boilers and Process Heaters no later than January 31, 2016.~~ ~~**(40 CFR, Part 63, Subpart DDDDD, 40 CFR 63.7495(b))**~~

~~**Footnotes:**~~
~~[1]This condition is state only enforceable and was established pursuant to Rule 201(1)(b).~~
~~[2]This condition is federally enforceable and was established pursuant to Rule 201(1)(a).~~

FG BLCMPRS
FLEXIBLE GROUP CONDITIONS

DESCRIPTION

Three natural gas-fired, 6,000, HP 2-stroke lean burn Dresser Rand TCVD-12 compressor engine used to compress natural gas into the storage reservoir during injection, and into the pipeline during withdrawal.

Emission Units: EU BLCMPR-A, EU BLCMPR-B, EU BLCMPR-C

POLLUTION CONTROL EQUIPMENT Clean burn/lean burn system.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period/ Operating Scenario	Equipment	Monitoring/ Testing Method	Underlying Applicable Requirements
1. NOx	26.4 pph^2	Test Protocol*	EU BLCMPR-A, EU BLCMPR-B, EU BLCMPR-C (The limit applies to each individual compressor engine.)	V.1, VI.3, VI.4, VI.5, VI.6	**40 CFR 52.21, R 336.2802**
2. CO	37.0 pph^2	Test Protocol*	EU BLCMPR-A, EU BLCMPR-B, EU BLCMPR-C (The limit applies to each individual compressor engine.)	V.1, VI.3, VI.4, VI.5, VI.6	**40 CFR 52.21, R 336.2802**
3. VOC	9.7 pph^2	Test Protocol*	EU BLCMPR-A, EU BLCMPR-B, EU BLCMPR-C (The limit applies to each individual compressor engine.)	V.1, VI.3, VI.4, VI.5, VI.6	**40 CFR 52.21, R 336.2802**

*Test protocol shall specify averaging time.

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee shall use only sweet natural gas as fuel for the compressor engines. Sweet gas is defined as any gas containing no more than 1 grain of hydrogen sulfide or 10 grains of total sulfur per 100 standard cubic feet.^{2} **R 336.1119(i) and (dd))**

2. The permittee shall not operate the three compressor engines unless the clean burn/lean burn combustion

systems on each engine are installed and operating properly.[2] **(R 336.1910)**

3. The combined total hours of operation of the three compressor engines shall not exceed 15,000 hours per calendar year.[2] **(40 CFR 52.21)**

4. The permittee shall operate the compressor engines within their established operating envelope as approved by the AQD. **(R 336.1213(3))**

5. The permittee shall operate EU BLCMPR-A, EU BLCMPR-B, EU BLCMPR-C at the torque and speed established within their operating envelope. The operating envelope shall be approved by the AQD. **(R 336.1213(3))**

6. The permittee shall operate the FG BLCMPRS per the AQD approved malfunction abatement plan. **(R 336.1911)**

IV. <u>DESIGN/EQUIPMENT PARAMETER(S)</u>

1. The NOx emission rate from each compressor engine shall not exceed 2 grams per brake horsepower hour at 100 percent speed and 100 percent torque.[2] **(40 CFR 52.21)**

2. The CO emission rate from each compressor engine shall not exceed 2.8 grams per brake horsepower hour at 100 percent speed and 100 percent torque.[2] **(40 CFR 52.21)**

3. The VOC emission rate from each compressor engine shall not exceed 0.73 grams per brake horsepower hour at 100 percent speed and 100 percent torque.[2] **(40 CFR 52.21; R336.1702(a))**

V. <u>TESTING/SAMPLING</u>

Records shall be maintained on file for a period of five years. (R 336.1213(3)(b)(ii))

1. Once every five-years the permittee shall conduct a stack test of NOx, CO, and VOC emissions on EU BLCMPR-A, EU BLCMPR-B, EU BLCMPR-C. **(R 336.1213(3)(a))**

2. All testing, sampling, analytical and calibration procedures used for any stack test program shall be performed in accordance with 40 CFR, Part 60, and Appendix A, Methods 2, 3A, 7E, 10, 10B, and 25 or other acceptable reference methods approved by the AQD. **(R 336.1213(3)(a))**

3. Once every five years the permittee shall demonstrate compliance with the grains of total sulfur in the compressor engine fuel by analyzing the fuel.[2] **(R 336.1119(i) and (dd))**

VI. <u>MONITORING/RECORDKEEPING</u>

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall record the total fuel consumption for each compressor engine in FG BLCMPRS for each calendar month. **(R 336.1213(3)(b))**

2. The permittee shall record the total engine hours of operation for each compressor engine in FG BLCMPRS for each calendar month. (**40 CFR 52.21)**

3. The permittee shall calculate and record the NOx, CO, and VOC emissions in pounds per hour for each engine in FG BLCMPRS calculated as an average over each calendar month using the equation in Appendix 7B, or an alternate equation approved by the AQD, in conjunction with monitoring, testing or recordkeeping data. The permittee may calculate NOx, CO, and VOC emissions from each engine in FG BLCMPRS by using an emission factor based on stack tests of the compressor engines. The emissions calculations shall be available

   to the AQD upon request by 15th of the following month. (R 336.1213(3))

4. The permittee shall recalculate the emission factor following the verification of emission rates from stack testing required in V. Testing. **(R 336.1213(3))**

5. The permittee shall continuously monitor and record the torque and speed of EU BLCMPR-A, EU BLCMPR-B, EU BLCMPR-C, to ensure the compressor engines operate within the established operating envelope. **(R 336.1213(3)(a))**

6. The permittee shall maintain the compressor engine operating envelope using the most recent stack test data. The operating envelope shall be approved by AQD**.** **(R 336.1213(3)(a))**

7. The permittee shall record monthly natural gas used for EU BLCMPR-A, EU BLCMPR-B, EU BLCMPR-C start-up and blow-down and a calculation, acceptable to the AQD, showing year-to-date VOC emission rates. **(R 336.1213(3))**

Appendix 7B

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

4. The permittee shall submit two complete test protocols to the AQD, one to the Technical Programs Unit Supervisor and one to the District Supervisor for approval at least 30 days prior to the anticipated test date. The protocol shall describe the test method(s) and the maximum routine operating conditions, including targets for key operational parameters associated with air pollution control equipment to be monitored and recorded during testing.[2] **(R 336.12001(3))**

5. The permittee shall notify the AQD Technical Programs Unit Supervisor and the District Supervisor no less than 7 days prior to the anticipated test date. **(R 336.2001(4))**

6. The permittee shall submit two complete test reports of the test results to the AQD, one to the Technical Programs Unit Supervisor and one to the District Supervisor, within 60 days following the last date of the test.[2] **(R 336.2001(5))**

7. The permittee shall submit a complete analysis plan to the AQD District Supervisor for approval at least 30 days prior to the anticipated analysis date. **(R 336.1119(i) and (dd))**

8. The permittee shall submit a complete report of the analysis results to the AQD District Supervisor, within 60 days following the last date of the test. **(R 336. 1119(i) and (dd))**

See Appendix 8

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	Maximum Exhaust Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements

Stack & Vent ID	Maximum Exhaust Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
1. SV-101 (EU BLCMPR-A)	48[2]	70.5[2]	**40 CFR 52.21, R 336.1802**
2. SV-102 (EU BLCMPR-B)	48[2]	70.5[2]	**40 CFR 52.21, R 336.1802**
3. SV-103 (EU BLCMPR-C)	48[2]	70.5[2]	**40 CFR 52.21, R 336.1802**

IX. OTHER REQUIREMENT(S)

1. The permittee shall maintain a malfunction abatement plan approved by the AQD District Supervisor in accordance with Rule 336.1911 for FG BLCMPRS. **(R 336.1911)**

2. The permittee shall develop an “operating envelope” within which each compressor engine has demonstrated, by emissions testing, to operate in compliance with all applicable NOx, CO, and VOC emission limits in pounds per hour. Ranges of engine torque and speed will define the operating envelope. The operating envelope shall be revised after stack testing, and the operating envelope shall be approved by the AQD. **(R 336.1213(3))**

Footnotes:

[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

~~FG BLHEATERS~~
~~FLEXIBLE GROUP CONDITIONS~~

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Commented [CW1]: TransCanada proposes to remove this flexible group as there are no applicable federal regulations that require emission testing on gas-fired heaters of this size and type. Furthermore, the heaters in this FG are also regulated under 40 CFR 63 DDDDD, and are required to perform annual work practice standards and tuning. Please contact Chris Waltman to discuss this further.

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~~DESCRIPTION~~

~~Two natural gas-fired Sivalls 16 MMBtu/hr indirect gas withdrawal heaters.~~

~~**Emission Unit:** EU BLHEATER-A and EU BLHEATER-B.~~

~~**POLLUTION CONTROL EQUIPMENT** NA~~

~~I. EMISSION LIMIT(S)~~

~~**Pollutant**~~	~~**Limit**~~	~~**Time Period/ Operating Scenario**~~	~~**Equipment**~~	~~**Monitoring/ Testing Method**~~	~~**Underlying Applicable Requirements**~~
~~1. NOx~~	~~0.14 lb/MM Btu[2]~~	~~Test Protocol*~~	~~EU BLHEATER-A, EU BLHEATER-B~~ ~~(The limit applies to each individual gas withdrawal heater.)~~	~~V.1~~	~~**R 336.1201(3)**~~
~~2. NOx~~	~~2.8 pph[2]~~	~~Test Protocol*~~	~~EU BLHEATER-A, EU BLHEATER-B~~ ~~(The limit applies to each individual gas withdrawal heater.)~~	~~V.1~~	~~**R 336.1201(3)**~~
~~3. CO~~	~~0.035 lb/MM Btu[2]~~	~~Test Protocol*~~	~~EU BLHEATER-A, EU BLHEATER-B~~ ~~(The limit applies to each individual gas withdrawal heater.)~~	~~V.1~~	~~**R 336.1201(3)**~~
~~4. CO~~	~~0.7 pph[2]~~	~~Test Protocol*~~	~~EU BLHEATER-A, EU BLHEATER-B~~ ~~(The limit applies to each individual gas withdrawal heater.)~~	~~V.1~~	~~**R 336.1201(3)**~~

~~*Test Protocol shall specify averaging time.~~

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~~II. MATERIAL LIMIT(S)~~

~~Material~~	~~Limit~~	~~Time Period/ Operating Scenario~~	~~Equipment~~	~~Monitoring/ Testing Method~~	~~Underlying Applicable Requirements~~
~~NA~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~

~~III. PROCESS/OPERATIONAL RESTRICTION(S)~~

~~1. The permittee shall use only sweet natural gas as fuel for the gas withdrawal heaters. Sweet gas is defined as any gas containing no more than 1 grain of hydrogen sulfide or 10 grains of total sulfur per 100 standard cubic feet.[2]~~ **~~(R 336.1119(i) and (dd))~~**

~~IV. DESIGN/EQUIPMENT PARAMETER(S)~~

~~NA~~

~~V. TESTING/SAMPLING~~

~~Records shall be maintained on file for a period of five years.~~ **~~(R 336.1213(3)(b)(ii))~~**

~~1. The permittee shall conduct a stack test once every five years on EU BLHEATER-A and EU BLHEATER-B to determine the NOx and CO in the exhaust gas measured as pounds per million BTU heat input and pounds per hour.~~ **~~(R 336.1213(3)(a))~~**

~~2. All testing, sampling, analytical and calibration procedures used for any stack test program shall be performed in accordance with 40 CFR, Part 60, and Appendix A, Methods 2, 3A, 7E, 10, 10B, and 25, or other acceptable reference methods approved by the AQD.~~ **~~(R 336.1213(3)(a))~~**

~~3. The permittee shall demonstrate compliance with the grains of total sulfur in the gas withdrawal heater fuel by analyzing the fuel once every five years.[2]~~ **~~(R 226.1119(i) and (dd))~~**

~~VI. MONITORING/RECORDKEEPING~~

~~Records shall be maintained on file for a period of five years.~~ **~~(R 336.1213(3)(b)(ii))~~**

~~1. The permittee shall monitor and record the fuel consumption for each of the gas withdrawal heaters for each calendar month.~~ **~~(R 336.1213(3)(b))~~** ~~The permittee shall record the total hours of operation for each gas withdrawal heater for each calendar month.~~ **~~(R 336.1213(3)(b))~~**

~~VII. REPORTING~~

~~1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A.~~ **~~(R 336.1213(3)(c)(ii))~~**

~~2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30.~~ **~~(R 336.1213(3)(c)(i))~~**

~~3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year.~~ **~~(R 336.1213(4)(c))~~**

~~4. No less than 30 days prior to testing, a complete stack testing plan must be submitted to the AQD. The final plan must be approved by the AQD prior to testing.~~ **~~(R 336.1213(3))~~**

~~5. Verification of emission rates includes the submittal of a complete report of the stack test results within 60 days of the last day of the test.~~ **~~(R 336.1001(4))~~**

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6. ~~The permittee shall submit two complete test protocols to the AQD, one to the Technical Programs Unit Supervisor and one to the District Supervisor for approval at least 30 days prior to the anticipated test date. The protocol shall describe the test method(s) and the maximum routine operating conditions, including targets for key operational parameters associated with air pollution control equipment to be monitored and recorded during testing.[2] **(R 336.12001(3))**~~

7. ~~The permittee shall submit a complete analysis plan to the AQD District Supervisor for approval at least 30 days prior to the anticipated analysis date. **(R 336.1119(i) and (dd))**~~

8. ~~The permittee shall submit a complete report of the analysis results to the AQD District Supervisor, within 60 days following the last date of the test. **(R 336.1119(i) and (dd))**~~

~~**See Appendix 8**~~

~~VIII. STACK/VENT RESTRICTION(S)~~

~~The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:~~

~~**Stack & Vent ID**~~	~~**Maximum Exhaust Dimensions (inches)**~~	~~**Minimum Height Above Ground (feet)**~~	~~**Underlying Applicable Requirements**~~
~~1. SV-107 (EU BLHEATER-A)~~	~~42~~	~~40~~	~~**R 336.1203(3)**~~
~~2. SV-108 (EU BLHEATER-B)~~	~~42~~	~~40~~	~~**R 336.1203(3)**~~

~~IX. OTHER REQUIREMENT(S)~~

~~NA~~

~~**Footnotes:**~~

~~[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).~~
~~[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).~~

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FG BLGENS
FLEXIBLE GROUP CONDITIONS

DESCRIPTION

Three natural gas-fired 1,125 HP 4-stroke lean burn Caterpillar 3516 generator engine used to provide primary power to the compressor station, and can produce a maximum of 800 KW of energy.

Emission Unit: EU BLGEN-A, EU BLGEN-B, and EU BLGEN-C

POLLUTION CONTROL EQUIPMENT Oxidation Catalyst.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period/ Operating Scenario	Equipment	Monitoring/ Testing Method	Underlying Applicable Requirements
1. NOx	5.7 pph[2]	Test Protocol*	EU BLGEN-A, EU BLGEN-B, EU BLGEN-C (The limit applies to each individual generator engine.)	V.1, VI.4, VI.5	**R 336.1205(1)**
2. CO	1.6 pph[2]	Test Protocol*	EU BLGEN-A, EU BLGEN-B, EU BLGEN-C (The limit applies to each individual generator engine.)	V.1, VI.4, VI.5	**R 336.1205(1)**
3. VOC	0.9 pph[2]	Test Protocol*	EU BLGEN-A, EU BLGEN-B, EU BLGEN-C (The limit applies to each individual generator engine.)	V.1, VI.4, VI.5	**R 336.1702**

*Test Protocol shall specify averaging time.

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee shall use only sweet natural gas as fuel for the generator engines. Sweet gas is defined as any gas containing no more than 1 grain of hydrogen sulfide or 10 grains of total sulfur per 100 standard cubic feet.[2] **(R 336.1119(i) and (d))**

2. The permittee shall not operate any generator engine in FG BLGENS unless the catalytic oxidation system is installed and operating properly.[2] **(R 336.1910)**

3. The permittee shall not operate any generator engine in FG BLGENS unless the lean burn/clean burn system is installed and operating properly.[2] **(R 336.1910)**

4. The permittee shall not operate any generator engine in FG BLGENS unless the air/fuel ratio control system of that generator engine is installed and operating properly. **(R 336.1910)**

5. The combined total hours of operation of the three generator engines in FG BLGENS shall not exceed 16,380 hours per calendar year.[2] **(R 336.1205(1))**

6. The permittee shall not operate a generator engine in FG BLGENS unless the generator engine's inlet and outlet temperature across the catalyst is in compliance with the AQD approved Malfunction Abatement Plan. As an alternative, the permittee shall not operate a generator engine in FG BLGENS unless the pressure drop at the inlet and outlet across the catalyst are in compliance with the AQD approved Malfunction Abatement Plan. **(R 336.1213(3))**

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. The NO_x emission rate from each generator engine shall not exceed 2 grams per brake horsepower hour at the maximum operating limit of 90 percent load.2 **(R 336.1205)**

2. The CO emission rate from each generator engine shall not exceed 1.4 grams per brake horsepower hour at the maximum operating limit of 90 percent load.2 **(R 336.1205)**

3. The VOC emission rate from each generator engine shall not exceed 0.55 grams per brake horsepower hour at the maximum operating limit of 90 percent load.2 **(R 336.1205)**

4. The permittee shall install and maintain a temperature monitor at the inlet and outlet of the catalytic converter. As an alternative, the permittee shall install and maintain a pressure monitor at the inlet and outlet of the catalytic converter. **(R 336.1213(3))**

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. Once every five years the permittee shall conduct a stack test on each engine in FG BLGENS to determine the NO_x, CO and VOC emissions in pounds per hour. **(R 336.1213(3)(b))**

2. All testing, sampling, analytical and calibration procedures used for any stack test program shall be performed in accordance with 40 CFR, Part 60 and Appendix A, Methods 1, 3A, 7E, 10, 18 and 19 or other acceptable reference methods approved by the AQD. **(R 336.1213 (3)(a))**

3. Once every five years the permittee shall analyze the sweet natural gas fuel supplied to and fired in the generator engines for grains of hydrogen sulfide or grains of total sulfur per 100 standard cubic feet.[2] **(R 336.1119(i) and (d))**

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall monitor and record the hours of operation per calendar month for each generator engine in FG BLGENS[2]. **(R 336.1205(1))**

2. The permittee shall continuously monitor the fuel consumption for each generator engine in FG BLGENS. The permittee shall record the fuel consumption once an hour. **(R 336.1213(3)(a))**

3. The permittee shall continuously monitor the temperature difference across each catalytic oxidizer and once

per hour record the temperature difference across each catalytic oxidizer. As an alternative, the permittee shall continuously monitor the pressure drop across each catalytic oxidizer and once per day record the pressure difference across each catalytic oxidizer. **(R 336.1213(3)(a))**

4. The permittee shall calculate and record the NO_x, CO and VOC emissions in pounds per hour for each engine in FG BLGENS calculated as an average over each calendar month using the equation in Appendix 7C, or an alternate equation approved by the AQD, in conjunction with monitoring, testing or recordkeeping data. The permittee may calculate NO_x, CO and VOC emissions from each engine in FG BLGENS by using an emission factor based on stack tests of the generator engines. The emissions calculations shall be available to the AQD upon request by the 15th of the following month. **(R 336.1213(3))**

5. The permittee shall recalculate the emission factor used to calculate emissions from the generator engines following the verification of emission rates from stack testing required in V. Testing. **(R 336.1213(3)(a))**

See Appendix 7C

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

4. The permittee shall submit two complete test protocols to the AQD, one to the Technical Programs Unit Supervisor and one to the District Supervisor for approval at least 30 days prior to the anticipated test date. The protocol shall describe the test method(s) and the maximum routine operating conditions, including targets for key operational parameters associated with air pollution control equipment to be monitored and recorded during testing.[2] **(R 336.2001(3))**

5. The permittee shall notify the AQD Technical Programs Unit Supervisor and the District Supervisor no less than 7 days prior to the anticipated test date. **(R 336.2001(4))**

6. The permittee shall submit two complete test reports of the test results to the AQD, one to the Technical Programs Unit Supervisor and one to the District Supervisor, within 60 days following the last date of the test.[2] **(R 336.2001(5))**

7. The permittee shall submit a complete analysis plan to the AQD District Supervisor for approval at least 30 days prior to the anticipated analysis date. **(R 336.1119(i) and (dd))**

8. The permittee shall submit a complete report of the analysis results to the AQD District Supervisor, within 60 days following the last date of the test. **(R 336. 1119(i) and (dd))**

See Appendix 8

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted.

Stack & Vent ID	Maximum Exhaust Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
1. SV-104 (EU BLGEN-A)	10[2]	64.6[2]	**R 336.1205**
2. SV-105 (EU BLGEN-B)	10[2]	64.6[2]	**R 336.1205**
3. SV-106 (EU BLGEN-C)	10[2]	64.6[2]	**R 336.1205**

IX. OTHER REQUIREMENT(S)

1. The permittee shall maintain a malfunction abatement plan (MAP) approved by the AQD District Supervisor in accordance with Rule 336.1911 for FG BLGENS. The MAP shall include each generator engine's inlet and outlet temperature across the catalyst; or as an alternative the permittee shall include each generator engine's inlet and outlet pressure across the catalyst. The temperature and pressure will be established during stack testing and demonstrate compliance with emission limits. **(R 336.1911)**

Footnotes:

[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).
[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

FG BLCLEANERS
FLEXIBLE GROUP CONDITIONS

DESCRIPTION

Any cold cleaner that is grandfathered or exempt from Rule 201 pursuant to Rule 278 and Rule 281(h) or Rule 285(r)(iv). Existing cold cleaners were placed into operation prior to July 1, 1979. New cold cleaners were placed into operation on or after July 1, 1979.

Emission Unit: EU BLCLEANER

I. EMISSION LIMIT(S)

NA

II. MATERIAL LIMIT(S)

1. The permittee shall not use cleaning solvents containing more than five percent by weight of the following halogenated compounds: methylene chloride, perchloroethylene, trichloroethylene, 1,1,1-trichloroethane, carbon tetrachloride, chloroform, or any combination thereof. **(R 336.1213(2))**

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. Cleaned parts shall be drained for no less than 15 seconds or until dripping ceases. **(R 336.1611(2)(b), R 336.1707(3)(b))**

2. The permittee shall perform routine maintenance on each cold cleaner as recommended by the manufacturer. **(R 336.1213(3))**

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. The cold cleaner must meet one of the following design requirements:
   a. The air/vapor interface of the cold cleaner is no more than ten square feet. **(R 336.1281(h))**
   b. The cold cleaner is used for cleaning metal parts and the emissions are released to the general in-plant environment. **(R 336.1285(r)(iv))**

2. The cold cleaner shall be equipped with a device for draining cleaned parts. **(R 336.1611(2)(b), R 336.1707(3)(b))**

3. All new and existing cold cleaners shall be equipped with a cover and the cover shall be closed whenever parts are not being handled in the cold cleaner. **(R 336.1611(2)(a), R 336.1707(3)(a))**

4. The cover of a new cold cleaner shall be mechanically assisted if the Reid vapor pressure of the solvent is more than 0.3 psia or if the solvent is agitated or heated. **(R 336.1707(3)(a))**

5. If the Reid vapor pressure of any solvent used in a new cold cleaner is greater than 0.6 psia; or, if any solvent used in a new cold cleaner is heated above 120 degrees Fahrenheit, then the cold cleaner must comply with at least one of the following provisions:
   a. The cold cleaner must be designed such that the ratio of the freeboard height to the width of the cleaner is equal to or greater than 0.7. **(R 336.1707(2)(a))**
   b. The solvent bath must be covered with water if the solvent is insoluble and has a specific gravity of more than 1.0. **(R 336.1707(2)(b))**

   c. The cold cleaner must be controlled by a carbon adsorption system, condensation system, or other method of equivalent control approved by the AQD. **(R 336.1707(2)(c))**

V. TESTING/SAMPLING

NA

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. For each new cold cleaner in which the solvent is heated, the solvent temperature shall be monitored and recorded at least once each calendar week during routine operating conditions. **(R 336.1213(3))**

2. The permittee shall maintain the following information on file for each cold cleaner: **(R 336.1213(3))**
   a. A serial number, model number, or other unique identifier for each cold cleaner.
   b. The date the unit was installed, manufactured or that it commenced operation.
   c. The air/vapor interface area for any unit claimed to be exempt under Rule 281(h).
   d. The applicable Rule 201 exemption.
   e. The Reid vapor pressure of each solvent used.
   f. If applicable, the option chosen to comply with Rule 707(2).

3. The permittee shall maintain written operating procedures for each cold cleaner. These written procedures shall be posted in an accessible, conspicuous location near each cold cleaner. **(R 336.1611(3), R 336.1707(4))**

4. As noted in Rule 611(2)(c) and Rule 707(3)(c), if applicable, an initial demonstration that the waste solvent is a safety hazard shall be made prior to storage in non-closed containers. If the waste solvent is a safety hazard and is stored in non-closed containers, verification that the waste solvent is disposed of so that not more than 20 percent, by weight, is allowed to evaporate into the atmosphere shall be made on a monthly basis. **(R 336.1213(3), R 336.1611(2)(c), R 336.1707(3)(c))**

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

See Appendix 8

VIII. STACK/VENT RESTRICTION(S)

NA

IX. OTHER REQUIREMENT(S)

NA

E. NON-APPLICABLE REQUIREMENTS

At the time of the ROP issuance, the AQD has determined that no non-applicable requirements have been identified for incorporation into the permit shield provision set forth in the General Conditions in Part A pursuant to Rule 213(6)(a)(ii).

APPENDICES

Appendix 1-S2. Abbreviations and Acronyms

The following is an alphabetical listing of abbreviations/acronyms that may be used in this permit.

AQD	Air Quality Division	MM	Million
acfm	Actual cubic feet per minute	MSDS	Material Safety Data Sheet
BACT	Best Available Control Technology	MW	Megawatts
BTU	British Thermal Unit	NA	Not Applicable
°C	Degrees Celsius	NAAQS	National Ambient Air Quality Standards
CAA	Federal Clean Air Act	NESHAP	National Emission Standard for Hazardous Air Pollutants
CAM	Compliance Assurance Monitoring	NMOC	Non-methane Organic Compounds
CEM	Continuous Emission Monitoring	NOx	Oxides of Nitrogen
CFR	Code of Federal Regulations	NSPS	New Source Performance Standards
CO	Carbon Monoxide	NSR	New Source Review
COM	Continuous Opacity Monitoring	PM	Particulate Matter
department	Michigan Department of Environmental Quality	PM-10	Particulate Matter less than 10 microns in diameter
dscf	Dry standard cubic foot	pph	Pound per hour
dscm	Dry standard cubic meter	ppm	Parts per million
EPA	United States Environmental Protection Agency	ppmv	Parts per million by volume
EU	Emission Unit	ppmw	Parts per million by weight
°F	Degrees Fahrenheit	PS	Performance Specification
FG	Flexible Group	PSD	Prevention of Significant Deterioration
GACS	Gallon of Applied Coating Solids	psia	Pounds per square inch absolute
GC	General Condition	psig	Pounds per square inch gauge
gr	Grains	PeTE	Permanent Total Enclosure
HAP	Hazardous Air Pollutant	PTI	Permit to Install
Hg	Mercury	RACT	Reasonable Available Control Technology
hr	Hour	ROP	Renewable Operating Permit
HP	Horsepower	SC	Special Condition
H_2S	Hydrogen Sulfide	scf	Standard cubic feet
HVLP	High Volume Low Pressure *	sec	Seconds
ID	Identification (Number)	SCR	Selective Catalytic Reduction
IRSL	Initial Risk Screening Level	SO_2	Sulfur Dioxide
ITSL	Initial Threshold Screening Level	SRN	State Registration Number
LAER	Lowest Achievable Emission Rate	TAC	Toxic Air Contaminant
lb	Pound	Temp	Temperature
m	Meter	THC	Total Hydrocarbons
MACT	Maximum Achievable Control Technology	tpy	Tons per year
MAERS	Michigan Air Emissions Reporting System	µg	Microgram
MAP	Malfunction Abatement Plan	VE	Visible Emissions
MDEQ	Michigan Department of Environmental Quality	VOC	Volatile Organic Compounds
mg	Milligram	yr	Year
mm	Millimeter		

*For HVLP applicators, the pressure measured at the gun air cap shall not exceed 10 pounds per square inch gauge (psig).

Appendix 2-S2. Schedule of Compliance

The permittee certified in the ROP application that this stationary source is in compliance with all applicable requirements and the permittee shall continue to comply with all terms and conditions of this ROP. A Schedule of Compliance is not required. **(R 336.1213(4)(a), R 336.1119(a)(ii))**

Appendix 3-S2. Monitoring Requirements

Specific monitoring requirement procedures, methods or specifications are detailed in Part A or the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, this appendix is not applicable.

Appendix 4-S2. Recordkeeping

Specific recordkeeping requirement formats and procedures are detailed in Part A or the appropriate source-wide, emission unit and/or flexible group special conditions. Therefore, this appendix is not applicable.

Appendix 5-S2. Testing Procedures

Specific testing requirement plans, procedures, and averaging times are detailed in the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, this appendix is not applicable.

Appendix 6-S2. Permits to Install

The following table lists any PTIs issued or ROP revision applications received since the effective date of the previously issued ROP No. MI-ROP-B7198-2008. Those ROP revision applications that are being issued concurrently with this ROP renewal are identified by an asterisk (*). Those revision applications not listed with an asterisk were processed prior to this renewal.

Source-Wide PTI No MI-PTI-B7198-2008 is being reissued as Source-Wide PTI No. MI-PTI-B7198-2014.

Permit to Install Number	ROP Revision Application Number	Description of Equipment or Change	Corresponding Emission Unit(s) or Flexible Group(s)
17-07A	201300051	EU BLGLYDHY Define sweet natural gas as containing no more than 1 grain of hydrogen sulfide or 10 grains of total sulfur per 100 standard cubic feet. Require analysis of the pre-dehydration natural gas to determine its non-methane VOC content and composition once every five years. Require compliance with applicable conditions from 40 CFR, Part 63, Subpart HHH. FG BLCMPRS Define sweet natural gas as containing no more than 1 grain of hydrogen sulfide or 10 grains of total sulfur per 100 cubic feet. Require demonstration with compliance of the grains of total sulfur in the fuel once every five years.	EU BLGLYDHY, FG BLCMPRS
NA	201300122	The revised malfunction abatement plan (MAP) replaced the former MAP.	EU BLCMPR-A, EU BLCMPR-B, EU BLCMPR-C, FG BLCMPRS

Appendix 7-S2. Emission Calculations

Appendix 7A. EU BLHHH

The permittee shall use the following equation, or alternate equation approved by the AQD, in conjunction with monitoring, testing or recordkeeping data to determine compliance with the emission limit of BTEX referenced in EU BLHHH, I.1, BTEX emissions (40 CFR 63.1275 equation 1).

$$EL_{BTEX} = 3.10x10^{-4} * Throughput * C_{i,BTEX} * 365\,\frac{days}{yr} * \frac{1\,Mg}{1x10^{6}\,grams} \qquad \text{Equation 1}$$

Where:

EL_{BTEX} = Unit-specific BTEX emission limit, megagrams per year;

3.10×10^{-4} = BTEX emission limit, grams BTEX/standard cubic meter-ppmv;

Throughput = Annual average daily natural gas throughput, standard cubic meters per day;

$C_{i,BTEX}$ = Annual average BTEX concentration of the natural gas at the inlet to the glycol dehydration unit, ppmv.

Appendix 7B. FG BLCMPRS

The permittee shall calculate and record the NOx, CO, and VOC emissions in pounds per hour for each engine in FG BLCMPRS as an average over each calendar month using this equation, or an alternate equation approved by the AQD, in conjunction with monitoring, testing or recordkeeping data. The permittee may calculate NOx, CO, and VOC emissions from each engine in FG BLCMPRS by using an emission factor based on stack tests of the compressor engines.

NOX, CO, or VOC (lb/hr) = natural gas usage (mmscf/hour)/engine operation (hours/month) X EF (pound NOx, CO, or VOC/mmscf)

Where:

mmscf is million standard cubic feet

EF is an emission factor expressed as pounds of NOx, CO, and VOC emitted per million cubic feet of gas used as fuel. EF shall be periodically recalculated as more current stack tests become available. The recalculated EF is subject to approval by the District Supervisor of the AQD.

Appendix 7C FG BLGENS

The permittee shall calculate and record the NOx, CO, and VOC emissions in pounds per hour for each engine in FG BLGENS as an average over each calendar month using this equation, or an alternate equation approved by the AQD, in conjunction with monitoring, testing or recordkeeping data. The permittee may calculate NOx, CO, and VOC emissions from each engine in FG BLGENS by using an emission factor based on stack tests of the generator engines.

NOX, CO, or VOC (lb/hr) = natural gas usage (mmscf/month)/engine operation (hrs/month) X EF (lb NOx, CO or VOC/mmscf)

Where:

mmscf is million standard cubic feet

EF is an emission factor expressed as pounds of NOx, CO, and VOC emitted per million cubic feet of gas used as fuel. EF shall be periodically recalculated as more current stack tests become available. The recalculated EF is subject to approval by the District Supervisor of the AQD.

Appendix 8-S2. Reporting

A. Annual, Semiannual, and Deviation Certification Reporting

The permittee shall use the MDEQ Report Certification form (EQP 5736) and MDEQ Deviation Report form (EQP 5737) for the annual, semiannual and deviation certification reporting referenced in the Reporting Section of the Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Alternative formats must meet the provisions of Rule 213(4)(c) and Rule 213(3)(c)(i), respectively, and be approved by the AQD District Supervisor.

B. Other Reporting

Specific reporting requirement formats and procedures are detailed in Part A or the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, Part B of this appendix is not applicable.

SECTION 3 – COLD SPRINGS 1 COMPRESSOR STATION

A. GENERAL CONDITIONS

Permit Enforceability

- All conditions in this permit are both federally enforceable and state enforceable unless otherwise noted. **(R 336.1213(5))**

- Those conditions that are hereby incorporated in a state-only enforceable Source-Wide PTI pursuant to Rule 201(2)(d) are designated by footnote one. **(R 336.1213(5)(a), R 336.1214a(5))**

- Those conditions that are hereby incorporated in a federally enforceable Source-Wide PTI pursuant to Rule 201(2)(c) are designated by footnote two. **(R 336.1213(5)(b), R 336.1214a(3))**

General Provisions

1. The permittee shall comply with all conditions of this ROP. Any ROP noncompliance constitutes a violation of Act 451, and is grounds for enforcement action, for ROP revocation or revision, or for denial of the renewal of the ROP. All terms and conditions of this ROP that are designated as federally enforceable are enforceable by the Administrator of the United States Environmental Protection Agency (USEPA) and by citizens under the provisions of the federal Clean Air Act (CAA). Any terms and conditions based on applicable requirements which are designated as “state-only” are not enforceable by the USEPA or citizens pursuant to the CAA. **(R 336.1213(1)(a))**

2. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this ROP. **(R 336.1213(1)(b))**

3. This ROP may be modified, revised, or revoked for cause. The filing of a request by the permittee for a permit modification, revision, or termination, or a notification of planned changes or anticipated noncompliance does not stay any ROP term or condition. This does not supersede or affect the ability of the permittee to make changes, at the permittee’s own risk, pursuant to Rule 215 and Rule 216. **(R 336.1213(1)(c))**

4. The permittee shall allow the department, or an authorized representative of the department, upon presentation of credentials and other documents as may be required by law and upon stating the authority for and purpose of the investigation, to perform any of the following activities **(R 336.1213(1)(d))**:
   a. Enter, at reasonable times, a stationary source or other premises where emissions-related activity is conducted or where records must be kept under the conditions of the ROP.
   b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of the ROP.
   c. Inspect, at reasonable times, any of the following:
      i. Any stationary source.
      ii. Any emission unit.
      iii. Any equipment, including monitoring and air pollution control equipment.
      iv. Any work practices or operations regulated or required under the ROP.
   d. As authorized by Section 5526 of Act 451, sample or monitor at reasonable times substances or parameters for the purpose of assuring compliance with the ROP or applicable requirements.

5. The permittee shall furnish to the department, within a reasonable time, any information the department may request, in writing, to determine whether cause exists for modifying, revising, or revoking the ROP or to determine compliance with this ROP. Upon request, the permittee shall also furnish to the department copies of any records that are required to be kept as a term or condition of this ROP. For information which is claimed

by the permittee to be confidential, consistent with the requirements of the 1976 PA 442, MCL §15.231 et seq., and known as the Freedom of Information Act, the person may also be required to furnish the records directly to the USEPA together with a claim of confidentiality. **(R 336.1213(1)(e))**

6. A challenge by any person, the Administrator of the USEPA, or the department to a particular condition or a part of this ROP shall not set aside, delay, stay, or in any way affect the applicability or enforceability of any other condition or part of this ROP. **(R 336.1213(1)(f))**

7. The permittee shall pay fees consistent with the fee schedule and requirements pursuant to Section 5522 of Act 451. **(R 336.1213(1)(g))**

8. This ROP does not convey any property rights or any exclusive privilege. **(R 336.1213(1)(h))**

Equipment & Design

9. Any collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in Rule 370(2). **(R 336.1370)**

10. Any air cleaning device shall be installed, maintained, and operated in a satisfactory manner and in accordance with the Michigan Air Pollution Control rules and existing law. **(R 336.1910)**

Emission Limits

11. Unless otherwise specified in this ROP, the permittee shall comply with Rule 301, which states, in part, “Except as provided in subrules 2, 3, and 4 of this rule, a person shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of a density greater than the most stringent of the following: **(R 336.1301(1))**
    a. A 6-minute average of 20 percent opacity, except for one 6-minute average per hour of not more than 27 percent opacity.
    b. A limit specified by an applicable federal new source performance standard.

    The grading of visible emissions shall be determined in accordance with Rule 303.

12. The permittee shall not cause or permit the emission of an air contaminant or water vapor in quantities that cause, alone or in reaction with other air contaminants, either of the following:
    a. Injurious effects to human health or safety, animal life, plant life of significant economic value, or property.[1] **(R 336.1901(a))**
    b. Unreasonable interference with the comfortable enjoyment of life and property.[1] **(R 336.1901(b))**

Testing/Sampling

13. The department may require the owner or operator of any source of an air contaminant to conduct acceptable performance tests, at the owner’s or operator’s expense, in accordance with Rule 1001 and Rule 1003, under any of the conditions listed in Rule 1001(1). **(R 336.2001)**

14. Any required performance testing shall be conducted in accordance with Rule 1001(2), Rule 1001(3) and Rule 1003. **(R 336.2001(2), R 336.2001(3), R 336.2003(1))**

15. Any required test results shall be submitted to the AQD in the format prescribed by the applicable reference test method within 60 days following the last date of the test. **(R 336.2001(5))**

Monitoring/Recordkeeping

16. Records of any periodic emission or parametric monitoring required in this ROP shall include the following information specified in Rule 213(3)(b)(i), where appropriate **(R 336.1213(3)(b))**:
    a. The date, location, time, and method of sampling or measurements.
    b. The dates the analyses of the samples were performed.
    c. The company or entity that performed the analyses of the samples.
    d. The analytical techniques or methods used.
    e. The results of the analyses.
    f. The related process operating conditions or parameters that existed at the time of sampling or measurement.

17. All required monitoring data, support information and all reports, including reports of all instances of deviation from permit requirements, shall be kept and furnished to the department upon request for a period of not less than 5 years from the date of the monitoring sample, measurement, report or application. Support information includes all calibration and maintenance records and all original strip-chart recordings, or other original data records, for continuous monitoring instrumentation and copies of all reports required by the ROP. **(R 336.1213(1)(e), R 336.1213(3)(b)(ii))**

Certification & Reporting

18. Except for the alternate certification schedule provided in Rule 213(3)(c)(iii)(B), any document required to be submitted to the department as a term or condition of this ROP shall contain an original certification by a Responsible Official which states that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete. **(R 336.1213(3)(c))**

19. A Responsible Official shall certify to the appropriate AQD District Office and to the USEPA that the stationary source is and has been in compliance with all terms and conditions contained in the ROP except for deviations that have been or are being reported to the appropriate AQD District Office pursuant to Rule 213(3)(c). This certification shall include all the information specified in Rule 213(4)(c)(i) through (v) and shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the certification are true, accurate, and complete. The USEPA address is: USEPA, Air Compliance Data - Michigan, Air and Radiation Division, 77 West Jackson Boulevard, Chicago, Illinois 60604. **(R 336.1213(4)(c))**

20. The certification of compliance shall be submitted annually for the term of this ROP as detailed in the special conditions, or more frequently if specified in an applicable requirement or in this ROP. **(R 336.1213(4)(c))**

21. The permittee shall promptly report any deviations from ROP requirements and certify the reports. The prompt reporting of deviations from ROP requirements is defined in Rule 213(3)(c)(ii) as follows, unless otherwise described in this ROP. **(R 336.1213(3)(c))**
    a. For deviations that exceed the emissions allowed under the ROP, prompt reporting means reporting consistent with the requirements of Rule 912 as detailed in Condition 25. All reports submitted pursuant to this paragraph shall be promptly certified as specified in Rule 213(3)(c)(iii).
    b. For deviations which exceed the emissions allowed under the ROP and which are not reported pursuant to Rule 912 due to the duration of the deviation, prompt reporting means the reporting of all deviations in the semiannual reports required by Rule 213(3)(c)(i). The report shall describe reasons for each deviation and the actions taken to minimize or correct each deviation.

   c. For deviations that do not exceed the emissions allowed under the ROP, prompt reporting means the reporting of all deviations in the semiannual reports required by Rule 213(3)(c)(i). The report shall describe the reasons for each deviation and the actions taken to minimize or correct each deviation.

22. For reports required pursuant to Rule 213(3)(c)(ii), prompt certification of the reports is described in Rule 213(3)(c)(iii) as either of the following **(R 336.1213(3)(c))**:
    a. Submitting a certification by a Responsible Official with each report which states that, based on information and belief formed after reasonable inquiry, the statements and information in the report are true, accurate, and complete.
    b. Submitting, within 30 days following the end of a calendar month during which one or more prompt reports of deviations from the emissions allowed under the ROP were submitted to the department pursuant to Rule 213(3)(c)(ii), a certification by a Responsible Official which states that, "based on information and belief formed after reasonable inquiry, the statements and information contained in each of the reports submitted during the previous month were true, accurate, and complete". The certification shall include a listing of the reports that are being certified. Any report submitted pursuant to Rule 213(3)(c)(ii) that will be certified on a monthly basis pursuant to this paragraph shall include a statement that certification of the report will be provided within 30 days following the end of the calendar month.

23. Semiannually for the term of the ROP as detailed in the special conditions, or more frequently if specified, the permittee shall submit certified reports of any required monitoring to the appropriate AQD District Office. All instances of deviations from ROP requirements during the reporting period shall be clearly identified in the reports. **(R 336.1213(3)(c)(i))**

24. On an annual basis, the permittee shall report the actual emissions, or the information necessary to determine the actual emissions, of each regulated air pollutant as defined in Rule 212(6) for each emission unit utilizing the emissions inventory forms provided by the department. **(R 336.1212(6))**

25. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the appropriate AQD District Office. The notice shall be provided not later than two business days after the start-up, shutdown, or discovery of the abnormal conditions or malfunction. Notice shall be by any reasonable means, including electronic, telephonic, or oral communication. Written reports, if required under Rule 912, must be submitted to the appropriate AQD District Supervisor within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal conditions or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5) and shall be certified by a Responsible Official in a manner consistent with the CAA. **(R 336.1912)**

Permit Shield

26. Compliance with the conditions of the ROP shall be considered compliance with any applicable requirements as of the date of ROP issuance, if either of the following provisions is satisfied. **(R 336.1213(6)(a)(i), R 336.1213(6)(a)(ii))**
    a. The applicable requirements are included and are specifically identified in the ROP.
    b. The permit includes a determination or concise summary of the determination by the department that other specifically identified requirements are not applicable to the stationary source.

    Any requirements identified in Part E of this ROP have been identified as non-applicable to this ROP and are included in the permit shield.

27. Nothing in this ROP shall alter or affect any of the following:
    a. The provisions of Section 303 of the CAA, emergency orders, including the authority of the USEPA under Section 303 of the CAA. **(R 336.1213(6)(b)(i))**

   b. The liability of the owner or operator of this source for any violation of applicable requirements prior to or at the time of this ROP issuance. **(R 336.1213(6)(b)(ii))**
   c. The applicable requirements of the acid rain program, consistent with Section 408(a) of the CAA. **(R 336.1213(6)(b)(iii))**
   d. The ability of the USEPA to obtain information from a source pursuant to Section 114 of the CAA. **(R 336.1213(6)(b)(iv))**

28. The permit shield shall not apply to provisions incorporated into this ROP through procedures for any of the following:
    a. Operational flexibility changes made pursuant to Rule 215. **(R 336.1215(5))**
    b. Administrative Amendments made pursuant to Rule 216(1)(a)(i)-(iv). **(R 336.1216(1)(b)(iii))**
    c. Administrative Amendments made pursuant to Rule 216(1)(a)(v) until the amendment has been approved by the department. **(R 336.1216(1)(c)(iii))**
    d. Minor Permit Modifications made pursuant to Rule 216(2). **(R 336.1216(2)(f))**
    e. State-Only Modifications made pursuant to Rule 216(4) until the changes have been approved by the department. **(R 336.1216(4)(e))**

29. Expiration of this ROP results in the loss of the permit shield. If a timely and administratively complete application for renewal is submitted not more than 18 months, but not less than 6 months, before the expiration date of the ROP, but the department fails to take final action before the end of the ROP term, the existing ROP does not expire until the renewal is issued or denied, and the permit shield shall extend beyond the original ROP term until the department takes final action. **(R 336.1217(1)(c), R 336.1217(1)(a))**

Revisions

30. For changes to any process or process equipment covered by this ROP that do not require a revision of the ROP pursuant to Rule 216, the permittee must comply with Rule 215. **(R 336.1215, R 336.1216)**

31. A change in ownership or operational control of a stationary source covered by this ROP shall be made pursuant to Rule 216(1). **(R 336.1219(2))**

32. For revisions to this ROP, an administratively complete application shall be considered timely if it is received by the department in accordance with the time frames specified in Rule 216. **(R 336.1210(9))**

33. Pursuant to Rule 216(1)(b)(iii), Rule 216(2)(d) and Rule 216(4)(d), after a change has been made, and until the department takes final action, the permittee shall comply with both the applicable requirements governing the change and the ROP terms and conditions proposed in the application for the modification. During this time period, the permittee may choose to not comply with the existing ROP terms and conditions that the application seeks to change. However, if the permittee fails to comply with the ROP terms and conditions proposed in the application during this time period, the terms and conditions in the ROP are enforceable. **(R 336.1216(1)(c)(iii), R 336.1216(2)(d), R 336.1216(4)(d))**

Reopenings

34. A ROP shall be reopened by the department prior to the expiration date and revised by the department under any of the following circumstances:
    a. If additional requirements become applicable to this stationary source with three or more years remaining in the term of the ROP, but not if the effective date of the new applicable requirement is later than the ROP expiration date. **(R 336.1217(2)(a)(i))**
    b. If additional requirements pursuant to Title IV of the CAA become applicable to this stationary source. **(R 336.1217(2)(a)(ii))**

c. If the department determines that the ROP contains a material mistake, information required by any applicable requirement was omitted, or inaccurate statements were made in establishing emission limits or the terms or conditions of the ROP. **(R 336.1217(2)(a)(iii))**

d. If the department determines that the ROP must be revised to ensure compliance with the applicable requirements. **(R 336.1217(2)(a)(iv))**

Renewals

35. For renewal of this ROP, an administratively complete application shall be considered timely if it is received by the department not more than 18 months, but not less than 6 months, before the expiration date of the ROP. **(R 336.1210(7))**

Stratospheric Ozone Protection

36. If the permittee is subject to Title 40 of the Code of Federal Regulations (CFR), Part 82 and services, maintains, or repairs appliances except for motor vehicle air conditioners (MVAC), or disposes of appliances containing refrigerant, including MVAC and small appliances, or if the permittee is a refrigerant reclaimer, appliance owner or a manufacturer of appliances or recycling and recovery equipment, the permittee shall comply with all applicable standards for recycling and emissions reduction pursuant to 40 CFR, Part 82, Subpart F.

37. If the permittee is subject to 40 CFR, Part 82, and performs a service on motor (fleet) vehicles when this service involves refrigerant in the MVAC, the permittee is subject to all the applicable requirements as specified in 40 CFR, Part 82, Subpart B, Servicing of Motor Vehicle Air Conditioners. The term “motor vehicle” as used in Subpart B does not include a vehicle in which final assembly of the vehicle has not been completed by the original equipment manufacturer. The term MVAC as used in Subpart B does not include the air-tight sealed refrigeration system used for refrigerated cargo or an air conditioning system on passenger buses using Hydrochlorofluorocarbon-22 refrigerant.

Risk Management Plan

38. If subject to Section 112(r) of the CAA and 40 CFR, Part 68, the permittee shall register and submit to the USEPA the required data related to the risk management plan for reducing the probability of accidental releases of any regulated substances listed pursuant to Section 112(r)(3) of the CAA as amended in 40 CFR, Part 68.130. The list of substances, threshold quantities, and accident prevention regulations promulgated under 40 CFR, Part 68, do not limit in any way the general duty provisions under Section 112(r)(1).

39. If subject to Section 112(r) of the CAA and 40 CFR, Part 68, the permittee shall comply with the requirements of 40 CFR, Part 68, no later than the latest of the following dates as provided in 40 CFR, Part 68.10(a):
    a. June 21, 1999,
    b. Three years after the date on which a regulated substance is first listed under 40 CFR, Part 68.130, or
    c. The date on which a regulated substance is first present above a threshold quantity in a process.

40. If subject to Section 112(r) of the CAA and 40 CFR, Part 68, the permittee shall submit any additional relevant information requested by any regulatory agency necessary to ensure compliance with the requirements of 40 CFR, Part 68.

41. If subject to Section 112(r) of the CAA and 40 CFR, Part 68, the permittee shall annually certify compliance with all applicable requirements of Section 112(r) as detailed in Rule 213(4)(c)). **(40 CFR, Part 68)**

Emission Trading

42. Emission averaging and emission reduction credit trading are allowed pursuant to any applicable interstate or regional emission trading program that has been approved by the Administrator of the USEPA as a part of Michigan's State Implementation Plan. Such activities must comply with Rule 215 and Rule 216. **(R 336.1213(12))**

Permit To Install (PTI)

43. The process or process equipment included in this permit shall not be reconstructed, relocated, or modified unless a PTI authorizing such action is issued by the department, except to the extent such action is exempt from the PTI requirements by any applicable rule. [2] **(R 336.1201(1))**

44. The department may, after notice and opportunity for a hearing, revoke PTI terms or conditions if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of the PTI or is violating the department's rules or the CAA. [2] **(R 336.1201(8), Section 5510 of Act 451)**

45. The terms and conditions of a PTI shall apply to any person or legal entity that now or hereafter owns or operates the process or process equipment at the location authorized by the PTI. If a new owner or operator submits a written request to the department pursuant to Rule 219 and the department approves the request, this PTI will be amended to reflect the change of ownership or operational control. The request must include all of the information required by Subrules (1)(a), (b) and (c) of Rule 219. The written request shall be sent to the appropriate AQD District Supervisor, MDEQ. [2] **(R 336.1219)**

46. If the installation, reconstruction, relocation, or modification of the equipment for which PTI terms and conditions have been approved has not commenced within 18 months of the original PTI issuance date, or has been interrupted for 18 months, the applicable terms and conditions from that PTI, as incorporated into the ROP, shall become void unless otherwise authorized by the department. Furthermore, the person to whom that PTI was issued, or the designated authorized agent, shall notify the department via the Supervisor, Permit Section, MDEQ, AQD, P. O. Box 30260, Lansing, Michigan 48909, if it is decided not to pursue the installation, reconstruction, relocation, or modification of the equipment allowed by the terms and conditions from that PTI. [2] **(R 336.1201(4))**

<u>Footnotes</u>:

[1] This condition is state-only enforceable and was established pursuant to Rule 201(1)(b).
[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

B. SOURCE-WIDE CONDITIONS

Part B outlines the Source-Wide Terms and Conditions that apply to this stationary source. The permittee is subject to these special conditions for the stationary source in addition to the general conditions in Part A and any other terms and conditions contained in this ROP.

The permittee shall comply with all specific details in the special conditions and the underlying applicable requirements cited. If a specific condition type does not apply to this source, NA (not applicable) has been used in the table. If there are no Source-Wide Conditions, this section will be left blank.

C. EMISSION UNIT CONDITIONS

Part C outlines terms and conditions that are specific to individual emission units listed in the Emission Unit Summary Table. The permittee is subject to the special conditions for each emission unit in addition to the General Conditions in Part A and any other terms and conditions contained in this ROP.

The permittee shall comply with all specific details in the special conditions and the underlying applicable requirements cited. If a specific condition type does not apply, NA (not applicable) has been used in the table. If there are no conditions specific to individual emission units, this section will be left blank.

EMISSION UNIT SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date/ Modification Date	Flexible Group ID
EUCS1GLYDHY	As the wet natural gas is withdrawn from the storage field, the difference between the field pressure and the pipeline pressure causes the temperature of the natural gas to drop. This temperature drop causes condensation of water and hydrocarbon liquids present in the wet natural gas. Cold Springs 1 uses ethylene glycol injection into the withdrawal gas stream for prevention of hydrate formation and freeze protection. During regeneration, process water and other hydrocarbon constituents are removed and lean glycol is returned to the injection system. The regenerator's still column off-gases are routed first through a condenser for bulk water and hydrocarbon removal. The remaining hydrocarbon-rich vapors are then sent to the thermal oxidizer. The glycol dehydrator has a condenser and a thermal oxidizer. (PTI No. 138-13A)	12/01/2008	NA

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date/ Modification Date	Flexible Group ID
EU CS1HHH	40 CFR, Part 63, Subpart HHH establishes national emission limitations and operating limitations for natural gas transmission and storage facilities that are major sources of HAP emissions. The rule affects facilities that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final user. Subpart HHH is applicable to EUCS1GLYDHY. The glycol dehydrator has the choice of using a condenser and/or a thermal oxidizer for compliance with this regulation.	10/15/15 Compliance date	NA
EU CS1LSHEATER	A natural gas-fired liquid stabilization heater rated at 5 MMBtu/hr.	Before 6/04/2010	FG CS1DDDDD
EU CS1WDHEATER	A natural gas-fired Withdrawal Heater rated at 15 MMBtu/hr used to heat gas upon withdrawal. The emission unit does not have a control device.	Before 6/04/2010	FG CS1DDDDD
EU CS1BOILER	A natural gas-fired boiler rated at 3.5 MMBtu/hr used for building and comfort heating throughout the facility. The emission unit does not have a control device.	Before 6/04/2010	FG CS12DDDDD
EU CS1CNDTANK1	A condensate storage tank with a maximum capacity of 16,800 gallons used to store stabilized condensate liquids. The emission unit is controlled by a thermal oxidizer.	12/08/2008	FG CS1CNDTANKS
EU CS1CNDTANK2	A condensate storage tank with a maximum capacity of 16,800 gallons used to store stabilized condensate liquids. The emission unit is controlled by a thermal oxidizer.	12/08/2008	FG CS1CNDTANKS
EU CS1CNDTANK3	A condensate storage tank with a maximum capacity of 16,800 gallons used to store stabilized condensate liquids. The emission unit is controlled by a thermal oxidizer.	12/08/2008	FG CS1CNDTANKS

Emission Unit ID	**Emission Unit Description (Including Process Equipment & Control Device(s))**	**Installation Date/ Modification Date**	**Flexible Group ID**
EU CS1CNDTANK4	A condensate storage tank with a maximum capacity of 16,800 gallons used to store stabilized condensate liquids. The emission unit is controlled by a thermal oxidizer.	12/08/2008	FG CS1CNDTANKS

EUCS1GLYDHY
EMISSION UNIT CONDITIONS

DESCRIPTION

Glycol Dehydration system has a 1.75MM BTU/Hr glycol reboiler. Cold Springs 1 uses ethylene glycol injection into the withdrawal gas stream for prevention of hydrate formation and freeze protection.

During regeneration, process water and other hydrocarbon constituents are removed and lean glycol is returned to the injection system. The regenerator's still column off-gases are routed first through a condenser for bulk water and hydrocarbon removal. The remaining hydrocarbon-rich vapors are then sent to the thermal oxidizer. (PTI No. 138-13A)

Flexible Group ID:

NA

POLLUTION CONTROL EQUIPMENT Condenser and Thermal Oxidizer.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period/ Operating Scenario	Equipment	Monitoring/ Testing Method	Underlying Applicable Requirements
1. Benzene	Less than one ton per year[1]	12-month rolling time period as determined at the end of each calendar month.	EUCS1GLYDHY	VI.1	**R 336.1225**
2. Benzene	0.995 pph with condenser only[1]	Test Protocol*	EUCS1GLYDHY	VI.2	**R 336.1225**
3. Benzene	0.02 pph with condenser followed by thermal oxidizer in series[1]	Test Protocol*	EUCS1GLYDHY	VI.2	**R 336.1225**

*Test Protocol shall specify averaging time.

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The glycol re-circulation rate shall not exceed a maximum of 960 gallons per hour.[2] **(R 336.1225, R 336.1702(a))**

2. The permittee shall not process natural gas in EUCS1GLYDHY unless the flash tank is installed, maintained, and operated in a satisfactory manner.[2] **(R 336.1225, R 336.1702(a))**
   Satisfactory operation includes:
   a. Routing the glycol through the flash tank prior to reboiling the glycol.
   b. Routing the flash tank exhaust gas to a combustion device.

3. Except as allowed in the condition below, the permittee shall not process natural gas in EUCS1GLYDHY unless the glycol reboiler vent is routed through a condenser and thermal oxidizer operating in series. These control devices must be installed, maintained, and operated in a satisfactory manner.[2] **(R 336.1225, R 336.1702(a))**
   Satisfactory operation of the condenser and thermal oxidizer includes:

a. CONDENSER
    i. Maximum exhaust gas temperature of 100°F (when bypassing the thermal oxidizer).
b. THERMAL OXIDIZER
    i. Minimum VOC destruction efficiency of 98 percent (by weight).
    ii. Maintain a minimum exhaust temperature of 1400°F.
    iii. Minimum retention time of 0.5 seconds.

4. During periods of thermal oxidizer outage or malfunction, the permittee may bypass the thermal oxidizer and control the glycol reboiler vent with only the condenser. Bypass of the thermal oxidizer shall not exceed 200 hours per 12-month rolling time period.[2] **(R 336.1225, R 336.1702(a))**

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. EUCS1GLYDHY shall be equipped with a thermal oxidizer. **(R 336.1213(3))**

2. EUCS1GLYDHY shall be equipped with a condenser. **(R 336.1213(3))**

3. EUCS1GLYDHY shall be equipped with a flash tank. **(R 336.1213(3))**

4. The permittee shall install, calibrate, maintain and operate in a satisfactory manner a device to monitor the thermal oxidizer and condenser exhaust gas temperatures, and the thermal oxidizer bypass temperature. [2] **(R 336.1213(3))**

5. EUCS1GLYDHY thermal oxidizer and condenser temperature monitor systems shall each be designed and equipped with alarm systems that will alarm if the operating temperature is less than 1400°F for the thermal oxidizer and greater than 100°F for the condenser. **(R 336.1213(3))**

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. Once every five years the permittee shall analyze the natural gas processed in the glycol dehydration unit to determine its content and composition using method(s) standard in the natural gas industry.[2] **(R 336.1225, R 336.1702(a))**

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall keep, in a satisfactory manner, monthly and 12-month rolling time period Benzene emission calculation records in tons from EUCS1GLYDHY. The permittee shall keep all records on file at a location approved by the AQD District Supervisor and make them available to the Department upon request.[1] **(R 336.1225, 40 CFR, Part 63, Subpart HHH)**

2. The permittee shall calculate the pounds per hour Benzene emission rate with the condenser only, and with the condenser followed by the thermal oxidizer in series, from EUCS1GLYDHY once each hour, using a method acceptable to the AQD District Supervisor. If GRI-GLYCalc (Version 3.0 or higher) is used to calculate the emission rates, the inputs to the model shall be representative of actual operating conditions of EUCS1GLYDHY and shall include the most recent gas analysis data. The emissions calculations shall be available to the AQD no later than the 15th of the following month. The permittee must submit any request for a change in the calculation frequency to the AQD District Supervisor for review and approval. The permittee shall keep records of Benzene emission rates on file at a location approved by the AQD District Supervisor and make them available to the Department upon request.[1] **(R 336.1225)**

3. The permittee shall install, calibrate, maintain and operate in a satisfactory manner a device to monitor and record the following at the frequency indicated.[2] **(R 336.1225, R 336.1702(a))**:
    a. Condenser exhaust gas temperature – continuous.
    b. Thermal incinerator bypass – daily.
    c. Thermal oxidizer exhaust gas temperature – continuous.

4. The permittee shall keep, in a satisfactory manner, the following records for EUCS1GLYDHY[2]: **(R 336.1225, R 336.1702(a))**
   a. At all times:
      i. Equipment specification records of the glycol circulation pump, including but not limited to the maximum circulation rate.
   b. When venting EUCS1GLYDHY through the condenser followed by the thermal oxidizer in series:
      i. Continuous records of the thermal oxidizer exhaust gas temperature
   c. When venting EUCS1GLYDHY through only the condenser (thermal oxidizer outage or malfunction):
      i. Continuous records of the condenser exhaust gas temperature
      ii. Hours that EUCS1GLYDHY is controlled by only the condenser.

5. The permittee shall monitor and record the alarm events actuated because the temperature limit of the condenser or thermal oxidizer was not met. The permittee shall record the action taken in response to an alarm event. If no action was taken in response to an alarm event, the permittee will record the reason for no action.[2] **(R 336.1702(a))**

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

4. At least 30 days prior to the anticipated natural gas analysis date, the permittee shall submit analysis protocols to the AQD for review and approval. The protocol shall describe the method(s) to be used.[2] **(R 336.1225, R 336.1702(a))**

5. The permittee shall notify the AQD no less than 7 days prior to the anticipated natural gas analysis date.[2] **(R 336.1225, R 336.1702(a))**

6. The permittee shall submit a complete report of the natural gas analysis to the AQD within 60 days following the last date of the analysis.[2] **(R 336.1225, R 336.1702(a))**

See Appendix 8

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	Maximum Exhaust Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
1. SV 011B (Condenser)	2[1]	44[1]	**R 336.1225**
2. SV 011A (Thermal Oxidizer)	20[1]	31[1]	**R 336.1225**

IX. OTHER REQUIREMENT(S)

NA

Footnotes:

[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

EU CS1HHH
EMISSION UNIT CONDITIONS

DESCRIPTION

One glycol dehydration system operates in two modes (glycol injection and glycol absorption) to remove water from the natural gas withdrawn from the storage reservoir. The glycol dehydration system meets the definition in 40 CFR 63.1271 and was constructed prior to August 23, 2011 and must attain compliance with the requirements in 40 CFR, Part 63, Subpart HHH by October 15, 2015.

Emission Units: EUCS1GLYDHY

Flexible Group ID: NA

POLLUTION CONTROL EQUIPMENT Condenser and/or Thermal Oxidizer.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period/ Operating Scenario	Equipment	Monitoring/ Testing Method	Underlying Applicable Requirements
1. BTEX	Calculated using the equation in Appendix 7A	Annual	EUCS1GLYDHY	V.2, V.4, VI.9	**40 CFR 63.1275(b)(1)(iii)**

See Appendix 7A

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The process vent from EUCS1GLYDHY shall be vented to a control device or a combination of control devices through a closed-vent system. **(40 CFR 63.1275(b)(1)(iii)(A))**

2. The control device(s) shall be one of those specified below and must be designed and operated in accordance with the following requirements: **(40 CFR 63.1281(f)(1))**
   a. A thermal oxidizer that reduces the concentration of BTEX to meet the emission limit in I.1, or the TOC or total HAP concentration in the exhaust gases at the outlet of the oxidizer is reduced to a level equal to or less than 20 ppmv on a dry basis corrected to 3 percent oxygen.
   b. A condenser or other non-destructive control device that is designed and operated to reduce the mass content of BTEX in the gases vented by 95 percent.

3. The permittee shall control HAP emissions from each GCG separator (flash tank) vent unless BTEX emissions from the reboiler vent and the flash tank are reduced to a level less than the limit in condition I.1. **(40 CFR 63.1275(c)(3))**

4. The permittee shall operate and maintain EUCS1GLYDHY, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. **(40 CFR 63.1274(h))**

5. The permittee shall operate each control device in accordance with the requirements specified below: **(40 CFR 63.1281(f)(2))**
   a. Each control device used to comply with this subpart shall be operating at all times. More than one unit may be vented to a control device.
   b. For each control device monitored in accordance with the requirements of conditions VI.7~~8~~ - ~~13~~12, the permittee shall demonstrate compliance according to the requirements of VI.2 (§ 63.1282(e)).

6. When using a condenser to demonstrate continuous compliance with emission limits the control device shall be operated at a maximum operating temperature established in accordance with the requirements of VI.8. When using a thermal oxidizer to demonstrate continuous compliance with emission limits the control device shall be operated at the minimum operating temperature established in accordance with the requirements of VI.8 or a minimum of 1400°F. (40 CFR 63.1282(e)(1))

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. The closed vent system shall be designed and operated in accordance with the following requirements: **(40 CFR 63.1281(c), 40** CFR 63.1283(c)(2)(iii))
   a. The closed-vent system shall route all gases, vapors, and fumes emitted from the material in and emission unit to a control device that meets the requirements specified in condition III.2.
   b. The closed-vent system shall be designed and operated with no detectable emissions.
   c. Any bypass devices in the closed-vent system that could divert emissions from entering the control device shall be equipped with a flow indicator at the inlet to the bypass device that takes readings every 15 minutes, and that sounds an alarm when the bypass device is open; or the bypass device valve at the inlet to the bypass device shall be secured using a car-seal or lock and key.

2. Each continuous parameter monitoring system (CPMS) shall meet the following specifications and requirements: **(40 CFR 63.1283(d)(1))**
   a. Each CPMS shall measure data values at least once every hour and record either:
      i. Each measured data value; or
      ii Each block average value for each 1-hour period or shorter periods calculated from all measured data values during each period. If values are measured more frequently than once per minute, a single value for each minute may be used to calculate the hourly (or shorter period) block average instead of all measured values.

3. The permittee shall install a device equipped with a continuous recorder to measure the values of operating parameters appropriate for the control device as specified below. **(40 CFR 63.1283(d)(3))**
   a. For a thermal oxidizer, the temperature monitoring device shall have a minimum accuracy of ±2 percent of the temperature being monitored in °C, or ±2.5°C, whichever value is greater. The temperature sensor shall be installed at a location representative of the combustion zone temperature
   b. For a condenser, the temperature monitoring device shall have a minimum accuracy of ±2 percent of the temperature being monitored in °C, or ±2.5°C, whichever value is greater. The temperature sensor shall be installed at a location in the exhaust vent stream from the condenser.

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. Determination of the actual flow rate of natural gas to EUCS1GLYDHY shall be made using either of the following procedures: **(40 CFR 63.1282(a)(1))**
   a. Install and operate a monitoring instrument that directly measures natural gas flow rate to EUCS1GLYDHY with an accuracy of ± 2 percent or better. The annual natural gas flow rate shall be converted to a daily average by dividing the annual flow rate by the number of days per year each EU processed natural gas.
   b. Document to the AQD's satisfaction, the actual annual average natural gas flowrate to EUCS1GLYDHY.

2. Determination of the actual average BTEX emissions from EUCS1GLYDHY with condenser and/or thermal oxidizer control device shall be made using the following procedure: **(40 CFR 63.1282(a)(2))**

   a. Use GRI-GLYCalc™, Version 3.0 or higher. Inputs to the model shall be representative of actual operating conditions of each glycol dehydration unit.

3. The permittee shall perform "no detectable emissions" testing for closed vent systems using the test methods and procedures specified in 40 CFR 63.1282(b). **(40 CFR 63.1282(b))**

4. If the permittee chooses to conduct a performance test to demonstrate that a control device meets the requirements of III.2 (40 CFR 1281(f)(1)) the permittee shall conduct emissions testing for compliance with the BTEX emission limit calculated using Equation 1 or the 20 ppmv TOC or Total HAP exhaust gas concentration reduction requirement using the following test methods and procedures: **(40 CFR 63.1282(d)(3)**
   a. Method 1 or 1A, 40 CFR, Part 60, Appendix A, as appropriate, shall be used for selection of the sampling sites. The sampling site shall be located at the outlet of the combustion device.
   b. The gas volumetric flow rate shall be determined using Method 2, 2A, 2C, or 2D, 40 CFR, Part 60, Appendix A, as appropriate.
   c. To determine compliance with the BTEX emission limit or the 20 ppmv TOC or Total HAP exhaust gas concentration reduction requirement, the permittee shall use one of the following methods: Method 18, 40 CFR, Part60, Appendix A; ASTM D64200-99 (Reapproved 2004); or any other method or data that have been validated according to the applicable procedures in Method 301, 40 CFR, Part 63, Appendix A.
   d. The permittee shall conduct performance tests according to the following schedule:
      i. An initial performance test shall be conducted no later than October 15, 2015.
      ii The first periodic performance test shall be conducted not later than 60 months after the initial performance test. Subsequent periodic performance tests shall be conducted at intervals no longer than 60 months following the previous periodic performance test or whenever a source desires to establish a new operating limit. Combustion control devices meeting either of the following criteria are not required to conduct periodic performance tests;
         A. Control device whose model is tested under, and meets the criteria of manufacturers performance test in 40 CFR 63.1282(g).
         B. A combustion control device demonstrating during the performance test that combustion zone temperature is an indicator of destruction efficiency and operates at a minimum temperature of 1400 degrees Fahrenheit.

5. As an alternative to the performance test referenced in V.4 the permittee may elect to use the procedures documented in the GRI report entitled "Atmospheric Rich/Lean method for Determining Glycol Dehydrator Emissions" (GRI-95/0368.1) as inputs for the model GRI-GLYCalc™, version 3.0 or higher, to generate a condenser performance curve. **(40 CFR 63.1282(d)(5))**

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall maintain records of the annual facility natural gas throughput each year. **(40 CFR 63.1270(a)(3))**

2. The permittee shall continuously monitor and record the temperature on the thermal oxidizer or condenser and calculate the daily average temperature for each operating day. **(40 CFR 63.1282(e), 40 CFR 63.1283(d)(4))**
   a. Establish a site specific maximum (condenser) or minimum (thermal oxidizer) temperature to define the conditions at which the control device must be operated to continuously achieve compliance with the emission limit.
   b. Calculate the daily average of the temperature readings in accordance with condition VI.7~~8~~.
   c. Compliance is achieved when the daily average of the temperature readings calculated under 2.b. is either equal to or greater than the minimum or equal to or less than the maximum monitoring value established under 2.a.

3. When using a condenser as the control device the permittee may demonstrate compliance with BTEX emission reductions by complying with the following requirements: **(40 CFR 63.1282(f))**

   a. The permittee shall establish a site-specific condenser performance curve according to the procedures specified in Condition VI.~~10~~9.
   b. The permittee must calculate the daily average condenser outlet temperature in accordance with Condition VI.~~10~~9.

c. The permittee shall determine the condenser efficiency for the current operating day using the daily average condenser outlet temperature and the condenser performance curve.
d. At the end of each operating day the permittee shall calculate the 30-day average BTEX emission reduction from the condenser efficiencies for the preceding 30 operating days.
e. Compliance is achieved if the average BTEX emission reduction is equal to or greater than the minimum percent reduction established in Condition VI.9~~10~~.

4. For each closed-vent system, the permittee shall comply with the following requirements: **(40 CFR 63.1283(c)(2-4))**
   a. Except for parts of the closed-vent system or cover that are designated unsafe to inspect or difficult to inspect, each closed-vent system and each bypass device shall be inspected according to the procedures specified below according the following schedule:
      i. For each closed-vent system joints, seams, or other connections that are permanently or semi-permanently sealed (e.g., a welded joint between two sections of hard piping or a bolted or gasketed ducting flange):
         A. Conduct an initial inspection to demonstrate that the closed-vent system operates with no detectable emissions.
         B. Conduct annual visual inspections for defects that could result in air emissions. Defects include, but are not limited to, visible cracks, holes, or gaps in piping; loose connections; or broken or missing caps or other closure devices.
      ii. For closed-vent system components other than those specified in VI.~~5~~4.a.i above:
         A. Conduct an initial inspection to demonstrate that the closed-vent system operates with no detectable emissions.
         B. Conduct annual inspections to demonstrate that the components or connections operate with no detectable emissions.
         C. Conduct annual visual inspections for defects that could result in air emissions. Defects include, but are not limited to, visible cracks, holes, or gaps in ductwork; loose connections; or broken or missing caps or other closure devices.
      iii. For each bypass device, except low leg drains, high point bleeds, analyzer vents, open-ended valves or lines, and safety devices, the permittee shall either:
         A. At the inlet to the bypass device that could divert the steam away from the control device to the atmosphere, set the flow indicator to take a reading at least once every 15 minutes; or
         B. If the bypass device valve installed at the inlet to the bypass device is secured in the non-diverting position using a car-seal or a lock-and-key type configuration, visually inspect the seal or closure mechanism at least once every month to verify that the valve is maintained in the non-diverting position and the vent stream is not diverted through the bypass device.
   b. In the event that a leak or defect is detected, the permittee shall repair the leak or defect as soon as practicable, except as provided in VI.4~~5~~.c.
      i. A first attempt at repair shall be made no later than 5 calendar days after the leak is detected.
      ii. Repair shall be completed no later than 15 calendar days after the leak is detected.
   c. Delay of repair of a closed-vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, as defined in § 63.1271, or if the permittee determines that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. Repair of such equipment shall be completed by the end of the next shutdown.

5. Any parts of the closed-vent system or cover that are designated, as described below, as unsafe to inspect are exempt from the inspection requirements of Condition VI.4~~5~~ if: **(40 CFR 63.1283(c)(5))**
   a. The permittee determines that the equipment is unsafe to inspect because inspecting personnel would be exposed to an imminent or potential danger as a consequence of complying with Condition VI.5.a.i or ii.
   b. The permittee has a written plan that requires inspection of the equipment as frequently as practicable during safe-to-inspect times.

6. Any parts of the closed-vent system or cover that are designated, as described below, as difficult to inspect are exempt from the inspection requirements of Condition VI.4~~5~~ if: **(40 CFR 63.1283(c)(6))**
   a. The permittee determines that the equipment cannot be inspected without elevating the inspecting personnel more than 2 meters above a support surface; and
   b. The permittee has a written plan that requires inspection of the equipment at least once every 5 years.

7. Using the data recorded by the monitoring system, except for inlet gas flowrate, the permittee must calculate the daily average value for each monitored operating parameter for each operating day. If the emissions unit operation is continuous, the operating day is a 24-hour period. If the emissions unit operation is not continuous, the operating day is the total number of hours of control device operation per 24-hour period. Valid data points must be available for 75 percent of the operating hours in an operating day to compute the daily average. **(40 CFR 63.1283(d)(4))**

8. For the control devices used to comply with 40 CFR, Part 63, Subpart HHH, the permittee shall establish a minimum operating parameter value or a maximum operating parameter value, as appropriate for the control device, to define the conditions at which the control device must be operated to continuously achieve the emission limits in Section I of FGMACTHHH. Each minimum or maximum operating parameter value shall be established as follows: **(40 CFR 63.1283(d)(5)(i))**
   a. If the permittee conducts performance tests to demonstrate that the control device achieves the applicable performance requirements, then the minimum operating parameter value or the maximum operating parameter value shall be established based on values measured during the performance test and supplemented, as necessary, by a condenser design analysis or control device manufacturer's recommendations or a combination of both.
   b. If the permittee uses a condenser design analysis to demonstrate that the control device achieves the applicable performance requirements, then the minimum operating parameter value or the maximum operating parameter value shall be established based on the condenser design analysis and may be supplemented by the condenser manufacturer's recommendations.
   c. If the permittee operates a control device where the performance test requirement was met under manufacturers' performance test to demonstrate that the control device achieves the applicable performance requirements, then the maximum inlet gas flowrate shall be established based on the performance test and supplemented, as necessary, by the manufacturer recommendations.

9. When using condensers as the control device the permittee shall also establish a condenser performance curve showing the relationship between condenser outlet temperature and condenser control efficiency. The curve shall be established using the procedures documented in the GRI report entitled, "Atmospheric Rich/Lean Method for Determining Glycol Dehydrator Emissions" (GRI-95/0368.1) as inputs for the model GRI-GLYCalc^{tm}, Version 3.0 or higher, to generate a condenser performance curve. **(40 CFR 63.1283(d)(5)(ii))**

10. A deviation for a control device is determined to have occurred when the monitoring data or lack of monitoring data result in any one of the criteria specified below being met. When multiple operating parameters are monitored for the same control device and during the same operating day, and more than one of these operating parameters meets an excursion criterion specified below, then a single excursion is determined to have occurred for the control device for that operating day. **(40 CFR 63.1283(d)(6)(i-iii))**
    a. When the daily average value of a monitored operating parameter is less than the minimum operating parameter limit (or, if applicable, greater than the maximum operating parameter limit) established for the operating parameter.
    b. When the 30-day average condenser efficiency calculated according to the requirements of Condition VI.3.d is less than the identified 30-day required percent reduction.
    c. When the monitoring data are not available for at least 75 percent of the operating hours in a day.

11. A deviation occurs for a closed-vent system containing one or more bypass devices that could be used to divert all or a portion of the gases, vapors, or fumes from entering the control device when: **(40 CFR 63.1283(d)(6)(iv))**
    a. The flow indicator indicates that flow has been detected and that the stream has been diverted away from the control device to the atmosphere.

    b. If the seal or closure mechanism has been broken, the bypass line valve position has a changed, the key for the lock-and-key type lock has been checked out, or the car-seal has broken.

12. For each deviation, the permittee shall be deemed to have failed to have applied control in a manner that achieves the required operating parameter limits. Failure to achieve the required operating parameter limits is a violation of this standard. **(40 CFR 63.1283(d)(7))**

13. Nothing in conditions VI.7~~8~~ through VI.12~~3~~ shall be construed to allow or excuse a monitoring parameter deviation caused by any activity that violates other applicable provisions of this subpart. **(40 CFR 63.1283(d)(9))**

14. The permittee shall maintain the records specified in 40 CFR 63.10(b)(2). **(40 CFR 63.1284(b)(2))**

15. The permittee shall maintain the following records: **(40 CFR 63.1284(b)(4), 40 CFR 63.1284(g))**
    a. Continuous records of the equipment operating parameters specified to be monitored in Conditions VI.7~~8~~-9~~10~~.
    b. Records of the daily average value of each continuously monitored parameter for each operating day determined according to the procedures specified in Condition VI.7~~8~~.
    c. For condensers using reduction efficiency for compliance, records of the annual 30-day rolling average condenser efficiency determined in Condition VI.3.d shall be kept in addition to the daily averages.
    d. The following records for a control device whose model is tested under the manufacturers' performance test:
        i. All visible emission readings and flow rate calculations made during the compliance determination
        ii. All hourly records and other recorded periods when the pilot flame is absent.
    e. Hourly records of the times and durations of all periods when the vent stream is diverted from the control device or the device is not operating.
    f. Where a seal or closure mechanism is used to comply with the closed vent bypass, hourly records of flow are not required. In such cases, the owner or operator shall record that the monthly visual inspection of the seals or closure mechanism has been done, and shall record the duration of all periods when the seal mechanism is broken, the bypass line valve position has changed, or the key for a lock-and-key type lock has been checked out, and records of any car-seal that has broken.

16. The permittee shall maintain records identifying all parts of the closed-vent system that are designated as unsafe to inspect in accordance with Condition VI.~~6~~5, an explanation of why the equipment is unsafe to inspect, and the plan for inspecting the equipment. **(40 CFR 63.1284(b)(5))**

17. The permittee shall maintain records identifying all parts of the closed-vent system that are designated as difficult to inspect in accordance with Condition VI.~~7~~6, an explanation of why the equipment is difficult to inspect, and the plan for inspecting the equipment. **(40 CFR 63.1284(b)(6))**

18. The permittee shall maintain the following records for each inspection conducted in accordance with Condition VI.~~5~~ 4 during which a leak or defect is detected. **(40 CFR 63.1284(b)(7))**
    a. The instrument identification numbers, operator name or initials, and identification of the equipment.
    b. The date the leak or defect was detected and the date of the first attempt to repair the leak or defect.
    c. Maximum instrument reading measured by the method specified in Condition V.3 after the leak or defect is successfully repaired or determined to be non-repairable.
    d. "Repair delayed" and the reason for the delay if a leak or defect is not repaired within 15 calendar days after discovery of the leak or defect.
    e. The name, initials, or other form of identification of the permittee (or designee) whose decision it was that repair could not be affected without a shutdown.
    f. The expected date of successful repair of the leak or defect if a leak or defect is not repaired within 15 calendar days.
    g. Dates of shutdowns that occur while the equipment is unrepaired.
    h. The date of successful repair of the leak or defect.

19. For each inspection conducted in accordance with Condition VI.~~5~~ 4 during which no leaks or defects are detected, the permittee shall maintain a record that the inspection was performed, the date of the inspection, and a statement that no leaks or defects were detected. **(40 CFR 63.1284(b)(8))**

20. The permittee shall maintain records of the occurrence and duration of each malfunction of process equipment or the air pollution control equipment and monitoring equipment. The permittee shall maintain records of actions taken during periods of malfunction to minimize emissions in accordance with Condition III.4 including corrective actions to restore malfunctioning process and air pollution control and monitoring equipment to its normal or usual manner of operation. **(40 CFR 63.1284(f))**

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

4. The permittee shall submit the notification of the planned date of a performance test and site–specific test plan at least 60 days before the test. **(40 CFR 63.1285(b)(3))**

5. The permittee shall submit a Notification of Compliance Status Report as required under § 63.9(h) within 180 days after October 15, 2015. In addition to the information required under § 63.9(h) the Notification of Compliance Status Report shall include the information specified in paragraphs 5.a. through l. of this section. If an owner or operator submits the required information at different times, and/or different submittals, subsequent submittals may refer to previous submittals instead of duplicating and resubmitting the previously submitted information. **(40 CFR 63.1285(d))**
    a. If a closed-vent system and a control device other than a flare are used to comply with § 63.1274, the owner or operator shall submit the information in condition 5.a.iii. and the information in either paragraph 5.a.i. or ii.
        i. The condenser design analysis documentation specified in § 63.1282(d)(4) if the owner or operator elects to prepare a design analysis; or
        ii. If the owner or operator is required to conduct a performance test, the performance test results including the information specified in condition 5.a.ii.A. and B. Results of a performance test conducted prior to the compliance date of this subpart can be used provided that the test was conducted using the methods specified in § 63.1282(d)(3), and that the test conditions are representative of current operating conditions. If the owner or operator operates a combustion control device model tested under § 63.1282(g), an electronic copy of the performance test results shall be submitted via email to *Oil_and_Gas_PT@EPA.GOV* unless the test results for that model of combustion control device are posted at the following Web site: *epa.gov/airquality/oilandgas/*.
            A. The percent reduction of HAP or TOC, or the outlet concentration of HAP or TOC (parts per million by volume on a dry basis), determined as specified in § 63.1282(d)(3); and
            B. The value of the monitored parameters specified in § 63.1283(d), or a site-specific parameter approved by the permitting agency, averaged over the full period of the performance test.
        iii. The results of the closed-vent system initial inspections performed according to the requirements in § 63.1283(c)(2)(i) and (ii).
    b. The owner or operator shall submit one complete test report for each test method used for a particular source.
        i. For additional tests performed using the same test method, the results specified in condition 5.a.ii. shall be submitted, but a complete test report is not required.
        ii. A complete test report shall include a sampling site description, description of sampling and analysis procedures and any modifications to standard procedures, quality assurance procedures, record of operating conditions during the test, record of preparation of standards, record of calibrations, raw data sheets for field sampling, raw data sheets for field and laboratory analyses, documentation of calculations, and any other information required by the test method.

    c. For each control device other than a flare used to meet the requirements of § 63.1274, the owner or operator shall submit the information specified in Condition 5.d.i. through iv. for each operating parameter required to be monitored in accordance with the requirements of § 63.1283(d).
        i. The minimum operating parameter value or maximum operating parameter value, as appropriate for the control device, established by the owner or operator to define the conditions at which the control device must be operated to continuously achieve the applicable performance requirements of § 63.1281(d)(1) or (e)(3)(ii).

- ii. An explanation of the rationale for why the owner or operator selected each of the operating parameter values established in § 63.1283(d)(5). This explanation shall include any data and calculations used to develop the value, and a description of why the chosen value indicates that the control device is operating in accordance with the applicable requirements of § 63.1281(d)(1), (e)(3)(ii), or (f)(1).
- iii. A definition of the source's operating day for purposes of determining daily average values of monitored parameters. The definition shall specify the times at which an operating day begins and ends.

d. Results of any continuous monitoring system performance evaluations shall be included in the Notification of Compliance Status Report.
e. The owner or operator shall comply with all requirements for compliance status reports contained in the source's title V permit, including reports required under 40 CFR, Part 63, Subpart HHH. Each time a notification of compliance status is required under this subpart, the owner or operator of such source shall submit the notification of compliance status to the appropriate permitting authority following completion of the relevant compliance demonstration activity specified in this subpart.
f. The owner or operator shall submit an analysis demonstrating whether an affected source is a major source using the maximum throughput calculated according to § 63.1270(a).
g. The owner or operator shall submit a statement as to whether the source has complied with the requirements of this subpart.
h. If the owner or operator installs a combustion control device model tested under the manufacturer's performance test procedures in § 6**3**.1282(g), the Notification of Compliance Status Report shall include the data listed under § 63.1282(g)(8).
i. For each combustion control device model tested under § 63.1282(g), the information listed in paragraphs 5.i.i. through vi. of this section.
   - i. Name, address and telephone number of the control device manufacturer.
   - ii. Control device model number.
   - iii. Control device serial number.
   - iv. Date the model of control device was tested by the manufacturer.
   - v. Manufacturer's HAP destruction efficiency rating.
   - vi. Control device operating parameters, maximum allowable inlet gas flow rate.

6. The permittee shall prepare Periodic Reports in accordance with a. and b. below and submit them to the Administrator. **(40 CFR 63.1285(e))**
   a. The permittee shall submit Periodic Reports semiannually beginning 60 calendar days after the end of the applicable reporting period. The first report shall be submitted no later than 240 days after the date the Notification of Compliance Status Report is due and shall cover the 6-month period beginning on the date the Notification of Compliance Status Report is due. The report shall include certification by a responsible official of truth, accuracy, and completeness.
   b. The permittee shall include the following information and any other information as applicable in §63.1285(e)(2).
      - i. A description of all deviations as defined in Conditions VI.12-14 that have occurred during the 6-month reporting period, and the information described in §63.1285(e)(2)(ii).
      - ii. For each inspection conducted in accordance with Condition VI.5 during which a leak or defect is detected, the records described in Condition VI.21 must be included in the next Periodic Report.
      - iii. For each closed-vent system with a bypass line, records required under Condition VI.17.e and f.
      - iv. A statement identifying if there were no deviations during the reporting period.
      - v. Any change in compliance methods as described in §63.1282(e).
      - vi. The results of any periodic test conducted during the reporting period.

7. Whenever a process change is made, or a change in any of the information submitted in the Notification of Compliance Status Report, the permittee shall submit a report within 180 days after the process change is made or as a part of the next Periodic Report, whichever is sooner. The report shall include: **(40 CFR 63.1285(f))**
   a. A brief description of the process change;
   b. A description of any modification to standard procedures or quality assurance procedures;
   c. Revisions to any of the information reported in the original Notification of Compliance Status Report under condition VII.5
   d. Information required by the Notification of Compliance Status Report under Condition VII.5 for changes involving the addition of processes or equipment.

8. Within 60 days after the date of completing a performance test (defined in § 63.2) you must submit the results of the performance tests to EPA's WebFIRE database by using the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) (*www.epa.gov/cdx*). Performance test data must be submitted in the file format generated through use of EPA's Electronic Reporting Tool (ERT) (see *http://www.epa.gov/ttn/chief/ert/index.html*). Only data collected using test methods on the ERT Web site are subject to this requirement for submitting reports electronically to WebFIRE. All reports required by this subpart not subject to the above electronic reporting requirements must be sent to the Administrator at the appropriate address. The Administrator may request a report in any form suitable for the specific case (e.g., by commonly used electronic media such as Excel spreadsheet, on CD or hard copy). The Administrator retains the right to require submittal of reports in paper format. **(40 CFR 63.1285(g))**

9. The permittee shall notify the AQD Technical Programs Unit Supervisor and the District Supervisor no less than 7 days prior to the anticipated test date. **(R 336.2001(4))**

See Appendix 8

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted.

Stack & Vent ID	Maximum Exhaust Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
NA	NA	NA	NA

IX. OTHER REQUIREMENT(S)

1. The permittee shall determine major source status using the maximum annual facility natural gas throughput calculated according to 40 CFR 63.1270(a)(1)(i) through (a)(1)(iv). As an alternative to calculating the maximum natural gas throughput, the owner or operator of a new or existing source may use the facility design maximum natural gas throughput to estimate the maximum potential emissions. **(40 CFR 63.1270(a)(1))**

2. The permittee shall determine the maximum values for other parameters used to calculate potential emissions as the maximum over the same period for which maximum throughput is determined. These parameters shall be based on an annual average or the highest single measured value. For estimating maximum potential emissions from glycol dehydration units, the glycol circulation rate used in the calculation shall be the unit's maximum rate under its physical and operational design consistent with the definition of potential to emit in 40 CFR 63.2. **(40 CFR 63.1270(a)(4))**

3. A site-specific monitoring plan must be prepared that addresses the monitoring system design, data collection, and the quality assurance and quality control elements. Each CPMS must be installed, calibrated, operated, and maintained in accordance with the procedures in your approved site-specific monitoring plan. The permittee may request approval of monitoring system quality assurance and quality control procedures alternative to those specified below and in your site-specific monitoring plan. **(40 CFR 63.1283(d)(1)(ii-iv))**

   a. The performance criteria and design specifications for the monitoring system equipment, including the sample interface, detector signal analyzer, and data acquisition and calculations;
   b. Sampling interface (e.g., thermocouple) location such that the monitoring system will provide representative measurements;
   c. Equipment performance checks, system accuracy audits, or other audit procedures;
   d. Ongoing operation and maintenance procedures in accordance with provisions in § 63.8(c)(1) and (c)(3);
   e. Ongoing reporting and recordkeeping procedures in accordance with provisions in § 63.10(c), (e)(1), and (e)(2)(i).
   f. The permittee must conduct the CPMS equipment performance checks, system accuracy audits, or other audit procedures specified in the site-specific monitoring plan at least once every 12 months.

g. The permittee must conduct a performance evaluation of each CPMS in accordance with the site-specific monitoring plan.

4. The permittee shall comply with all applicable provisions of the National Emission Standards for Hazardous Air Pollutants, as specified in 40 CFR, Part 63, Subpart A and Subpart HHH, for Natural Gas Transmission and Storage Facilities by October 15, 2015. **(40 CFR, Part 63, Subparts A and HHH)**

Footnotes:

[1] This condition is state-only enforceable and was established pursuant to Rule 201(1)(b).

[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

D. FLEXIBLE GROUP CONDITIONS

Part D outlines the terms and conditions that apply to more than one emission unit. The permittee is subject to the special conditions for each flexible group in addition to the General Conditions in Part A and any other terms and conditions contained in this ROP.

The permittee shall comply with all specific details in the special conditions and the underlying applicable requirements cited. If a specific condition type does not apply, NA (not applicable) has been used in the table. If there are no special conditions that apply to more than one emission unit, this section will be left blank.

FLEXIBLE GROUP SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FG CS1DDDDD	Stabilizer Heater (5 MMBtu/hr) and Boiler (3.5 MMBtu/hr)	EU CS1BOILER, EU CS1SHEATER, EU CS1WDHEATER
FG CS1CNDTANKS	Four condensate storage tanks controlled by a thermal oxidizer.	EU CS1TANK1, EU CS1TANK2, EU CS1TANK3, EU CS1TANK4

FG CS1DDDDD
FLEXIBLE GROUP CONDITIONS

DESCRIPTION

Requirements for existing Gas 1, (Natural Gas only) for existing Boilers and Process Heaters at major sources of Hazardous Air Pollutants per 40 CFR Part 63, Subpart DDDDD. These existing boilers or process heaters must comply with this subpart no later than January 31, 2016, except as provided in 40 CFR 63.6(i).

Emission Units:

The collection at a major source of all existing industrial, commercial, and institutional boilers and process heaters within the units designed to burn gas 1 fuel subcategory as defined in 40 CFR 63.7575. At the time of permit renewal:

Less than 5 MMBtu/hr	EU CS1BOILER (3.5 MMBtu/hr)
Equal to or greater than 5 MMBtu/hr and less than 10 MMBtu/hr	EU CS1HEATER (5 MMBtu/hr)
Equal to or greater than 10 MMBtu/hr	EU CS1WDHEATER (15 MMBtu/hr)

POLLUTION CONTROL EQUIPMENT

NA

I. EMISSION LIMIT(S)

NA

II. MATERIAL LIMIT(S)

1. The permittee shall only burn natural gas as defined in 40 CFR 63.7575. **(40 CFR 63.7499(l))**

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee must operate and maintain affected sources in a manner consistent with safety and good air pollution control practices for minimizing emissions. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Administrator that may include, but is

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not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source. **(40 CFR 63.7500(a)(3))**

2. The permittee may obtain approval from the Administrator to use an alternative to the work practice standards noted in SC III.1. **(40 CFR 63.7500(b))**

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3. The permittee must:
    a. Complete a tune-up every 5 years (61 months) for boilers/process heaters less than or equal to 5 million Btu per hour. **(40 CFR 63.7500(e), 40 CFR 63.7515(d))**
    b. Complete a tune-up every 2 years (25 months) for boilers greater than 5 million Btu per hour and less than 10 million Btu per hour. **(40 CFR 63.7500(e), 40 CFR 63.7515(d))**
    c. Complete a tune-up annually (13 months) for boilers greater than 10 million Btu per hour. **(40 CFR 63.7540(a)(10), 40 CFR 63.7515(d))**
    d. Conduct the tune-up within 30 calendar days of startup, if the unit is not operating on the required date for a tune-up. **(40 CFR 63.7540(a)(13))**
    e. Follow the procedures described in SC IX 3.a through 3.f for all initial and subsequent tune ups.

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(40 CFR 63.7540(a)(10), 40 CFR Part 63, Subpart DDDDD, Table 3)

IV. DESIGN/EQUIPMENT PARAMETER(S)

NA

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

NA

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee must keep a copy of each notification and report submitted to comply with 40 CFR Part 63, Subpart DDDDD, including all documentation supporting any Initial Notification or Notification of Compliance Status or semiannual compliance report that the permittee submitted, according to the requirements in 40 CFR 63.10(b)(2)(xiv). **(40 CFR 63.7555(a)(1))**

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2. The permittee must keep each record on site, or they must be accessible from on-site (for example, through a computer network), for at least 2 years after the date of each occurrence, measurement, maintenance, corrective action, report, or record. The permittee can keep the records off site for the remaining 3 years. **(40 CFR 63.7560(a), (b), and (c))**

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

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2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

4. Unless the EPA Administrator has approved a different schedule for submission of reports under 40 CFR 63.10(a), the permittee must submit each report, according to paragraph (h) of 40 CFR 63.7550, stated in SC VII.7, by the date in Table 9 of 40 CFR Part 63, Subpart DDDDD and according to the requirements in paragraphs (b)(1) through (4) of 40 CFR 63.7550, as listed below. For units that are subject only to a requirement to conduct an annual tune-up according to 40 CFR 63.7540(a)(10), stated in SC III.3.c, biennial tune-up according to 40 CFR 63.7540(a)(11), stated in SC III.3.b, or 5-year tune-up according to 40 CFR 63.7540(a)(12), stated in SC III.3.a, and not subject to emission limits or operating limits, the permittee may submit only an annual, biennial, or 5-year compliance report, as applicable, as specified in paragraphs (b)(1) through (4) of 40 CFR 63.7550, as listed below, instead of a semi-annual compliance report.

   (40 CFR 63.7550(b))

   a. When submitting an annual, biennial, or 5-year compliance report, the first compliance report must cover the period beginning on January 31, 2016 and ending on December 31 within 1, 2, or 5 years, as applicable, after the compliance date that is specified in 40 CFR 63.7495.
   (40 CFR 63.7550(b)(1))
   b. The first annual, biennial, or 5-year compliance report must be postmarked or submitted no later than March 15. **(40 CFR 63.7550(b)(2), 40 CFR 63.7550(b)(5))**
   c. Annual, biennial, and 5-year compliance reports must cover the applicable 1-, 2-, or 5-year periods from January 1 to December 31. **(40 CFR 63.7550(b)(3))**
   d. Annual, biennial, and 5-year compliance reports must be postmarked or submitted no later than March 15. **(40 CFR 63.7550(b)(4), 40 CFR 63.7550(b)(5))**

5. The permittee must include the following information in the compliance report. **(40 CFR 63.7550(c), 40 CFR 63.7550(c)(1))**
   a. Company and Facility name and address. **(40 CFR 63.7550(c)(5)(i))**
   b. Process unit information, emissions limitations, and operating parameter limitations. **(40 CFR 63.7550(c)(5)(ii))**
   c. Date of report and beginning and ending dates of the reporting period. **(40 CFR 63.7550(c)(5)(iii))**
   d. Include the date of the most recent tune-up for each unit. Include the date of the most recent burner inspection if it was not done annually, biennially, or on a 5-year period and was delayed until the next scheduled or unscheduled unit shutdown. **(40 CFR 63.7550(c)(5)(xiv))**
   e. Statement by a responsible official with that official's name, title, and signature, certifying the truth, accuracy, and completeness of the content of the report. **(40 CFR 63.7550(c)(5)(xvii))**

6. The permittee must submit the reports according to the procedures specified in paragraph (h)(3) of 40 CFR 63.7550, as listed below. **(40 CFR 63.7550(h))**
   a. The permittee must submit all reports required by Table 9 of 40 CFR Part 63, Subpart DDDDD electronically to the EPA via the Compliance and Emissions Data Reporting Interface (CEDRI). (CEDRI can be accessed through the EPA's CDX.) The permittee must use the appropriate electronic report in CEDRI for 40 CFR Part 63, Subpart DDDDD. Instead of using the electronic report in CEDRI for 40 CFR Part 63, Subpart DDDDD, the permittee may submit an alternate electronic file consistent with the XML schema listed on the CEDRI Web site (*http://www.epa.gov/ttn/chief/cedri/index.html*), once the XML schema is available. If the reporting form specific to 40 CFR Part 63, Subpart DDDDD is not available in CEDRI at the time that the report is due, the permittee must submit the report to the Administrator at the appropriate address listed in 40 CFR 63.13. The permittee must begin submitting reports via CEDRI no later than 90-days after the form becomes available in CEDRI. **(40 CFR 63.7550(h)(3))**

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See Appendix 8

VIII. STACK/VENT RESTRICTION(S)

NA

IX. OTHER REQUIREMENT(S)

1. The permittee must be in compliance with the applicable work practice standards. **(40 CFR 63.7505(a))**

2. For affected sources (as defined in 40 CFR 63.7490) that have not operated since the previous compliance demonstration and more than one year has passed since the previous compliance demonstration, the permittee must complete a subsequent tune-up within 30 days of startup by following the procedures described in SC IX 3.a through 3.f. **(40 CFR 63.7515(g))**

3. The permittee must demonstrate continuous compliance with the tune-up requirement by completing the following: **(40 CFR 63.7540(a))**
   a. Inspect the burner, and clean or replace any components of the burner as necessary (the permittee may perform the burner inspection any time prior to tune-up or delay the burner inspection until the next scheduled unit shutdown). At units where entry into a piece of process equipment or into a storage vessel is required to complete the tune-up inspections, inspections are required only during planned entries into the storage vessel or process equipment. **(40 CFR 63.7540(a)(10)(i))**
   b. Inspect the flame pattern, as applicable, and adjust the burner as necessary to optimize the flame pattern. The adjustment should be consistent with the manufacturer's specifications, if available. **(40 CFR 63.7540(a)(10)(ii))**
   c. Inspect the system controlling the air-to-fuel ratio, as applicable, and ensure that it is correctly calibrated and functioning properly (the permittee may delay the inspection until the next scheduled unit shutdown). Units that produce electricity for sale may delay the inspection until the first outage, not to exceed 36 months from the previous inspection. **(40 CFR 63.7540(a)(10)(iii))**
   d. Optimize total emissions of CO. This optimization should be consistent with the manufacturer's specifications, if available, and with any NO_x requirement to which the unit is subject. **(40 CFR 63.7540(a)(10)(iv))**
   e. Measure the concentrations in the effluent stream of CO in parts per million, by volume, and oxygen in volume percent, before and after the adjustments are made (measurements may be either on a dry or wet basis, as long as it is the same basis before and after the adjustments are made). Measurements may be taken using a portable CO analyzer. **(40 CFR 63.7540(a)(10)(v))**
   f. Maintain on-site and submit, if requested by the Administrator, the most recent periodic report containing the information as listed below. **(40 CFR 63.7540(a)(10)(vi))**
      i. The concentrations of CO in the effluent stream in parts per million by volume, and oxygen in volume percent, measured at high fire or typical operating load, before and after the tune-up of the boiler or process heater. **(40 CFR 63.7540(a)(10)(vi)(A))**
      ii. A description of any corrective actions taken as a part of the tune-up. **(40 CFR 63.7540(a)(10)(vi)(B))**
      iii. The type and amount of fuel used over the 12 months prior to the tune-up, but only if the unit was physically and legally capable of using more than one type of fuel during that period. Units sharing a fuel meter may estimate the fuel used by each unit. **(40 CFR 63.7540(a)(10)(vi)(C))**

4. If the boiler or process heater has a heat input capacity of less than or equal to 5 million Btu per hour, the permittee may delay the burner inspection specified in SC IX 3.a until the next scheduled or unscheduled unit shutdown, but the permittee must inspect each burner at least once every 72 months. If an oxygen trim system is utilized on a unit without emission standards to reduce the tune-up frequency to once every 5 years, set the oxygen level no lower than the oxygen concentration measured during the most recent tune-up. **(40 CFR 63.7540(a)(12))**

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Footnotes:

[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

~~DESCRIPTION~~

~~EU CS1HEATER (5 MMBtu/hr), EU CS1WDHEATER (15 MMBtu/hr), and EU CS1BOILER (3.5 MMBtu/hr) are subject to 40 CFR, Part 63, Subpart DDDDD National Emission Standard for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters.~~

~~**Emission Unit:** EU CS1SHEATER, EU CS1WDHEATER, and EU CS1BOILER.~~

~~**POLLUTION CONTROL EQUIPMENT:** NA~~

~~I. EMISSION LIMIT(S)~~

~~Pollutant~~	~~Limit~~	~~Time Period/ Operating Scenario~~	~~Equipment~~	~~Monitoring/ Testing Method~~	~~Underlying Applicable Requirements~~
~~NA~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~

~~II. MATERIAL LIMIT(S)~~

~~Material~~	~~Limit~~	~~Time Period/ Operating Scenario~~	~~Equipment~~	~~Monitoring/ Testing Method~~	~~Underlying Applicable Requirements~~
~~NA~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~

~~III. PROCESS/OPERATIONAL RESTRICTION(S)~~

~~NA~~

~~IV. DESIGN/EQUIPMENT PARAMETER(S)~~

~~NA~~

~~V. TESTING/SAMPLING~~

~~Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**~~

1. ~~The permittee must conduct an initial performance tune-up no later than January 31, 2016 for EU CS1HEATER and EU CS1WDHEATER according to § 63.7540(a)(11). Subsequent biennial tune-ups must be conducted no more than 25 months after the previous tune-up. **(40 CFR 63.7510(e), 40 CFR 63.7515(d), 40 CFR 63.7540(a)(11), 40 CFR, Part 63, Subpart DDDDD, Table 3.2)**~~

2. ~~The permittee must conduct an initial performance tune-up no later than January 31, 2016 for EU CS1BOILER according to § 63.7540(a)(12). Subsequent 5-year tune-ups must be conducted no more than 61 months after the previous tune-up. **(40 CFR 63.7510(e), 40 CFR 63.7515(d), 40 CFR 63.7540(a)(12), 40 CFR, Part 63, Subpart DDDDD, Table 3.1)**~~

3. ~~The permittee shall complete a one-time energy assessment specified in Table 3.4 (a) through (h) no later than January 31, 2016 for all Emission Units in FG CS1DDDDD. An energy assessment completed on or after January 1, 2008, that meets or is amended to meet the energy assessment requirements, satisfies the energy~~

~~assessment requirement. A facility that operates under an energy management program compatible with ISO 50001 that includes the affected units also satisfies the energy assessment requirement. The energy assessment must include the following:~~

- ~~a. A visual inspection of the boiler or process heater system.~~
- ~~b. An evaluation of operating characteristics of the boiler or process heater systems, specifications of energy using systems, operating and maintenance procedures, and unusual operating constraints.~~
- ~~c. An inventory of major energy use systems consuming energy from affected boilers and process heaters and which are under the control of the boiler/process heater owner/operator.~~
- ~~d. A review of available architectural and engineering plans, facility operation and maintenance procedures and logs, and fuel usage.~~
- ~~e. Reviews of the facility's energy management practices and provide recommendations for improvements consistent with the definition of energy management practices, if identified.~~
- ~~f. A list of cost-effective energy conservation measures that are within the facility's control.~~
- ~~g. A list of the energy savings potential of the energy conservation measures identified.~~
- ~~h. A comprehensive report detailing the ways to improve efficiency, the cost of specific improvements, benefits, and the time frame for recouping those investments.~~
  ~~**(40 CFR 63.7510(e), 40 CFR, Part 63, Subpart DDDDD Table 3.4)**~~

~~VI. MONITORING/RECORDKEEPING~~

~~Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**~~

1. ~~The permittee shall maintain a copy of each notification and report submitted to comply with 40 CFR, Part 63, Subpart DDDDD including all documentation supporting any Initial Notification or Notification of Compliance Status or Semiannual Compliance report that was submitted, according to the requirements in § 63.10(b)(2)(xiv) and any records of performance tests, fuel analyses, or other compliance demonstrations and performance evaluations as required in § 63.10(b)(2)(viii). **(40 CFR 63.7555)**~~

~~VII. REPORTING~~

1. ~~Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**~~

2. ~~Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**~~

3. ~~Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**~~

4. ~~A compliance report containing the information below shall be submitted with the annual certification of compliance in VII.3 above. The compliance report for EU CS1HEATER and EU CS1WDHEATER is due every two years starting in 2018. The compliance report for EU CS1BOILER is due every five years starting in 2021. **(40 CFR 63.7550(B), 40 CFR 63.7550(c)(5))**~~
   - ~~a. Company and Facility name and address.~~
   - ~~b. Process unit information, emissions limitations, and operating parameter limitations.~~
   - ~~c. Date of report and beginning and ending dates of the reporting period.~~
   - ~~d. The total operating time during the reporting period.~~
   - ~~e. Include the date of the most recent tune-up for EU CS1HEATER, EU CS1WDHEATER and EU CS1BOILER. Include the date of the most recent burner inspection if it was not done annually, biennially, or on a 5-year period and was delayed until the next scheduled or unscheduled unit shutdown.~~

5. ~~The permittee shall submit a Notification of Compliance Status (NOCS) following the initial compliance demonstration. The NOCS must contain the following: **(40 CFR 63.7530(d),(e), and (f), 40 CFR 63.7545(e))**~~
   - ~~a. A description of each Emission Unit including identification of which subcategories the EU is in and the design heat input capacity of the EU~~

   - ~~b. The following certifications of compliance, as applicable, and signed by a responsible official:~~

~~i. "This facility complies with the required initial tune-up according to the procedures in § 63.7540(a)(10)(i) through (vi)."~~
~~ii. "This facility has had an energy assessment performed according to § 63.7530(e) and is an accurate depiction of the facility at the time of the assessment."~~

~~**See Appendix 8**~~

~~VIII. STACK/VENT RESTRICTION(S)~~

~~The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:~~

~~Stack & Vent ID~~	~~Maximum Exhaust Dimensions (inches)~~	~~Minimum Height Above Ground (feet)~~	~~Underlying Applicable Requirements~~
~~NA~~	~~NA~~	~~NA~~	~~NA~~

~~IX. OTHER REQUIREMENT(S)~~

~~1. The permittee shall comply with all applicable provisions of the National Emission Standards for Hazardous Air Pollutants, as specified in 40 CFR, Part 63, Subpart A and Subpart DDDDD: Industrial, Commercial, and Institutional Boilers and Process Heaters no later than January 31, 2016.~~ ~~**(40 CFR, Part 63, Subpart DDDDD, 40 CFR 63.7495(b))**~~

~~**Footnotes:**~~
~~[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).~~
~~[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).~~

FG CS1CNDTANKS
FLEXIBLE GROUP CONDITIONS

DESCRIPTION: Four condensate storage tanks each with a maximum capacity of 16,800 gallons used to store stabilized condensate liquids.

Emission Unit: EU CS1TANK1, EU CS1TANK2, EU CS1TANK3, and EU CS1TANK4

POLLUTION CONTROL EQUIPMENT: A natural gas blanket is used to minimize VOC and Toxic air contaminates (TAC) emissions from the tanks. A thermal oxidizer is used to control hydrocarbon vapors resulting from breathing and working losses from the condensate storage tanks.

I. EMISSION LIMIT(S)

NA

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee shall not operate FG CS1CNDTANKS unless a malfunction abatement plan (MAP) as described in Rule 911(2), for thermal oxidizer control of VOC emissions from FG CS1CNDTANKS is implemented and maintained.

2. The permittee shall not operate FG CS1CNDTANKS unless the thermal oxidizer is operated with a minimum exhaust temperature of 1400°F. **(R 336.1213(3))**

3. The permittee shall install, calibrate, maintain and operate in a satisfactory manner a device to monitor and record the thermal oxidizer exhaust gas temperature on a continuous basis.[2] **(R 336.1702(a))**

IV. DESIGN/EQUIPMENT PARAMETER(S)

NA

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

NA

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall keep, in a satisfactory manner, records of the thermal oxidizer exhaust gas temperature. The permittee shall keep all records on file at a location approved by the AQD district supervisor and make records available to the Department upon request.[2] **(R 336.1213(3), R 336.1702(a))**

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to

December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

See Appendix 8

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	**Maximum Exhaust Dimensions (inches)**	**Minimum Height Above Ground (feet)**	**Underlying Applicable Requirements**
1. SV011C (Thermal Oxidizer)	20[1]	31[1]	**R 336.1225**

IX. OTHER REQUIREMENT(S)

1. The permittee shall maintain a malfunction abatement plan approved by the AQD District Supervisor for FG CS1CNDTANKS.[2] **(R 336.1911)** The MAP shall, at a minimum, specify the following:
    i. A complete preventative maintenance program including identification of the supervisory personnel responsible for overseeing the inspection, maintenance, and repair of air-cleaning devices, a description of the items or conditions that shall be inspected, the frequency of the inspections or repairs, and an identification of the major replacement parts that shall be maintained in inventory for quick replacement.
    ii. An identification of the source and air-cleaning device operating variables that shall be monitored to detect a malfunction or failure, the normal operating range of these variables, and a description of the method of monitoring or surveillance procedures.
    iii. A description of the corrective procedures or operational changes that shall be taken in the event of a THERMAL OXIDIZER malfunction.

    b. If at any time the MAP fails to address or inadequately addresses an event that meets the characteristics of a malfunction, the permittee shall amend the MAP within 45 days after such an event occurs. The permittee shall also amend the MAP within 45 days, if new equipment is installed or upon request from the District Supervisor. The permittee shall submit the MAP and any amendments to the MAP to the AQD District Supervisor for review and approval. If the AQD does not notify the permittee within 90 days of submittal, the MAP or amended MAP shall be considered approved. Until an amended plan is approved, the permittee shall implement corrective procedures or operational changes to achieve compliance with all applicable rules.

Footnotes:

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[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).
[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

E. NON-APPLICABLE REQUIREMENTS

At the time of the ROP issuance, the AQD has determined that no non-applicable requirements have been identified for incorporation into the permit shield provision set forth in the General Conditions in Part A pursuant to Rule 213(6)(a)(ii).

APPENDICES

Appendix 1-S3. Abbreviations and Acronyms

The following is an alphabetical listing of abbreviations/acronyms that may be used in this permit.

AQD	Air Quality Division	MM	Million
acfm	Actual cubic feet per minute	MSDS	Material Safety Data Sheet
BACT	Best Available Control Technology	MW	Megawatts
BTU	British Thermal Unit	NA	Not Applicable
°C	Degrees Celsius	NAAQS	National Ambient Air Quality Standards
CAA	Federal Clean Air Act	NESHAP	National Emission Standard for Hazardous Air Pollutants
CAM	Compliance Assurance Monitoring	NMOC	Non-methane Organic Compounds
CEM	Continuous Emission Monitoring	NOx	Oxides of Nitrogen
CFR	Code of Federal Regulations	NSPS	New Source Performance Standards
CO	Carbon Monoxide	NSR	New Source Review
COM	Continuous Opacity Monitoring	PM	Particulate Matter
department	Michigan Department of Environmental Quality	PM-10	Particulate Matter less than 10 microns in diameter
dscf	Dry standard cubic foot	pph	Pound per hour
dscm	Dry standard cubic meter	ppm	Parts per million
EPA	United States Environmental Protection Agency	ppmv	Parts per million by volume
EU	Emission Unit	ppmw	Parts per million by weight
°F	Degrees Fahrenheit	PS	Performance Specification
FG	Flexible Group	PSD	Prevention of Significant Deterioration
GACS	Gallon of Applied Coating Solids	psia	Pounds per square inch absolute
GC	General Condition	psig	Pounds per square inch gauge
gr	Grains	PeTE	Permanent Total Enclosure
HAP	Hazardous Air Pollutant	PTI	Permit to Install
Hg	Mercury	RACT	Reasonable Available Control Technology
hr	Hour	ROP	Renewable Operating Permit
HP	Horsepower	SC	Special Condition
H_2S	Hydrogen Sulfide	scf	Standard cubic feet
HVLP	High Volume Low Pressure *	sec	Seconds
ID	Identification (Number)	SCR	Selective Catalytic Reduction
IRSL	Initial Risk Screening Level	SO_2	Sulfur Dioxide
ITSL	Initial Threshold Screening Level	SRN	State Registration Number
LAER	Lowest Achievable Emission Rate	TAC	Toxic Air Contaminant
lb	Pound	Temp	Temperature
m	Meter	THC	Total Hydrocarbons
MACT	Maximum Achievable Control Technology	tpy	Tons per year
MAERS	Michigan Air Emissions Reporting System	µg	Microgram
MAP	Malfunction Abatement Plan	VE	Visible Emissions
MDEQ	Michigan Department of Environmental Quality	VOC	Volatile Organic Compounds
mg	Milligram	yr	Year
mm	Millimeter		

*For HVLP applicators, the pressure measured at the gun air cap shall not exceed 10 pounds per square inch gauge (psig).

Appendix 2-S3. Schedule of Compliance

The permittee certified in the ROP application that this stationary source is in compliance with all applicable requirements and the permittee shall continue to comply with all terms and conditions of this ROP. A Schedule of Compliance is not required. **(R 336.1213(4)(a), R 336.1119(a)(ii))**

Appendix 3-S3. Monitoring Requirements

Specific monitoring requirement procedures, methods or specifications are detailed in Part A or the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, this appendix is not applicable.

Appendix 4-S3. Recordkeeping

Specific recordkeeping requirement formats and procedures are detailed in Part A or the appropriate source-wide, emission unit and/or flexible group special conditions. Therefore, this appendix is not applicable.

Appendix 5-S3. Testing Procedures

There are no specific testing requirement plans or procedures for this ROP. Therefore, this appendix is not applicable.

Appendix 6-S3. Permits to Install

The following table lists any PTIs issued or ROP revision applications received since the effective date of the previously issued ROP No. MI-ROP-B7198-2008. Those ROP revision applications that are being issued concurrently with this ROP renewal are identified by an asterisk (*). Those revision applications not listed with an asterisk were processed prior to this renewal.

Source-Wide PTI No MI-PTI-B7198-2008 is being reissued as Source-Wide PTI No. MI-PTI-B7198-2014.

Permit to Install Number	ROP Revision Application Number	Description of Equipment or Change	Corresponding Emission Unit(s) or Flexible Group(s)
29-13	NA	EUCS1GLYDHY Allowed the two modes of operation of the glycol dehydrator to have two emission limits (one for each operating mode). Permitted federally enforceable limit on Benzene of less than 1TPY to ensure area source status.	EUCS1GLYDHY

The following ROP amendments or modifications were issued after the effective date of ROP No. MI-ROP-B7198-2014.

Permit to Install Number	ROP Revision Application Number/Issuance Date	Description of Change	Corresponding Emission Unit(s) or Flexible Group(s)
138-13A	201400093/ November 21, 2014	Increase in glycol recirculation rate from 720 gallons per hour to 960 gallons per hour. Lowered benzene emission limit from 0.995 pounds per hour to 0.43 pounds per hour. The benzene limit was changed to 0.02 pph with condenser followed by thermal oxidizer in series.	EUCS1GLYDHY

Appendix 7-S3. Emission Calculations

Appendix 7A. EU CS1HHH

The permittee shall use the following equation, or alternate equation approved by the AQD, in conjunction with monitoring, testing or recordkeeping data to determine compliance with the emission limit of BTEX referenced in EU CS12HHH-S1, I.1, BTEX emissions (40 CFR 63.1275 equation 1).

$$EL_{BTEX} = 3.10x10^{-4} * Throughput * C_{i,BTEX} * 365 \frac{days}{yr} * \frac{1\,Mg}{1x10^{6}\,grams} \quad \text{Equation 1}$$

Where:

EL_{BTEX} = Unit-specific BTEX emission limit, megagrams per year;

3.10×10^{-4} = BTEX emission limit, grams BTEX/standard cubic meter-ppmv;

Throughput = Annual average daily natural gas throughput, standard cubic meters per day;

$C_{i,BTEX}$ = Annual average BTEX concentration of the natural gas at the inlet to the glycol dehydration unit, ppmv.

Appendix 8-S3. Reporting

A. Annual, Semiannual, and Deviation Certification Reporting

The permittee shall use the MDEQ Report Certification form (EQP 5736) and MDEQ Deviation Report form (EQP 5737) for the annual, semiannual and deviation certification reporting referenced in the Reporting Section of the Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Alternative formats must meet the provisions of Rule 213(4)(c) and Rule 213(3)(c)(i), respectively, and be approved by the AQD District Supervisor.

B. Other Reporting

Specific reporting requirement formats and procedures are detailed in Part A or the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, Part B of this appendix is not applicable.

Appendix D

Plans Referenced within the ROP:

D-1: Blue Lake, Cold Springs 1, and Cold Springs 12 Emission Test and LDAR Assessment of Small Glycol Dehydration Units

D-2: Cold Springs 12, Blue Lake, and Cold Springs 1 Preventative Maintenance / Malfunction Abatement Plan (PM/MAP)

D-3: Cold Springs 12 40 CFR Part 63 Subpart HHH Site Monitoring Plan

D-4: Blue Lake 40 CFR Part 63 Subpart HHH Site Monitoring Plan

D-5: Cold Springs 1 40 CFR Part 63 Subpart HHH Site Monitoring Plan

Appendix D-1

Blue Lake, Cold Springs 1, and Cold Springs 12 Emission Test and LDAR Assessment of Small Glycol Dehydration Units

Blue Lake, Cold Springs 1, and Cold Springs 12

Emission Test and LDAR Assessment of Small Glycol Dehydration Units

ANR Pipeline Company Mancelona Stations

10000 Pflum Road
Mancelona, Michigan

TransCanada
In business to deliver

State Registration No. B7198
Prepared for
TransCanada
Houston, Texas

April 2, 2015

Bureau Veritas Project No. 11015-000004.00

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Executive Summary

TransCanada retained Bureau Veritas North America, Inc. to evaluate the closed-vent systems and/or test air emissions at the ANR Pipeline Company (ANR) Gas Storage and Compressor Stations in Mancelona, Michigan. TransCanada stores natural gas in underground reservoirs and transports gas via pipelines to other companies and end-users after the gas is processed through glycol dehydration units. Testing was conducted on the Blue Lake (Blue Lake Gas Storage Company), Cold Springs 1 (Cold Springs 1 Compressor Station), and Cold Springs 12 (Cold Springs 12 Compressor Station) glycol dehydration units. The purpose of the testing was to:

- Evaluate the glycol dehydration units' closed-vent systems for leaks.
- Measure benzene, toluene, ethylbenzene, and xylenes (BTEX) emissions from the Blue Lake and Cold Springs 1 glycol dehydration units' thermal oxidizer exhaust stacks.
- Evaluate compliance with 40 CFR Part 63, National Emissions Standards for Hazardous Air Pollutants for Source Categories, Subpart HHH, "National Emissions Standards for Hazardous Air pollutants for Natural Gas Transmission and Storage Facilities," incorporated in Michigan Department of Environmental Quality (MDEQ) Renewable Operating Permit (ROP) MI-ROP- B7198-2014a.

The glycol dehydration systems are defined as "existing small glycol dehydration units" in accordance with 40 CFR 63, Subpart HHH, and subject to:

- Leak Detection and Repair (LDAR) standards.
- Control device BTEX, total organic compound (TOC), or total hazardous air pollutants (HAPs) emission standards.

The testing was completed in accordance with United States Environmental Protection Agency (USEPA) Reference Methods 1 through 4, 18, and 21. On February 11 and 12, 2015, testing was conducted at Blue Lake and Cold Springs 1 and consisted of completion of the LDAR assessments and three 60-minute test runs for each source to measure BTEX. On February 13 and 19, 2015, testing was conducted at Cold Springs 12 and consisted of completion of the LDAR assessment.

Leak Detection and Repair

Detailed results of the LDAR assessments are presented in Tables 3-3 through 3-5. Documentation of each LDAR assessment was recorded on LDAR Recordkeeping and Field Inspection Forms, which are included in Appendix C of this report. The results of the LDAR assessments are summarized in the following table.

LDAR Assessment Results

Date (2015)	Glycol Dehydration Unit	Number of Components Evaluated	Number of Readings Below Leak Criterion of 500 ppmv	Number of Readings Exceeding Leak Criterion of 500 ppmv	Comment
Feb 11	Blue Lake	29	29	0	No leaks detected
Feb 12	Cold Springs 1	26	26	0	No leaks detected
Feb 13 and Feb 19	Cold Springs 12	30	30	0	No leaks detected

ppmv; part per million by volume

Based on the results of the LDAR assessments, no volatile organic compound (VOC) readings were measured at a concentration exceeding the criterion of a leak (i.e., 500 part per million by volume [ppmv]).

Performance Testing

The emission testing was conducted to evaluate compliance with the emission limit of the thermal oxidizers, which control air emissions from the glycol dehydration systems. Emission testing was conducted on the Blue Lake and Cold Springs 1 glycol dehydration units.

Test ports could not be installed for the Cold Springs 12 unit prior to the testing; therefore, emission testing was not completed at Cold Springs 12.

Detailed results of the Blue Lake and Cold Springs 1 testing are presented in Tables 1 and 2 after the Tables Tab of this report. The results of the testing are summarized in the following table.

BTEX Emission Results
Compared to Permit Emission Limits

Date (2015)	Glycol Dehydration Unit	Emission Unit	Parameter	Units	Average Result[1]	Emission Limit[2]
Blue Lake						
Feb 11	Blue Lake	E EU BLGLYDHY	Benzene[†]	lb/hr	<0.00036	NA
			Toluene[†]		<0.00076	NA
			Ethylbenzene[†]		<0.00078	NA
			Total xylenes[†]		<0.0015	NA
			Mass rate of BTEX	lb/hr	<0.0034	NA
				Mg/yr	<0.0056	209.76
Cold Springs 1						
Feb. 12	Cold Springs 1	EUCS1GLYDHY	Benzene[†]	lb/hr	<0.00044	NA
			Toluene[†]		<0.00091	NA
			Ethylbenzene[†]		<0.00093	NA
			Total xylenes[†]		<0.0019	NA
			Mass rate of BTEX	lb/hr	<0.0042	NA
				Mg/yr	<0.0068	179.21

[†] Corrected for spike recovery following USEPA Method 18.

[1] Based on typical maximum operating hours for the total withdrawal season.

[2] Emission limit was calculated based on the annual average daily throughput rates from 2009 through 2013 using Equation 1 of the regulation (40CFR63.1275(b)(1)(iii)).

lb/hr: pound per hour
Mg/yr: megagrams per year
NA: not applicable
BTEX: benzene, toluene, ethylbenzene, total xylenes

The BTEX measurements demonstrate that estimated annual air emissions from the thermal oxidizers controlling the glycol dehydration units are within the allowable limit.

1.0 Introduction

1.1 Summary of Test Program

TransCanada retained Bureau Veritas North America, Inc. to evaluate the closed-vent systems and/or test air emissions at the ANR Pipeline Company (ANR) Gas Storage and Compressor Stations in Mancelona, Michigan. TransCanada stores natural gas in underground reservoirs and transports gas via pipelines to other companies and end-users after the gas is processed through glycol dehydration units. Testing was conducted on the Blue Lake (Blue Lake Gas Storage Company), Cold Springs 1 (Cold Springs 1 Compressor Station), and Cold Springs 12 (Cold Springs 12 Compressor Station) glycol dehydration units. The purpose of the testing was to:

- Evaluate the glycol dehydration units' closed-vent systems for leaks.
- Measure benzene, toluene, ethylbenzene, and xylenes (BTEX) emissions from the Blue Lake and Cold Springs 1 glycol dehydration units' thermal oxidizer exhaust stacks.
- Evaluate compliance with 40 CFR Part 63, National Emissions Standards for Hazardous Air Pollutants for Source Categories, Subpart HHH, "National Emissions Standards for Hazardous Air pollutants for Natural Gas Transmission and Storage Facilities," incorporated in Michigan Department of Environmental Quality (MDEQ) Renewable Operating Permit (ROP) MI-ROP- B7198-2014a.

The glycol dehydration systems are defined as "existing small glycol dehydration units" in 40 CFR 63, Subpart HHH, and subject to:

- Leak Detection and Repair (LDAR) standards.
- Control device BTEX, total organic compound (TOC), or total hazardous air pollutants (HAPs) emission standards.

Leak Detection and Repair

The LDAR assessments were conducted following the LDAR plan that Bureau Veritas prepared which outlined procedures to detect volatile organic compound (VOC) leaks from equipment components of the closed-vent system and identify necessary repairs as required by 40 CFR 60, Subpart HHH and MDEQ MI-ROP-B7198-2014A.

When compliance with the emission standard is achieved using a control device or combination of control devices, the closed-vent system shall have no detectable emissions. A potential leak interface is evaluated to operate with no detectable organic emissions if the organic concentration is less than 500 parts per million by volume (ppmv).

Bureau Veritas conducted the following LDAR activities:

- Identified, tagged, and listed the components to be monitored and those that are difficult to inspect.
- Established procedures if the leak criterion is exceeded.
- Monitored components through initial visual inspection and LDAR monitoring following United States Environmental Protection Agency (USEPA) Method 21 guidelines.
- Communicated findings to TransCanada for leak repair (if applicable) and reporting by TransCanada.
- Reported the initial inspection findings.

Documentation of each LDAR assessment was recorded on LDAR Recordkeeping and Field Inspection Forms, which are included in Appendix C of this report.

Performance Testing

The emission testing was conducted to evaluate compliance with the emission limit of the thermal oxidizers, which control air emissions from the glycol dehydration systems. Emission testing was conducted on the Blue Lake and Cold Springs 1 glycol dehydration units.

The thermal oxidizers are subject to the following emission limit:

> Unit-specific BTEX emission limit in megagrams (Mg) per year, calculated using Equation 1 of the regulation (40CFR63.1275(b)(1)(iii)):

$$EL_{BTEX} = 3.10\text{x}10^{-4} \times \text{Throughput} \times C_{i,BTEX} \times 365\,\frac{\text{day}}{\text{yr}} \times \frac{1\ \text{Mg}}{1\text{x}10^{6}\ \text{gram}}$$

Where:

EL_{BTEX} = Unit-specific BTEX emission limit, megagrams per year

$3.10\text{x}10^{-4}$ = BTEX emission limit, grams BTEX/standard cubic meter-ppmv

Throughput = Annual average daily natural gas throughput, standard cubic meters

$C_{i,BTEX}$ = Annual average BTEX concentration of the natural gas at the inlet to the glycol dehydration unit, ppmv

The throughput values were measured at the custody transfer meter and based on annual average daily throughput rates from 2009 through 2013.

The testing was completed in accordance with USEPA Reference Methods 1 through 4, 18, and 21 identified in §63.1282 of Subpart HHH of 40 CFR Part 63—Test Methods, Compliance Procedures, and Compliance Demonstrations. Measurement of BTEX concentrations following USEPA Method 18 incorporates the analytical procedures of Occupational Health and Safety Administration (OSHA) 7 and USEPA SW-846 Method 8260.

On February 11 and 12, 2015, Bureau Veritas conducted the following for the Blue Lake and Cold Springs 1 units:

- The LDAR assessment.
- Three 60-minute test runs at the exhaust of each unit to measure BTEX concentrations.

On February 13 and 19, 2015, Bureau Veritas conducted the following for the Cold Springs 12 unit:

- The LDAR assessment.

Test ports could not be installed for the Cold Springs 12 unit prior to the testing; therefore, emission testing was not completed at Cold Springs 12.

The sampling conducted is summarized below in Table 1-1.

Table 1-1
Sources Tested, Parameters, and Test Dates

Source	Test Parameter	Test Date
Blue Lake		
Blue Lake thermal oxidizer exhaust	BTEX	February 11, 2015
Closed vent system joints	VOC leaks	
Cold Springs 1		
Cold Springs 1 thermal oxidizer exhaust	BTEX	February 12, 2015
Closed vent system joints	VOC leaks	
Cold Springs 1		
Closed vent system joints	VOC leaks	February 13 and 19, 2015

BTEX: benzene, toluene, ethylbenzene, total xylenes
VOC: volatile organic compound

1.2 Key Personnel

Key personnel involved in this test program are listed in Table 1-2. Mr. Thomas Schmelter, Senior Project Manager with Bureau Veritas, led the emission testing program under the direction of Dr. Derek Wong, Director and Vice President with Bureau Veritas.

Mr. Jeff Punjak, Controls Specialist, Plant Reliability with TransCanada; Mr. Pedro Amieva, US Plant Reliability with TransCanada; Ms. Melinda Holdsworth, Environmental Air Emissions and GHG Advisor with TransCanada; and others coordinated with Bureau Veritas and arranged for process data to be recorded.

Portions of the testing were witnessed by Mr. Rob Dickman, Environmental Quality Analyst, and Ms. Gloria Torello, Environmental Quality Analyst, with MDEQ.

Table 1-2
Key Personnel

<table>
<tr><th colspan="2">TransCanada</th></tr>
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</table>

2.0 Source and Sampling Locations

2.1 Process Description

ANR, a wholly owned subsidiary of TransCanada, operates natural gas pipeline systems that connect supply basins and markets throughout the Midwest and south to the Gulf of México. ANR owns and operates several facilities in Michigan that are used in both natural gas transmission and storage. The locations evaluated as part of this test program are natural gas transmission and compression stations that operate natural gas storage fields.

The pipeline transports natural gas to and from the storage reservoir fields. Natural gas is injected into underground fields in spring and summer and withdrawn in fall and winter for residential and commercial heating purposes. During injection, natural gas flows into the reservoir until the field pressure approaches pipeline pressure. When the pressures near equilibrium, one or more engines are used to compress the natural gas into the reservoir. Compression injection usually continues until the field reaches its maximum rated pressure.

During the storage period, natural gas absorbs hydrocarbons and water while in the underground geologic formation. Gas withdrawn from the storage field is conditioned through a glycol dehydration system to remove water. Dehydration is necessary in order to (1) meet contract sales specifications, (2) remove water vapor that may form hydrates, ice-like structures that can cause corrosion or plug equipment lines, and (3) to improve fuel heating values. Glycol dehydration is an absorption process in which a liquid glycol absorbent directly contacts the natural gas stream, which is circulated counter-current to the glycol flow, and absorbs water vapor in a contact tower or absorption column.

At the existing small glycol dehydration units, natural gas is pumped into towers, where the gas passes over a series of glycol trays. The glycol in these trays absorbs water and hydrocarbons in the natural gas. The conditioned natural gas can be fed into a separator to remove liquids that remain before being compressed and/or transported into the pipeline for distribution.

The rich, or "dirty," glycol that contains water and hydrocarbons accumulates in the bottom of the towers and is transported to a three-phase separator that separates heavy hydrocarbons from the glycol. The glycol is filtered before being transported into a re-boiler unit. The re-boiler evaporates water from the glycol. The resulting lean, or "clean," glycol is recirculated into the glycol towers.

Water from the re-boiler is condensed and transported to a condensate and brine tanks, when necessary. The re-boiler vapors, which may contain volatile organic compounds—including HAPs such as BTEX—are directed to a condenser and/or thermal oxidizer for control prior to exhausting to atmosphere.

Figures 2-1 through 2-4 depict the natural gas withdrawal and small glycol dehydration unit processes for Blue Lake, Cold Springs 1, and Cold Springs 12.

The small glycol dehydration units were tested when natural gas was being processed at the maximum routine operating conditions. The natural gas throughput rate was measured at the custody transfer meter. Process and control equipment data recorded during testing are included in Appendix F. Table 2-1 summarizes the process and control equipment data.

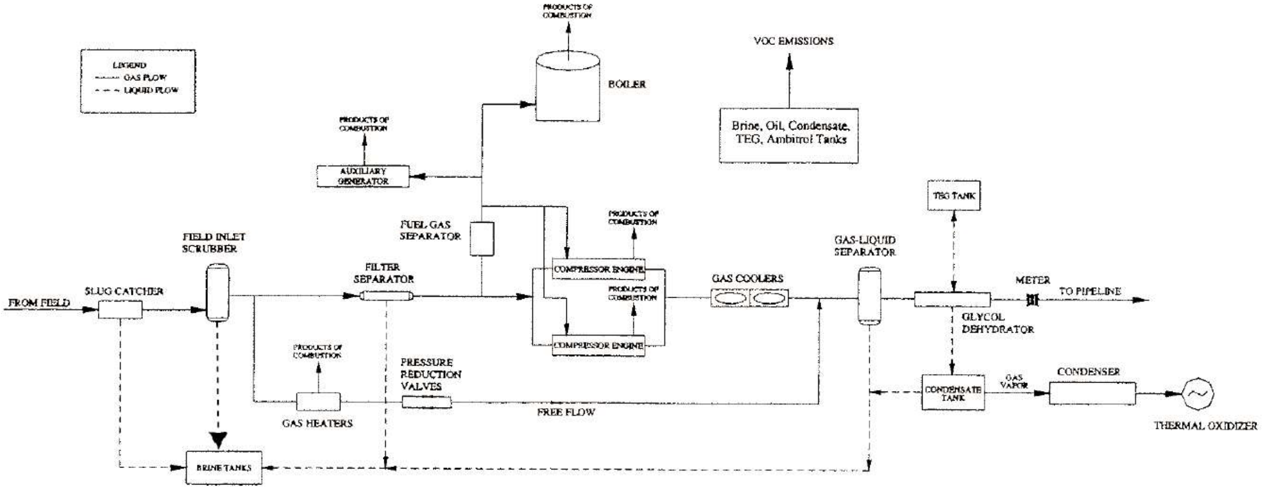
Table 2-1
Summary of Process Operating Parameters

Parameter	Units	Run 1	Run 2	Run 3	Average
Blue Lake (E EU BLGLYDHY)					
Natural gas throughput rate during testing	MMCFH	26.8	26.9	27.0	26.9
Thermal oxidizer combustion temperature	°F	1,450	1,465	1,474	1,463
Glycol recirculation Rate	GPM	73.1	75.5	75.7	74.8
Cold Springs 1 (EUCS1GLYDHY)					
Natural gas throughput rate during testing	MMCFH	8.3	8.1	6.1	7.5
Thermal oxidizer combustion temperature	°F	1,462	1,463	1,461	1,462
Glycol recirculation Rate	GPM	16	16	16	16

MMCFH: million cubic feet per hour
GPM: gallon per minute

Notes

1. The throughput values were measured at the custody transfer meter.
2. As provided by TransCanada, the maximum facility withdrawal rate for Blue Lake is 29.2 MMCFH.
3 As provided by TransCanada, the maximum facility withdrawal rate for Cold Springs 1 is 8.3 MMCFH.



Source: TransCanada.

Figure 2-1. General Gas Withdrawal Process Flow

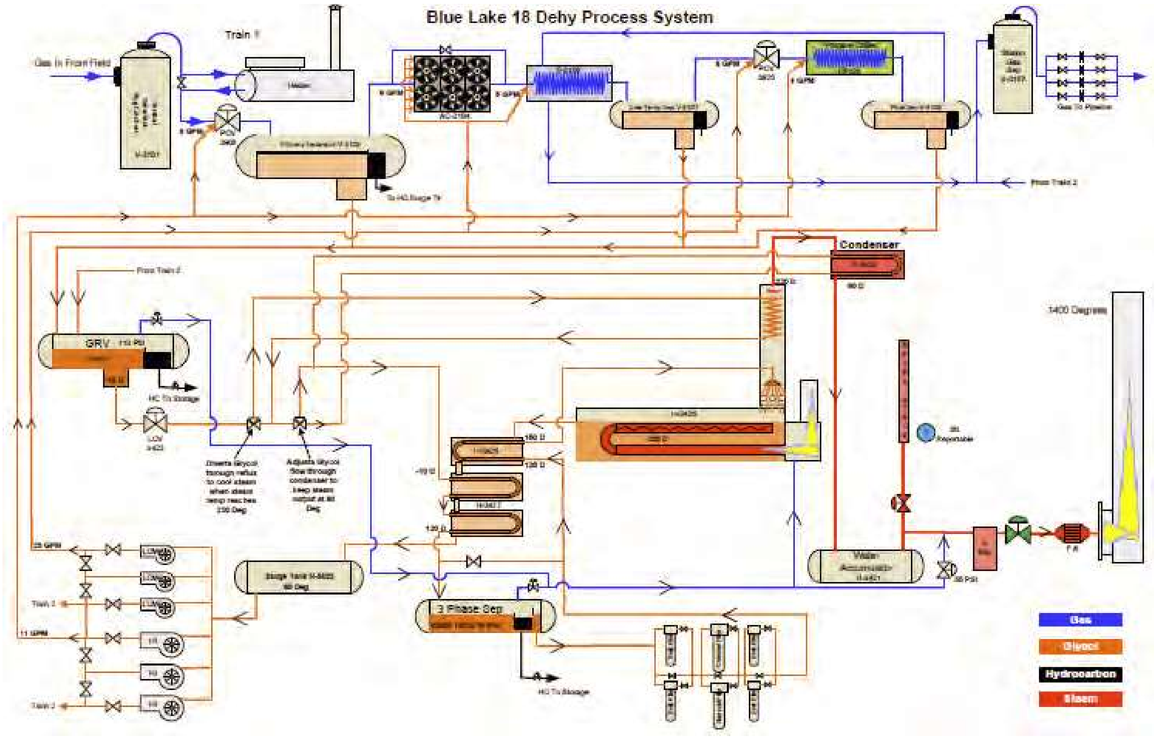
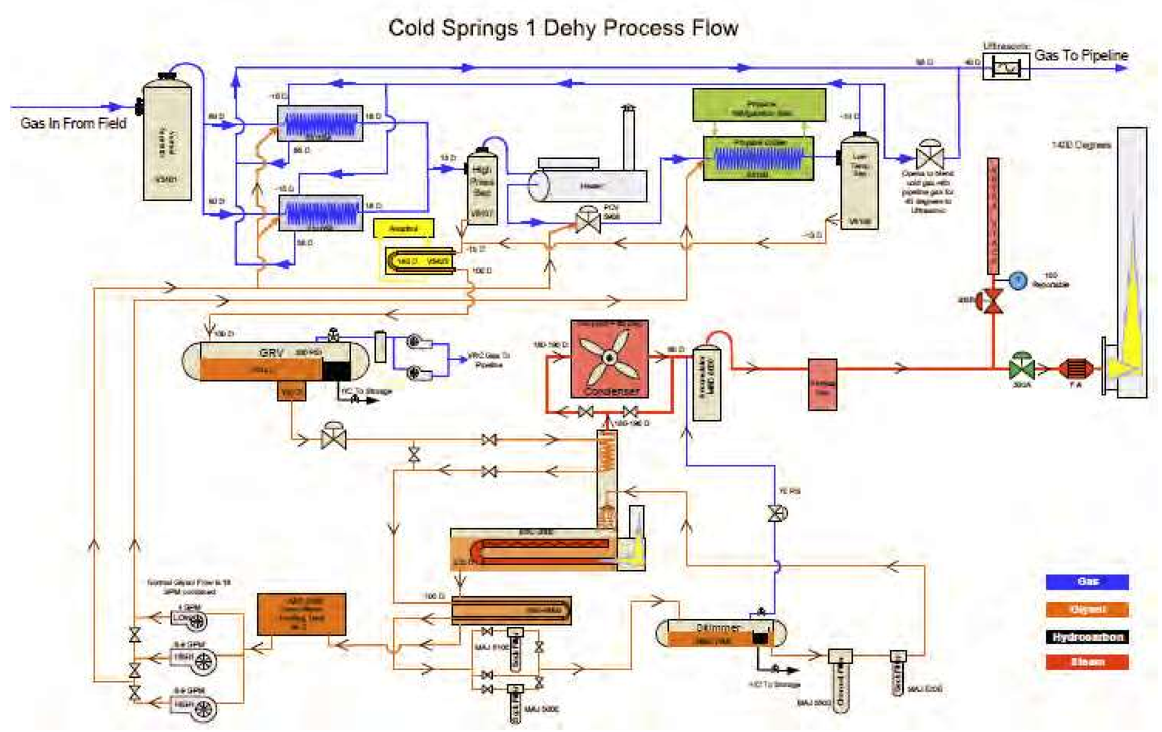
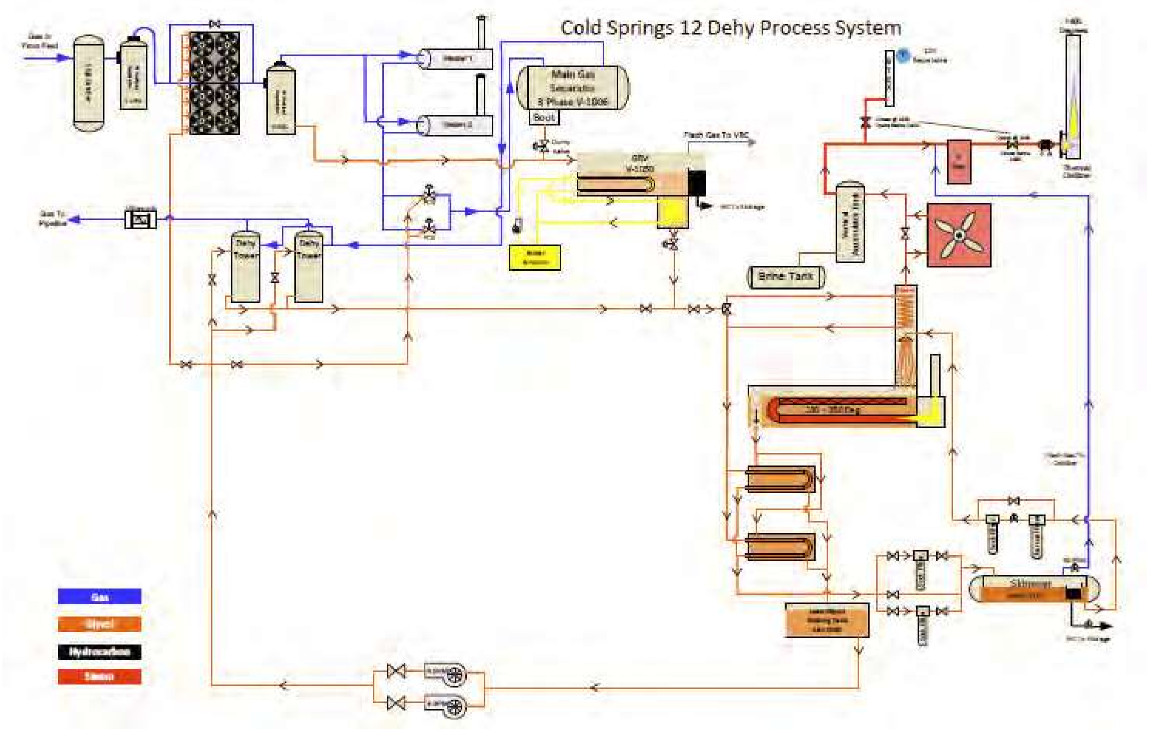


Figure 2-2. Blue Lake Dehydration Unit Process Flow Source: TransCanada.



Source: TransCanada.

Figure 2-3. Cold Springs 1 Dehydration Unit Process Flow



Source: TransCanada.

Figure 2-4. Cold Springs 12 Dehydration Unit Process Flow

2.2 Control Equipment

From the gas conditioning process, the glycol dehydration re-boiler vent is the primary source of emissions. These emissions can be controlled by vapor recovery (condensation), combustion, and pollution prevention.

Condensers control emissions from the small glycol dehydration units. Condensers convert components in the vapor phase to the liquid phase by reducing the temperature of the process vent stream. Condensers not only reduce emissions, but also recover condensable hydrocarbon vapors that can be used or sold for hydrocarbon liquid production or disposed.

Residual VOCs and HAPs in the exhaust gas of the condenser is combusted in the thermal oxidizer. Process gas enters the combustion chamber, where the burner heats the gas to 1,400°F to oxidize VOCs, producing primarily water vapor and carbon dioxide. The treated gas exiting the combustion chamber is discharged to the atmosphere through the exhaust stack. The incinerators are designed to obtain a minimum VOC destruction efficiency greater than 95%.

Pollution prevention refers to system optimization of the small glycol dehydration units by adjustment of process variables to reduce air emissions. For example, small glycol dehydration units may circulate more glycol than necessary to meet contract specifications. High glycol circulation rates increase the amount of BTEX absorbed from the natural gas stream; therefore, more BTEX and VOCs are released from the small glycol dehydration unit re-boiler vent during regeneration of the glycol. Optimizing the glycol circulation rate and other process variable may reduce associated air emissions.

Process and control equipment data recorded during testing are included in Appendix F. Table 2-1 summarizes the process and control equipment data.

2.3 Flue Gas Sampling Locations

The sampling ports meet the upstream and downstream siting requirements of USEPA Method 1; however, only one sample port is available at the Blue Lake sampling location. Because two sampling ports were not present Blue Lake sampling location, a single sampling port was used for volumetric flowrate measurements. This sampling approach was approved by MDEQ prior to testing.

Descriptions of the flue gas sampling locations are presented in Sections 2.3.1 and 2.3.2.

2.3.1 Blue Lake Thermal Oxidizer Exhaust

The Blue Lake thermal oxidizer exhaust stack is 20 inches in diameter and has one 2-inch-diameter sampling port. Six traverse points were used to measure stack gas velocity. The port is located:

- 55 inches (2.8 duct diameters) from the nearest downstream disturbance.
- 304 inches (15.2 duct diameters) from the nearest upstream disturbance.

The port was accessible via an articulating boom lift.

Figure 2-5 is a photograph of the Blue Lake thermal oxidizer sampling location. Figure 1 in the Appendix depicts the sampling ports and traverse point locations.

2.3.2 Cold Springs 1 Thermal Oxidizer Exhaust Stack

The Cold Springs 1 thermal oxidizer exhaust stack is 25 inches in diameter and has two 2-inch-diameter sampling ports. Six traverse points were used to measure stack gas velocity. The port is located:

- 37 inches (1.5 duct diameters) from the nearest downstream disturbance.
- 291 inches (11.6 duct diameters) from the nearest upstream disturbance.

The port was accessible an articulating boom lift.

Figure 2-6 is a photograph of the Cold Springs 1 thermal oxidizer sampling location. Figure 2 in the Appendix depicts the sampling ports and traverse point locations.

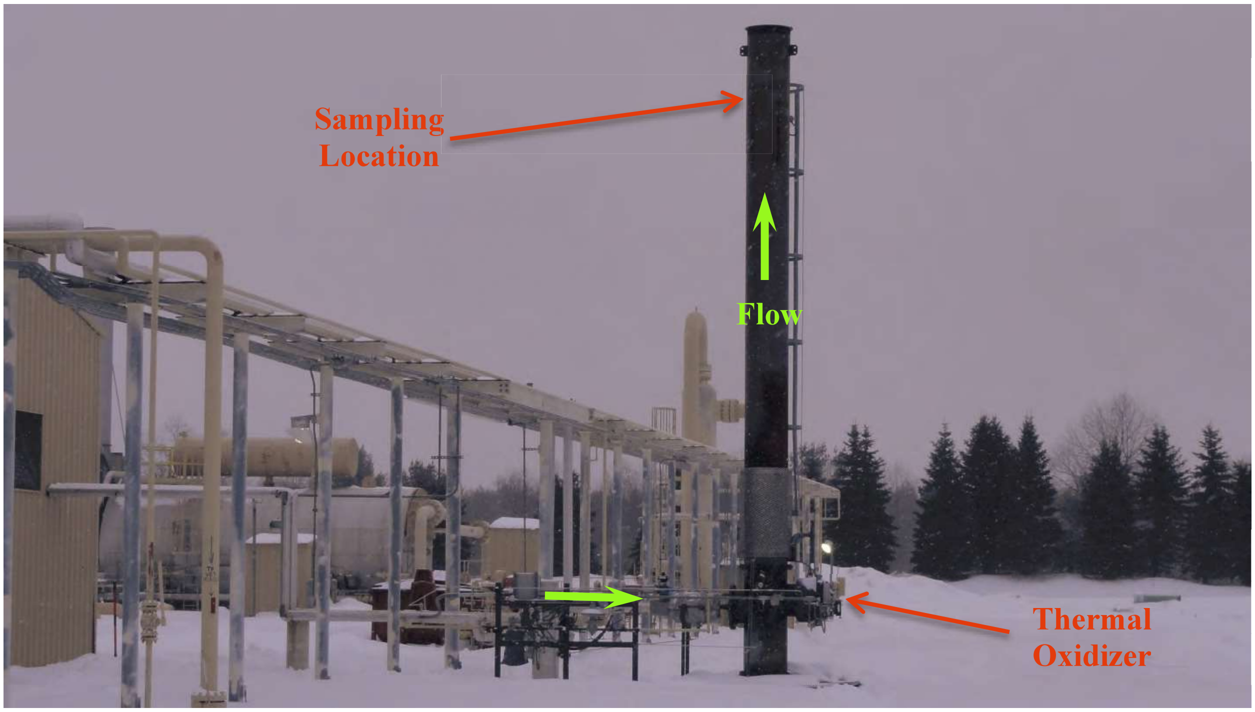


Figure 2-5. Blue Lake Thermal Oxidizer Exhaust Stack

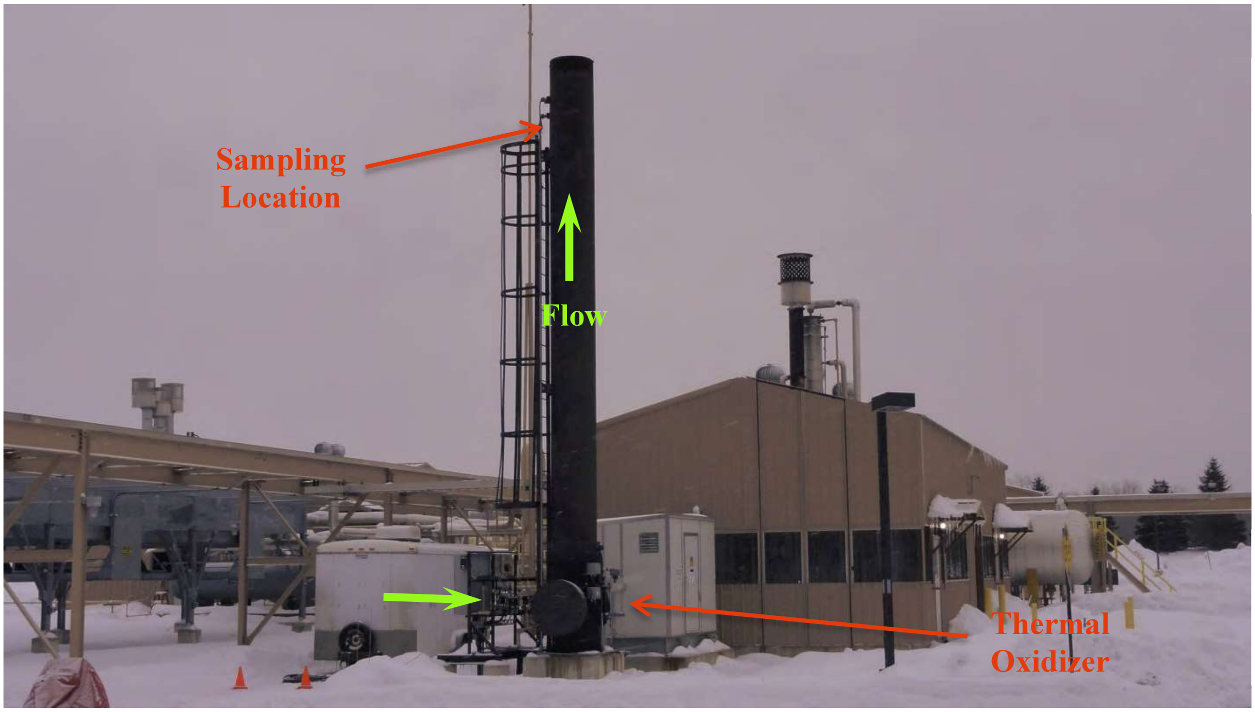


Figure 2-6. Cold Springs 1 Thermal Oxidizer Exhaust Stack

2.4 LDAR Sampling Locations

The process equipment at the Blue Lake, Cold Springs 1, and Cold Springs 12 locations that was evaluated for LDAR included valves, flanges, pressure relief devices, and other connections.

Bureau Veritas conducted the initial LDAR monitoring by inspecting closed-vent system joints, seams, or other connections that are permanently or semi-permanently sealed (e.g., a welded joint between two sections of hard piping or a bolted or gasketed ducting flange).

The inspection consisted of a (1) visual examination and (2) no-detectable-emission evaluation. The visual examination evaluated defects that could result in air emissions, such as visible cracks, holes, gaps in piping, loose connections, or broken or missing caps or other closure devices. The no-detectable-emissions evaluation was performed following USEPA Method 21 procedures discussed in Section 4.0.

Where metal wrap pipe insulation was present around a pipe joint, seam, or other connection and a visual inspection could not be performed without damage, the Method 21 monitoring was performed at the seams in the metal pipe wrap insulation near the inaccessible joint, seam, or other connection.

TransCanada identified the LDAR locations evaluated at the Blue Lake, Cold Springs 1, and Cold Springs 12 small glycol dehydration units. The LDAR test locations are presented in Figures 2-7 through 2-9.

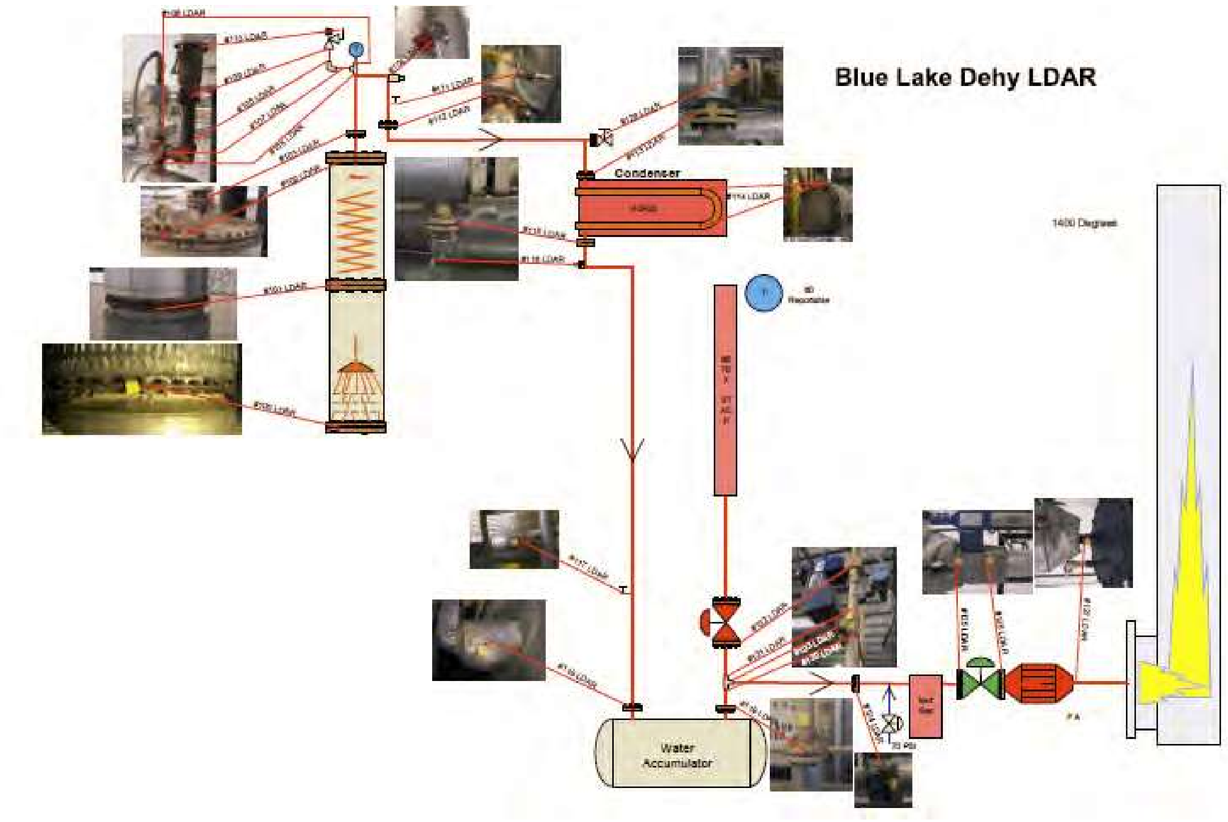


Figure 2-7. Blue Lake LDAR Sampling Locations

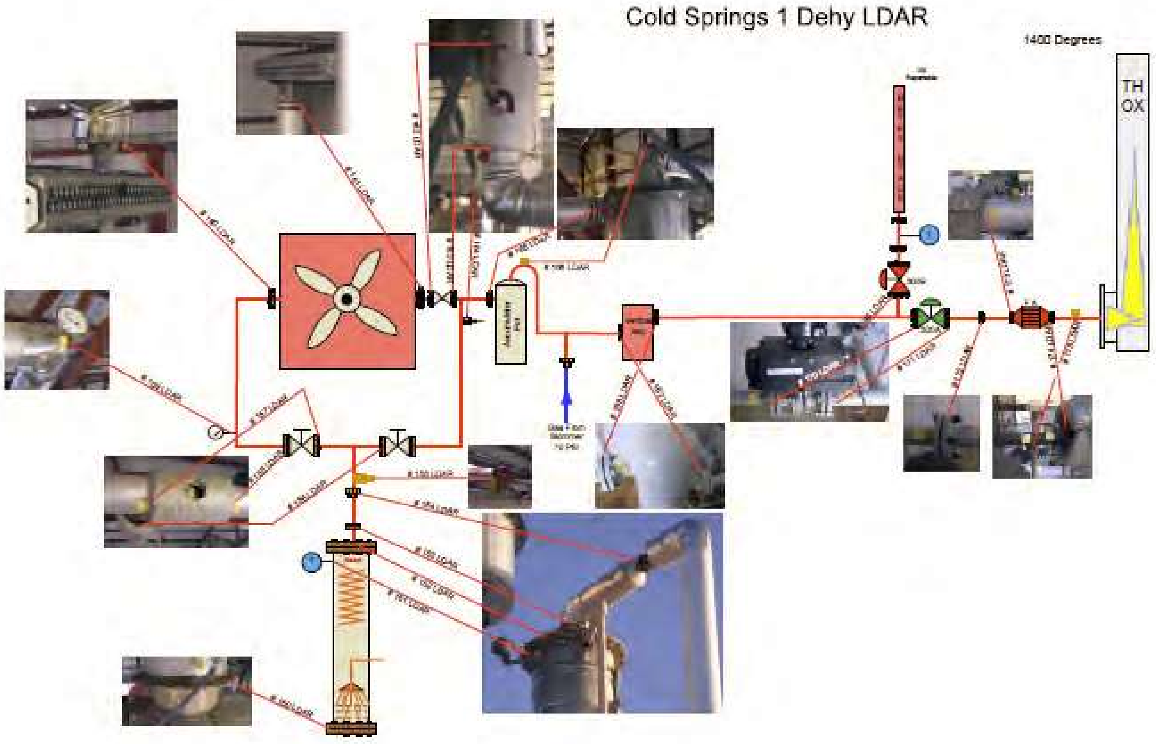


Figure 2-8. Cold Springs 1 LDAR Sampling Locations

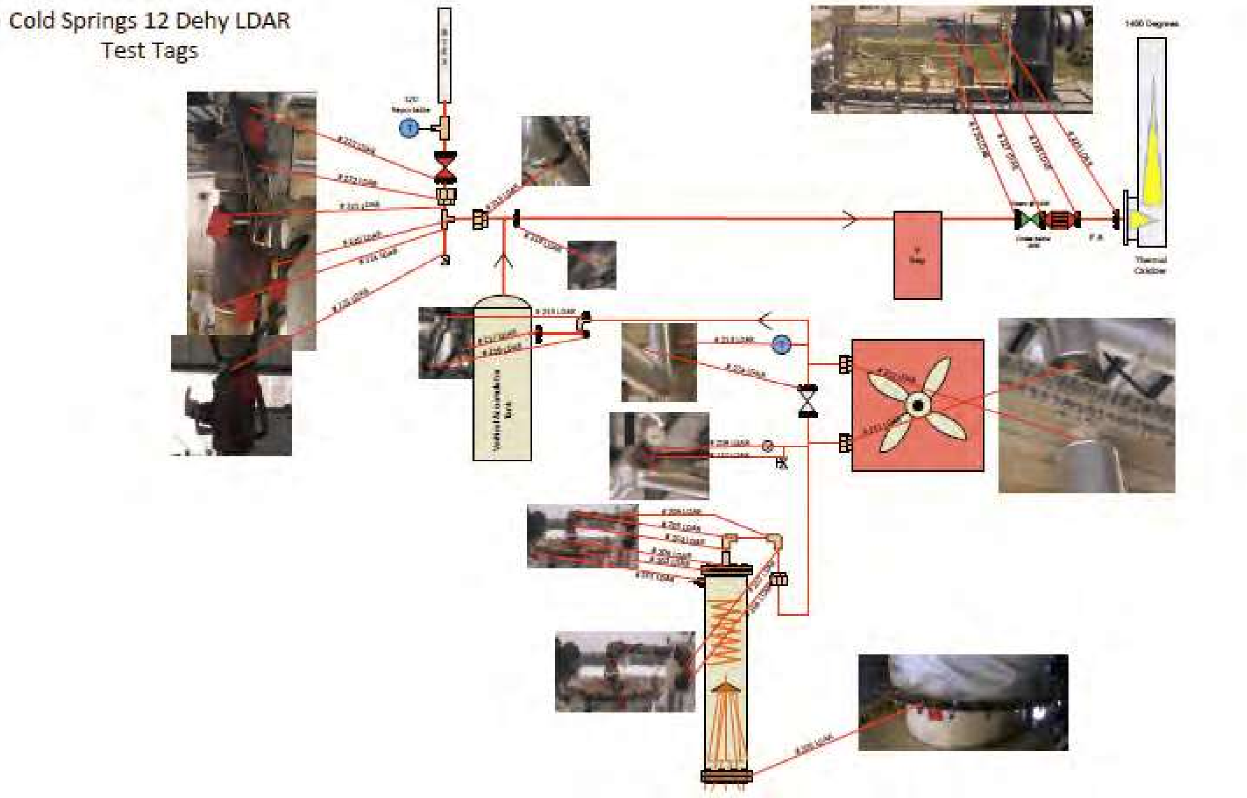


Figure 2-9. Cold Springs 12 LDAR Sampling Locations

3.0 Results

3.1 Objective

The objective of the testing was to evaluate the closed-vent systems and test air emissions of the small glycol dehydration units for:

- Leaks of VOCs.
- BTEX emissions from the Blue Lake and Cold Springs 1 glycol dehydration units' thermal oxidizer exhaust stacks.
- Compliance with 40 CFR Part 63, National Emissions Standards for Hazardous Air Pollutants for Source Categories, Subpart HHH, "National Emissions Standards for Hazardous Air pollutants for Natural Gas Transmission and Storage Facilities" incorporated in MDEQ ROP MI-ROP- B7198-2014a.

Table 3-1 summarizes the sampling and analytical matrix.

Table 3-1
Test Matrix

Sampling Location	Sample/Type of Pollutant	Sampling Method	No. of Test Runs and Duration	Analytical Method	Analytical Laboratory
Blue Lake (EU BLGLYDHY)	BTEX	1, 2, 3, 4, and 18	Three 60-minute runs	Field measurement Gas chromatography	Bureau Veritas and Maxxam Analytics[†]
	VOC leaks	21	NA	Flame ionization detector	NA
Cold Springs 1 (EUCS1GLYDHY)	BTEX	1, 2, 3, 4, and 18	Three 60-minute runs	Field measurement Gas chromatography	Bureau Veritas and Maxxam Analytics[†]
	VOC leaks	21	NA	Flame ionization detector	NA
Cold Springs 12 (EU CS12GLYDHY)	BTEX	1, 2, 3, 4, and 18	Three 60-minute runs	Field measurement Gas chromatography	Bureau Veritas and Maxxam Analytics[†]
	VOC leaks	21	NA	Flame ionization detector	NA

[†] Maxxam Analytics is a Bureau Veritas company

3.2 Field Test Changes and Issues

Communication between TransCanada and Bureau Veritas allowed the testing to be completed with the changes described in Sections 3.2.1 through 3.2.3.

3.2.1 LDAR Assessment at Cold Springs 12

The LDAR assessment for Cold Springs 12 began on February 13, 2015, however, due to mechanical issues (freeze-up) with the condenser the assessment could not be completed on components downstream of the condenser under maximum routine operating conditions that day. Therefore, the LDAR assessment was completed on February 19, 2015 after the glycol dehydration unit was repaired and working correctly. The delay in completion the sampling did not affect the results of the LDAR assessment.

3.2.2 Emissions Testing at Cold Springs 12

Test ports could not be installed for the Cold Springs 12 unit prior to the testing; therefore, emission testing was not completed at Cold Springs 12.

3.2.3 Complications from Extreme Weather Conditions

Due to extreme weather conditions (i.e., temperatures below 0°F), six impinger samples likely froze and broke during transport to the laboratory. Figure 3-1 shows the broken sample containers. Based on the similar manner in which the sample containers broke, they did not appear to have shattered as a result of transport; it is more probable that the sample containers froze during transport causing the bottom of the sample containers to break open. The low temperatures in Mancelona, Michigan during testing and sample transport ranged from 9°F to -24°F and are shown in Table 3-2.

Bottom of sampling containers broken off indicates samples froze during transport to the laboratory

Figure 3-1. Broken Sample Containers

Table 3-2
Temperatures during Emissions Testing and Sample Transport
Mancelona, Michigan

Date	Temperature (°F)	
	High	Low
February 11, 2015	25	9
February 12, 2015	9	-12
February 13, 2015	16	-12
February 14, 2015	13	-13
February 15, 2015	1	-24
February 16, 2015	13	-22
February 17, 2015	13	-2

Note that temperatures shown in this table represent actual temperatures and do not take into account adjustment for wind chill

As a result of the broken sample containers the following impinger samples could not be analyzed:

- Blue Lake - Run 1 Spike, Run 2 Normal, and Run 3 Normal
- Cold Springs 1 - Run 1 Normal, Run 1 Spike, and Run 2 Normal

In order to complete the emissions results calculations, the results of these impinger samples were assumed to be non-detect based on the following:

- The concentrations of benzene, toluene, ethylbenzene, and xylenes in the other six impinger samples were below the laboratory analytical detection limit of 1 microgram per liter.
- The total condensate collected in the impingers from the Blue Lake source averaged 1.8 milliliters and 6.2 milliliters at Cold Springs. The average volume of air sampled exceeded 11,000 milliliters. The mass of benzene, toluene, ethylbenzene, and xylenes in the air sample was below the laboratory analytical detection limits of 2 to 8 micrograms.
- The USEPA Method 18 spike recovery data indicates acceptable QA/QC of the paired sample trains including those where the impinger samples could not be analyzed.

It is Bureau Veritas opinion, the broken sample containers did not significantly affect the calculation of emissions results.

3.3 Summary of Results

Detailed results of the LDAR assessments are presented in Tables 3-3 through 3-5. Documentation of each LDAR assessment was recorded on LDAR Recordkeeping and Field Inspection Forms, which are included in Appendix C of this report.

The results of the BTEX testing are summarized in Table 3-6. Detailed results of the BTEX testing are presented in Tables 1 and 2 after Table Tab of this report. Graphs of the BTEX emission rates are provided after the Graphs Tab in the Appendix. Sample calculations are presented in Appendix B.

Table 3-3
Blue Lake LDAR Results - February 11, 2015

Tag	Description	Device Type	Time Inspected	Yellow Tag† VOC Leak Inspection Readings (ppmv)	Red Tag‡ VOC Leak Inspection Readings (ppmv)	Leak Detected
100	Base of still column	Flange	11:52	90	-	No
101	Mid point of still column	Flange	11:40	-	9.1	No
102	Top of still column	Flange	11:40	-	6	No
103	Top of still column	Pipe	11:41	-	1.2	No
104	Tap for temperature controller reflux	Pipe	11:41	-	1.1	No
105	Pipe to relief valve	Pipe	11:42	-	0.5	No
106	Thermowell at top of still column	Thermo	11:42	-	0.8	No
107	Tee outlet to relief valve	Threaded	11:42	-	0.5	No
108	Pipe elbow for relief valve at top of still column	Threaded	11:42	-	1	No
109	Pipe at the base of the relief valve top of still	Threaded	11:42	-	1	No
110	Exit of relief valve	Cap	11:43	-	32	No
111	1" valve on line coming down from still column	Threaded	11:54	24	-	No
112	Flanged connection piping to condenser	Flange	11:55	45	-	No
113	Connection to inlet of condenser	Flange	11:59	50	-	No
114	End flange of condenser tube	Flange	11:59	30	-	No
115	Connection to outlet of condenser	Flange	12:00	20	-	No
116	Temperature probe at outlet of condenser	Thermo	12:01	53	-	No
117	Input tube for corrosion fluid	Pipe	12:05	38	-	No
118	Inlet of water accumulator vessel	Flange	12:06	61	-	No
119	Outlet of water accumulator vessel	Flange	12:07	65	-	No
120	Base of tee for Betx valve	Threaded	12:08	90	-	No
121	Top of tee for Betx valve	Threaded	12:09	98	-	No
122	Betx valve inlet	Flange	12:09	100	-	No
123	Outlet tee to thermo oxidizer	Threaded	12:10	78	-	No
124	Pipe flange in piping	Flange	12:12	33	-	No
125	Input to thermo oxidizer isolation valve	Flange	12:13	7		No
126	Output of isolation valve to thermo oxidizer	Flange	12:14	5		No
127	Output from flame arrester	Flange	12:14	1	-	No
128	Valve to condenser bypass	Flange	11:59	50	-	No

ppmv: part per million by volume
VOC: volatile organic compound
BTEX: benzene, toluene, ethylbenzene, total xylenes
-: not applicable
†: Yellow Tag refers to a component that is accessible and monitored initially and annually.
‡: Red Tag refers to a component that is difficult to access and is monitored initially and every 5 years.

Notes

1. Background VOC Reading = between 1 and 80 ppmv
2. No detections exceeding leak criterion of 500 ppmv

Table 3-4
Cold Springs 1 LDAR Results - February 12, 2015

Tag	Description of Location	Device Type	Time Inspected	Yellow Tag† VOC Leak Inspection Readings (ppmv)	Red Tag‡ VOC Leak Inspection Readings (ppmv)	Leak Detected
150	Base of still column	Flange	10:52	88	-	No
151	Thermowell on still column	Thermo	12:42	-	3.5	No
152	Top of still column	Flange	12:43	-	8.1	No
153	Piping out of the top of the still column	Flange	12:43	-	14.7	No
154	Union connection at top of still column	Union	12:44	-	12.2	No
155	1" pipe and valve	Pipe	10:55	89	-	No
156	Inlet to condenser bypass valve	Flange	10:56	330	-	No
157	Inlet to condenser inlet valve	Flange	10:57	327	-	No
158	Outlet of condenser inlet valve	Flange	10:58	158	-	No
159	Temperature gauge	Thermo	10:59	81	-	No
160	Inlet flange to condenser	Flange	11:35	-	318	No
161	Outlet flange from condenser	Flange	10:50	-	71	No
162	Inlet to condenser outlet valve	Flange	10:50	-	166	No
163	Outlet to condenser outlet valve	Flange	10:49	-	118	No
164	Temperature probe	Thermo	10:49	-	84	No
165	Inlet to accumulator pot	Flange	10:49	-	64	No
166	Plug at the top of the elbow of the vertical sep	Plug	10:48	-	75	No
167	Inlet to Vertical Sep	Flange	10:46	3.8	-	No
168	Outlet from Vertical Sep	Flange	10:45	3.5	-	No
169	Inlet to Betx valve	Flange	10:44	3.6	-	No
170	Inlet to thermo oxidizer inlet valve	Flange	10:44	3.6	-	No
171	Outlet to thermo oxidizer inlet valve	Flange	10:43	3.5	-	No
172	Pipe Flange	Flange	10:43	3.5	-	No
173	Inlet to flame arrester	Flange	10:42	3.2	-	No
174	Outlet of flame arrester	Flange	10:42	3.2	-	No
175	Plug before inlet to thermo oxidizer	Plug	10:42	3.1	-	No

ppmv: part per million by volume
VOC: volatile organic compound
BTEX: benzene, toluene, ethylbenzene, total xylenes
-: not applicable
†: Yellow Tag refers to a component that is accessible and monitored initially and annually.
‡: Red Tag refers to a component that is difficult to access and is monitored initially and every 5 years.

Notes

1. Background VOC reading = between 3 and 300 ppmv
2. No detections exceeding leak criterion of 500 ppmv

Table 3-5
Cold Springs 12 LDAR Results - February 13 and 19, 2015

Tag	Description of Location	Device Type	Time Inspected	Yellow Tag[†] VOC Leak Inspection Readings (ppmv)	Red Tag[‡] VOC Leak Inspection Readings (ppmv)	Leak Detected
200	Base of the still column	Flange	15:48	-	18	No
201	Tubing to reflux valve	Flange	9:02	-	4	No
202	Top of the still column	Flange	9:02	-	8	No
203	Piping at the top of still column	Flange	9:03	-	6	No
204	Coupling at top of still column	Coupling	9:04	-	4	No
205	Piping at the top of still column	Elbow pipe	9:05	-	10	No
206	Piping at the top of still column	Elbow pipe	9:05	-	5	No
207	Piping at the top of still column	Elbow pipe	9:05	-	12	No
208	Union	Union	9:06	-	4	No
209	Temperature probe	Piping Tee	15:48	-	48	No
210	Input for corrosion inhibitor line	Piping Tee	15:49	-	62	No
211	Inlet to condenser union	Union	15:50	-	38	No
212	Outlet from condenser coupling to Tee	Coupling	15:51	-	25	No
213	Condenser outlet temperature	Thermowell	15:51	-	16	No
214	Outlet of bypass valve to Tee	Flange	15:52	-	24	No
215	Bull plug to elbow into Accumulator	Plug	15:53	18	-	No
216	Bull Inlet to elbow to accumulator tank	Plug	15:54	25	-	No
217	Outlet to thermo oxidizer from accumulator tank	Flange	15:55	22	-	No
218	Outlet to thermo oxidizer from accumulator tank	Flange	15:56	21	-	No
219	Union for piping to Betx valve	Union	15:56	10	-	No
220	Inlet to the tee to Btex valve	Piping	16:01	-	11.7	No
221	Outlet of the tee to the Betx valve	Piping	16:03	-	8.6	No
222	Inlet to the union for the Betx valve	Piping	16:00	-	14	No
223	Inlet to the Betx valve	Piping	16:00	-	14	No
224	Drain line from Betx valve	Piping	15:59	-	9.7	No
225	Drain line from Betx valve	Piping	15:58	-	9.5	No
226	Inlet to thermo oxidizer iso valve	Flange	16:05	-	4.8	No
227	Outlet from thermo oxidizer iso valve	Flange	16:06	4.3	-	No
228	Outlet of flane arrester	Flange	16:06	4.1	-	No
229	Input to thermo oxidizer	Flange	16:05	3.6	-	No

ppmv: part per million by volume
VOC: volatile organic compound
BTEX: benzene, toluene, ethylbenzene, total xylenes
-: not applicable
†: Yellow Tag refers to a component that is accessible and monitored initially and annually.
‡: Red Tag refers to a component that is difficult to access and is monitored initially and every 5 years.

Notes

1. Background VOC reading = between 4 and 13 ppmv
2. No detections exceeding leak criterion of 500 ppmv

Based on the results of the LDAR assessments, results no VOC readings were measured at a concentration exceeding the criterion of a leak (i.e., 500 ppmv).

Table 3-6
Summary of Air Emission Test Results

Date (2015)	Glycol Dehydration Unit	Emission Unit	Parameter	Units	Average Result[1]	Emission Limit[2]
Blue Lake						
Feb 11	Blue Lake	E EU BLGLYDHY	Benzene[†]	lb/hr	<0.00036	NA
			Toluene[†]		<0.00076	NA
			Ethylbenzene[†]		<0.00078	NA
			Total xylenes[†]		<0.0015	NA
			Mass rate of BTEX	lb/hr	<0.0034	NA
				Mg/yr	<0.0056	209.76
Cold Springs 1						
Feb. 12	Cold Springs 1	EUCS1GLYDHY	Benzene[†]	lb/hr	<0.00044	NA
			Toluene[†]		<0.00091	NA
			Ethylbenzene[†]		<0.00093	NA
			Total xylenes[†]		<0.0019	NA
			Mass rate of BTEX	lb/hr	<0.0042	NA
				Mg/yr	<0.0068	179.21

[†] Corrected for spike recovery following USEPA Method 18.

[1] Based on typical maximum operating hours for the total withdrawal season.

[2] Emission limit was calculated based on the annual average daily throughput rates from 2009 through 2013 using Equation 1 of the regulation (40CFR63.1275(b)(1)(iii)).

lb/hr: pound per hour
Mg/yr: megagrams per year
NA: not applicable
BTEX: benzene, toluene, ethylbenzene, total xylenes

The BTEX measurements demonstrate that estimated annual air emissions from the thermal oxidizers controlling the glycol dehydration units are within the allowable limit.

4.0 Sampling and Analytical Procedures

4.1 Test Methods

Bureau Veritas measured the flue gas volumetric flowrate and BTEX concentrations, and evaluated the closed vent system for leaks using USEPA Methods 1 through 4, 18, and/or 21 identified in §63.1282 of Subpart HHH of 40 CFR Part 63—Test Methods, Compliance Procedures, and Compliance Demonstrations. Measurement of BTEX following USEPA Method 18 incorporates the sampling and analytical procedures of OSHA 7, and USEPA SW-846 Method 8260. Bureau Veritas tested emissions using methods presented in Table 4-1.

Table 4-1
Sampling Methods

Parameter	Location	Reference	
	Exhaust Stack	Method	Title
Sampling ports and traverse points	●	EPA 1	Sample and Velocity Traverses for Stationary Sources
Velocity and flowrate	●	EPA 2	Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)
Molecular weight	●	EPA 3	Gas Analysis for the Determination of Dry Molecular Weight
Moisture content	●	EPA 4	Determination of Moisture Content in Stack Gases
		EPA ALT-008	Alternative Moisture Measurement Method - Midget Impingers
BTEX	●	EPA 18	Measurement of Gaseous Organic Compound Emissions by Gas Chromatography
BTEX	●	OSHA 7	Organic Vapors
BTEX (in condensate)	●	EPA 8260	Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)
VOC leaks	●	EPA 21	Determination of Volatile Organic Compound Leaks

4.1.1 Volumetric Flowrate (USEPA Methods 1 and 2)

Method 1, "Sample and Velocity Traverses for Stationary Sources," from 40 CFR 60, Appendix A, was used to evaluate the sampling location and the number of traverse points for the measurement of velocity profiles.

Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)," was used to measure flue gas velocity and calculate volumetric flowrate. An S-type Pitot tube and thermocouple assembly connected to a digital manometer and thermometer was used. Because the dimensions of Bureau Veritas' Pitot tubes meet the requirements outlined in Method 2, Section 10.0, a baseline Pitot tube coefficient of 0.84 (dimensionless) was assigned.

The digital manometer and thermometer are calibrated using calibration standards, which are traceable to National Institute of Standards (NIST). The Pitot tube inspection and calibration sheets are included in Appendix A.

Cyclonic Flow Check. Bureau Veritas evaluated whether cyclonic flow was present at the sampling location.

Cyclonic flow is defined as a flow condition with an average null angle greater than 20°. The direction of flow can be determined by aligning the Pitot tube to obtain zero (null) velocity head readings—the direction would be parallel to the Pitot tube face openings or perpendicular to the null position. By measuring the angle of the Pitot tube face openings in relation to the stack walls when a null angle is obtained, the direction of flow is measured. If the absolute average of the flow direction angles is greater than 20°, the flue gas flow is considered to be cyclonic at that sampling location and an alternative location should be found.

The average of the measured traverse point flue gas velocity null angles was approximately 0° for both the Blue Lake and the Cold Springs 1 units. Because the average null angle is less than 20°, the measurements indicate the absence of cyclonic flow.

4.1.2 O_2 and CO_2 Concentrations (USEPA Method 3)

Molecular weight was measured using USEPA Method 3, "Gas Analysis for the Determination of Dry Molecular Weight." Flue gas was extracted from the stack through a probe positioned near the centroid of the duct and directed into a Fyrite® gas analyzer. The concentrations of carbon dioxide (CO_2) and oxygen (O_2) were measured by chemical absorption with a Fyrite® gas analyzer to within ±0.5%.

The average CO_2 and O_2 results of the grab samples were used to calculate the stack gas molecular weight.

4.1.3 Moisture Content (USEPA Methods 4 and ALT 008)

The moisture content at the exhausts were measured using USEPA Method 4, "Determination of Moisture Content in Stack Gases," incorporating the approved alternative procedures of Method ALT-008, "Alternative Moisture Measurement Method - Midget Impingers." Bureau Veritas' moisture content stack sampling system consists of:

- A stainless steel probe.
- A sampling line connecting the probe to the impingers.

- A set of three impingers (with the configuration shown in Table 4-2) situated in an ice bath.
- A sampling line connecting the impingers to a dry-gas meter.
- An Environmental Supply® control case equipped with a pump, dry-gas meter, and calibrated orifice.

Before initiating a test run, the sampling train was leak-checked by capping the sampling train and applying a vacuum of approximately 5 inches of mercury. The dry-gas meter was monitored for approximately 1 minute to measure that the sample train leak rate was less than 0.02 cubic feet per minute (cfm). The sampling probe was inserted into the sampling port near the centroid of the stack in preparation of sampling. Flue gas was extracted at a constant rate from the stack, with moisture removed from the sample stream by the chilled impingers.

Each test run duration was 60 minutes.

Table 4-2
USEPA Method 4 and ALT-008 Impinger Configuration

Impinger	Type	Contents	Amount
1	Midget	Water	10 milliliters
2	Midget	Water	10 milliliters
3	Midget	Silica desiccant	~15 grams

At the conclusion of the test run, a post-test leak check was conducted and the impinger train was disassembled. The weight of liquid and silica gel in each impinger was measured with a digital scale. The weight of water collected within the impingers and volume of flue gas sampled were used to calculate the percent moisture content. One moisture content sample was collected during each test run. Figure 4-1 depicts the USEPA Method 4 and ALT 008 sampling train.

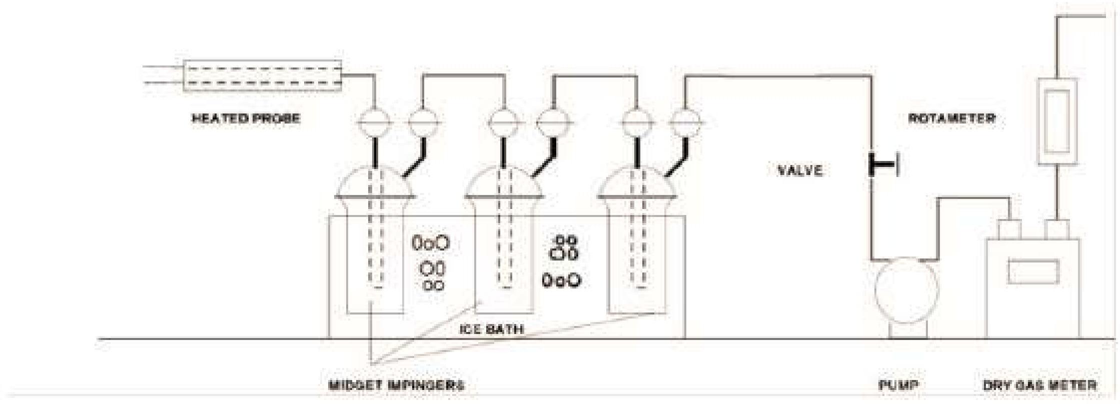


Figure 4-1. USEPA Method 4 and ALT 008 Sample Train

4.1.4 Organic Compounds (USEPA Method 18)

BTEX concentrations were measured following procedures in USEPA Method 18, “Measurement of Gaseous Organic Compound Emissions by Gas Chromatography.” The sampling and analytical procedures incorporated:

- USEPA Method 8260, “Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS).”
- OSHA Method 7, “Organic Vapors.”

Impingers and sorbent tubes were used to measure BTEX concentrations following USEPA Method 18 and OSHA 7 procedures. The sampling train consisted of:

- A set of two impingers (with the configuration shown in Table 4-3) situated in an ice bath.
- Unspiked (normal) or spiked sorbent tubes for the targeted analytes.
- Critical orifices to set the sampling flowrate.
- Teflon® tubing connecting the critical orifices to a rotameter.
- Sampling pump.

Table 4-3
USEPA Method 18 Impinger Configuration

Impinger	Type	Contents	Amount
1	Midget	Water	10 milliliters
2	Midget	Empty	0 milliliters

Flue gas passes through (1) impingers to remove water and residual glycol and (2) sorbent tubes positioned upstream of critical orifices (Gemini® twin-port sampler) that control flowrate, for the collection of BTEX. The critical orifices are connected to a rotameter and sampling pump. The sampling flowrate was monitored with the rotameter.

A similar sampling train using spiked sorbent tubes was collocated and placed parallel to the unspiked sorbent tubes for quality assurance/quality control (QA/QC) purposes.

Figure 4-2 depicts the USEPA Method 18 sampling train.

Based on expected concentrations and analytical detection limits, the USEPA Method 18 sampling train was set up to collect approximately 12 liters of flue gas at 0.2 liters per minute for each 60-minute test run. The mass of pollutant on a spiked sorbent tube was targeted to be 40 to 60% of the mass expected to be collected.

Before testing, the flowrate through each sorbent tube was measured using a rotameter and verified with a BIOS International DryCal® calibrator. The critical orifices were adjusted so that the sampling flowrate was within ±20% of the target sampling rate. The pre-test flowrate was recorded on a test run data sheet. After the sampling rate was measured, the sampling train was positioned to sample the flue gas. Flue gas was sampled through the impingers and into the sorbent tubes for 60 minutes per test run.

At the conclusion of each test run, the post-test sampling train flowrate was measured using the DryCal calibrator. The average of the pre- and post-test flowrates was used to calculate the flue gas sample volume for the test duration. The contents of the impingers were recovered and the sorbent tube was capped and stored in a chilled cooler. The samples were analyzed by Bureau Veritas' laboratory in Novi, Michigan, and Bureau Veritas' Maxxam Analytics laboratory in Mississauga, Ontario.

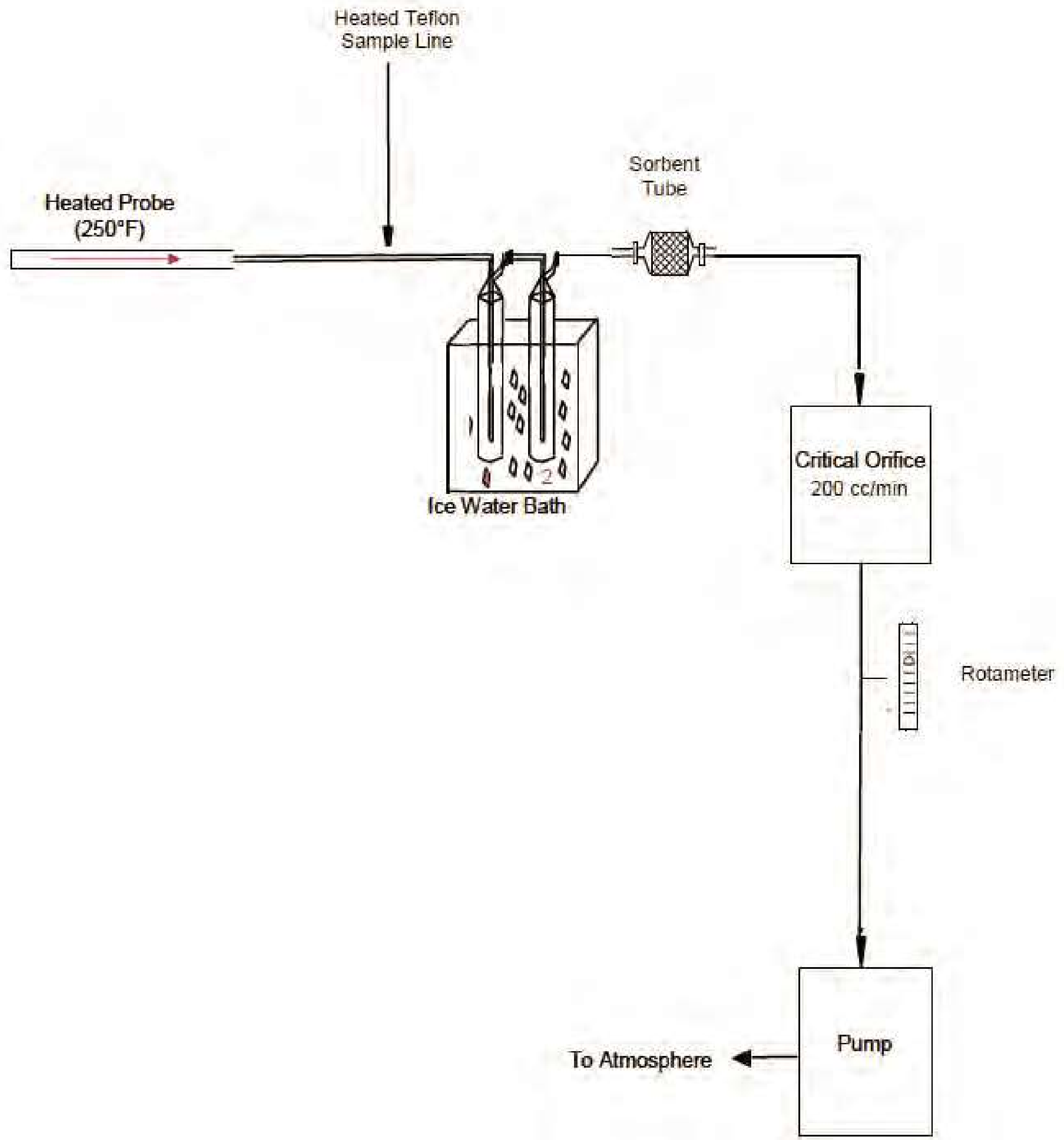


Figure 4-2. USEPA Method 18 Sampling Train

4.1.5 Volatile Organic Compound Leaks (USEPA Method 21)

USEPA Method 21, "Determination of Volatile Organic Compound Leaks" was used to evaluate the closed vent system for leaks. The process equipment evaluated includes valves, flanges, pressure relief devices, and other connections. A potential leak interface is determined to operate with no detectable organic emissions if the organic concentration is less than 500 ppmv. Bureau Veritas used a Thermo Scientific TVA 1000 portable FID that met the specification of Method 21 Section 6.0 to evaluate VOC leaks from the process sources.

Prior to testing, the analyzer was calibrated by introducing the following calibration gas standards alternatively in triplicate:

- Zero gas: air containing less than 10 ppmv VOC.
- Calibration gas: a mixture of methane in air at a methane concentration of 493.5 parts per million by volume. The calibration precision criterion is ≤10 % of the calibration gas value.

During calibration, the response time of the analyzer was measured by introducing the zero gas and then the calibration gas. After the calibration gas was introduced, the time required to attain 90% of the final stable reading is the response time. The response time criterion is ≤30 seconds.

Because the small glycol dehydration units are located within covered structures, a background VOC concentration was measured. The local ambient VOC concentration was measured by moving the instrument probe randomly within 3 to 6 feet from the closed vent system component to be monitored.

Although published response factors for the TVA 1000 are available, the measured VOC concentration was not converted to an "actual" concentration because the incoming process stream is natural gas and the majority of the VOCs in the closed vent system are likely to be methane. Thus, process system leaks were measured as methane, the calibration gas. Response factors for the analyzer calibrated using a methane standard are not applicable.

Inspection of the closed-vent system consisted of positioning the sampling probe at the surface of the component interface where a leak could occur. The probe was moved along the interface periphery while observing the instrument readout. If an increased concentration was observed, the sampling probe was slowly moved until the maximum concentration was obtained. The component was sampled for a minimum of twice the response time and if the maximum concentration, less the local ambient background VOC concentration, exceeded the leak definition, the data would have been recorded and reported to TransCanada for repair. No VOC readings were measured at a concentration exceeding the criterion of a leak.

4.2 Procedures for Obtaining Process Data

Process data were recorded by TransCanada personnel. Refer to Section 2.1 and 2.2 for discussions of process and control device data and Appendix F for the operating parameters recorded during testing.

4.3 Sampling Identification and Custody

Mr. Thomas Schmelter with Bureau Veritas was responsible for the handling and procurement of the data collected in the field. Mr. Schmelter ensured the data sheets were accounted for and completed.

Recovery and analytical procedures were applicable to the sampling methods used in this test program. Sampling and recovery procedures were described previously Section 4.0.

Applicable Chain of Custody procedures followed guidelines outlined within ASTM D4840-99 (Reapproved 2010), “Standard Guide for Sample Chain-of-Custody Procedures.”

For each sample collected (i.e., impinger, sorbent tube) sample identification and custody procedures were completed as follows:

- Containers were sealed to prevent contamination.
- Containers were labeled with test number, location, and test date.
- Containers were stored in a cooler.
- Samples were logged using guidelines outlined in ASTM D4840-99 (Reapproved 2010), “Standard Guide for Sample Chain-of-Custody Procedures.”
- Samples were delivered to the laboratory.

Chains of custody and laboratory analytical results are included in Appendix E.

5.0 QA/QC Activities

Equipment used in this test program passed QA/QC procedures. Refer to Appendix A for equipment calibrations and inspection sheets. Field data sheets are presented in Appendix C. Computer-generated data sheets are presented within Appendix D.

5.1 Pretest QA/QC Activities

Before testing, the sampling equipment was cleaned, inspected, and calibrated according to procedures outlined in the applicable USEPA sampling method and USEPA's "Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, Stationary Source-Specific Methods."

5.2 QA/QC Audits

The results of select sampling and equipment QA/QC audits and the acceptable tolerance are presented in the following sections. Analyzer calibration and gas certification sheets are presented in Appendix A.

5.2.1 Sampling Train QA/QC Audits

The sampling trains described in Section 4.1 were audited for measurement accuracy and data reliability. Table 5-1 summarizes the QA/QC audits conducted for the Method 4 sampling train.

Table 5-1
Method 4 Sampling Train QA/QC Audits

Parameter	Run 1	Run 2	Run 3	Method Requirement	Comment
Blue Lake (E EU BLGLYDHY)					
Sampling train leak check Post–test	0.000 ft^3 for 1 min at 4 in Hg	0.000 ft^3 for 1 min at 5 in Hg	0.000 ft^3 for 1 min at 5 in Hg	<0.020 ft^3 for 1 minute at ≥ sample vacuum recorded during test	Valid
Sampling vacuum (in Hg)	1	1	1		
Cold Springs 1 (EUCS1GLYDHY)					
Sampling train leak check Post–test	0.000 ft^3 for 1 min at 5 in Hg	0.000 ft^3 for 1 min at 5 in Hg	0.000 ft^3 for 1 min at 5 in Hg	<0.020 ft^3 for 1 minute at ≥ sample vacuum recorded during test	Valid
Sampling vacuum (in Hg)	1	1	1		

5.2.2 Instrument Analyzer QA/QC Audits

The Method 21 sampling described in Section 4.1 was audited for measurement accuracy and data reliability. The analyzer passed the applicable calibration criteria. The following table summarizes gas cylinders used during this test program. Refer to Appendix A for additional calibration data.

Table 5-2
Calibration Gas Cylinder Information

Parameter	Gas Vendor	Cylinder Serial Number	Cylinder Value	Expiration Date
Total hydrocarbons (THC)	The American Gas Group	EB0019307	<0.1 ppm	NA
Methane (CH_4)	Airgas	CC337690	493.5 ppm	September 27, 2020

5.2.3 Dry-Gas Meter QA/QC Audits

Table 5-3 summarizes the dry-gas meter calibration checks in comparison to the acceptable USEPA tolerance. Refer to Appendix A for complete DGM calibrations.

Table 5-3
Dry-gas Meter Calibration QA/QC Audit

Dry-Gas Meter	Pre-test DGM Calibration Factor (Y) (dimensionless)	Post-Test DGM Calibration Factor (Y) (dimensionless)	Difference Between Pre- and Post-test DGM Calibrations	Acceptable Tolerance	Comment
2	0.993 (11/14/14)	0.991 (3/13/15)	0.002	±0.05	Valid

5.2.4 Thermocouple QA/QC Audits

Temperature measurements using thermocouples and digital pyrometers were compared to a reference temperature (i.e., ice water bath, boiling water) prior to and after testing to evaluate accuracy of the equipment. The thermocouples and pyrometers measured temperature within ±1.5% of the reference temperatures and were within USEPA acceptance criteria. Thermocouple calibration sheets are presented in Appendix A.

5.2.5 QA/QC Blanks

Sample media blanks were analyzed for the parameters of interest. The results of the blanks are presented in the Table 5-4.

Refer to Appendix E for the laboratory results.

Table 5-4
QA/QC Blanks

Sample Identification	Result (µg)	Comment
BTEX Blank 1	<2 Benzene <4 Ethylbenzene <4 Toluene <8 Total Xylenes	Compounds of interest not detected
BTEX Blank 2	<2 Benzene <4 Ethylbenzene <4 Toluene <8 Total Xylenes	Compounds of interest not detected
BTEX Spike Blank 1	29 Benzene 27 Ethylbenzene 28 Toluene 52 Total Xylenes	The average mass of BTEX spike Blanks 1 and 2 were used in Method 18 spike recovery calculations
BTEX Spike Blank 2	30 Benzene 27 Ethylbenzene 28 Toluene 52 Total Xylenes	
	(µg/L)	
Water Blank 1	<1 Benzene <1 Ethylbenzene <1 Toluene <1 Total Xylenes	Compound of interest not detected
Water Blank 2	<1 Benzene <1 Ethylbenzene <1 Toluene <1 Total Xylenes	Compound of interest not detected

5.3 QA/QC Checks for Data Reduction and Validation

Mr. Thomas Schmelter validated the computer spreadsheets onsite. The computer spreadsheets were used to evaluate the accuracy of field calculations. The field data sheets were reviewed to evaluate whether data has been recorded and inputted appropriately. The computer data sheets were checked against the raw field data sheets for accuracy during review of the draft report. Sample calculations were performed to verify computer spreadsheet computations.

5.4 QA/QC Problems

Equipment audits and QA/QC procedures demonstrate sample collection accuracy for the test runs.

6.0 Limitations

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This report reviewed by:

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Health, Safety, and Environmental Services

Tables

Table 1

BTEX Results

TransCanada - Blue Lake
Mancelona, Michigan
Bureau Veritas Project No. 11015-000004.00
Sampling Date: February 11, 2015

Parameter	Run 1		Run 2		Run 3		Average
	1 Normal	1 Spike	2 Normal	2 Spike	3 Normal	3 Spike	
Sampling Start Time	10:05		11:15		12:25		
Sample Duration (min)	60		60		60		60
Estimated Operating Hours							
Estimated Annual Operating Hours[1] (hr/yr)	3,624						
Sampling Conditions							
Stack Flowrate (dscfm)	540		440		524		501
Ambient Temperature (°F)	62		63		63		63
Saturated Partial Pressure of Water Vapor (in Hg)	0.6		0.6		0.6		0.57
Atmospheric Pressure (in Hg)	28.4		28.4		28.4		28.4
Sampling Rate							
Pre-Sampling Flowrate (cc/min)	202.6	204.2	200.2	202.5	200.1	206.8	202.7
Post-Sampling Flowrate (cc/min)	189.2	202.5	195.6	188.6	199.2	201.7	196.1
Sampling Flowrate Pre-test to Post-test Change (%)	6.6	0.8	2.3	6.9	0.4	2.5	3.3
Average Sampling Flowrate (cc/min)	195.9	203.4	197.9	195.6	199.7	204.3	199.4
Average Sampling Flowrate (dry standard l/min)	0.184	0.191	0.186	0.184	0.188	0.192	0.187
Sample Volume (l, dry standard)	11.1	11.5	11.1	11.0	11.3	11.5	11.2
Impinger							
Mass of condensate collected (g)	1.4	2.3	1.9	1.4	1.1	2.6	1.8
Volume of condensate collected (ml)	1.4	2.3	1.9	1.4	1.1	2.6	1.8
Concentration of Benzene in condensate (µg/l)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Concentration of Toluene in condensate (µg/l)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Concentration of Ethylbenzene in condensate (µg/l)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Concentration of Total Xylenes in condensate (µg/l)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Mass of Benzene in condensate (µg)	<0.0014	<0.0023	<0.0019	<0.0014	<0.0011	<0.0026	<0.0018
Mass of Toluene in condensate (µg)	<0.0014	<0.0023	<0.0019	<0.0014	<0.0011	<0.0026	<0.0018
Mass of Ethylbenzene in condensate (µg)	<0.0014	<0.0023	<0.0019	<0.0014	<0.0011	<0.0026	<0.0018
Mass of Total Xylenes in condensate (µg)	<0.0014	<0.0023	<0.0019	<0.0014	<0.0011	<0.0026	<0.0018
Sorbent Tube							
Benzene Mass (µg)	<2	30	<2	30	<2	30	16
Benzene Spike Mass (µg)	-	30	-	30	-	30	30
Benzene Concentration (mg/dscm)	<0.2	-	<0.2	-	<0.2	-	0.2
Benzene Spike Recovery (R)	-	0.95	-	0.95	-	0.95	**0.9**
Toluene Mass (µg)	<4	29	<4	29	<4	29	17
Toluene Spike Mass (µg)	-	28	-	28	-	28	28
Toluene Concentration (mg/dscm)	<0.4	-	<0.4	-	<0.4	-	0.4
Toluene Spike Recovery (R)	-	0.89	-	0.89	-	0.89	**0.89**
Ethylbenzene Mass (µg)	<4	28	<4	26	<4	28	16
Ethylbenzene Spike Mass (µg)	-	27	-	27	-	27	27
Ethylbenzene Concentration (mg/dscm)	<0.4	-	<0.4	-	<0.4	-	0.4
Ethylbenzene Spike Recovery (R)	-	0.88	-	0.82	-	0.89	**0.86**
Total Xylenes Mass (µg)	<8	55	<8	51	<8	54	31
Total Xylenes Spike Mass (µg)	-	52	-	52	-	52	52
Total Xylenes Concentration (mg/dscm)	<0.7	-	<0.7	-	<0.7	-	0.72
Total Xylenes Spike Recovery (R)	-	0.90	-	0.83	-	0.88	**0.87**
Total							
Benzene Mass in Impinger and Sorbent Tube (µg)[†]	<2.1		<2.1		<2.1		<2.1
Benzene Concentration (mg/dscm)[†]	<0.19		<0.19		<0.19		<0.19
Benzene Mass Emission Rate (lb/hr)[†]	**<0.00039**		**<0.00031**		**<0.00037**		**<0.00036**
Toluene Mass in Impinger and Sorbent Tube (µg)[†]	<4.5		<4.5		<4.5		<4.5
Toluene Concentration (mg/dscm)[†]	<0.41		<0.40		<0.40		<0.40
Toluene Mass Emission Rate (lb/hr)[†]	**<0.00082**		**<0.00066**		**<0.00078**		**<0.00076**
Ethylbenzene Mass in Impinger and Sorbent Tube (µg)[†]	<4.5		<4.9		<4.5		<4.6
Ethylbenzene Concentration (mg/dscm)[†]	<0.41		<0.44		<0.40		<0.42
Ethylbenzene Mass Emission Rate (lb/hr)[†]	**<0.00083**		**<0.00072**		**<0.00079**		**<0.00078**
Total Xylenes Mass in Impinger and Sorbent Tube (µg)[†]	<8.9		<9.7		<9.1		<9.2
Total Xylenes Concentration (mg/dscm)[†]	<0.81		<0.87		<0.81		<0.83
Total Xylenes Mass Emission Rate (lb/hr)[†]	**<0.0016**		**<0.0014**		**<0.0016**		**<0.0015**
Mass Rate of BTEX (lb/hr)	**<0.0037**		**<0.0031**		**<0.0035**		**<0.0034**
Mass Rate of BTEX (Mg/yr)	**<0.0060**		**<0.0051**		**<0.0058**		**<0.0056**

[1] Based on typical maximum operating hours for the total withdrawal season.

[†] Corrected for spike recovery following USEPA Method 18.

Gray shading indicates results are based on estimation, see Section 3.0 of this report for details.

Table 2

BTEX Results

TransCanada - Cold Springs 1

Mancelona, Michigan

Bureau Veritas Project No. 11015-000004.00

Sampling Date: February 12, 2015

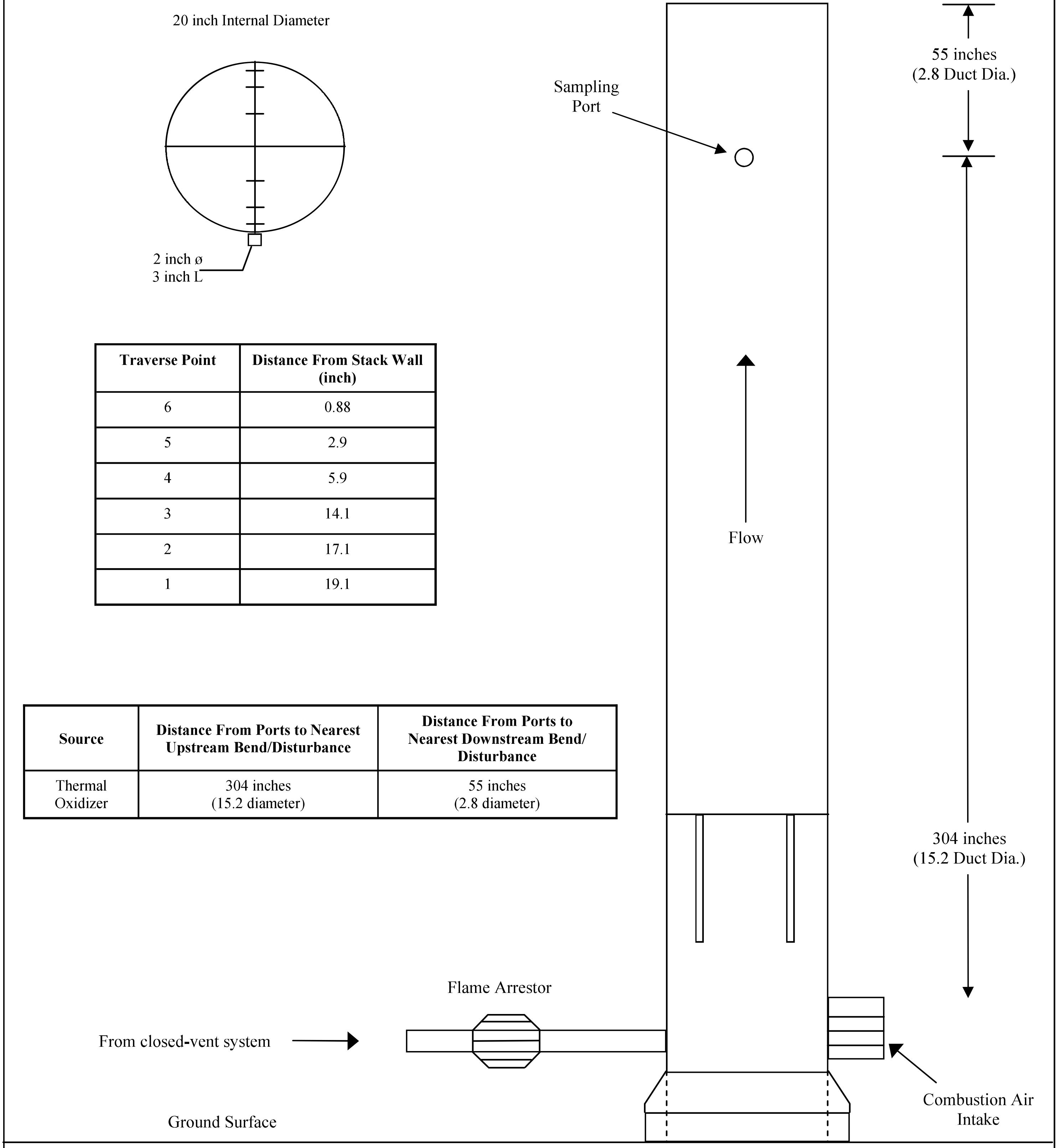
Parameter	Run 1		Run 2		Run 3		Average
	1 Normal	1 Spike	2 Normal	2 Spike	3 Normal	3 Spike	
Sampling Start Time	9:00		10:15		11:25		
Sample Duration (min)	60		60		60		60
Estimated Operating Hours							
Estimated Annual Operating Hours[1] (hr/yr)	3,624						
Sampling Conditions							
Stack Flowrate (dscfm)	681		860		812		784
Ambient Temperature (°F)	32		40		48		40
Saturated Partial Pressure of Water Vapor (in Hg)	0.2		0.2		0.3		0.25
Atmospheric Pressure (in Hg)	28.8		28.8		28.8		28.8
Sampling Rate							
Pre-Sampling Flowrate (cc/min)	199.9	203.2	201.1	200.2	201.1	202.6	201.4
Post-Sampling Flowrate (cc/min)	235.6	203.4	182.4	200.0	202.6	200.7	204.1
Sampling Flowrate Pre-test to Post-test Change (%)	17.9	0.1	9.3	0.1	0.7	0.9	4.8
Average Sampling Flowrate (cc/min)	217.8	203.3	191.8	200.1	201.9	201.7	202.7
Average Sampling Flowrate (dry standard l/min)	0.224	0.209	0.193	0.202	0.200	0.199	0.205
Sample Volume (l, dry standard)	13.4	12.5	11.6	12.1	12.0	12.0	12.3
Impinger							
Mass of condensate collected (g)	10.0	9.3	3.6	7.0	3.4	3.9	6.2
Volume of condensate collected (ml)	10.0	9.3	3.6	7.0	3.4	3.9	6.2
Concentration of Benzene in condensate (µg/l)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Concentration of Toluene in condensate (µg/l)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Concentration of Ethylbenzene in condensate (µg/l)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Concentration of Total Xylenes in condensate (µg/l)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Mass of Benzene in condensate (µg)	<0.0100	<0.0093	<0.0036	<0.0070	<0.0034	<0.0039	<0.0062
Mass of Toluene in condensate (µg)	<0.0100	<0.0093	<0.0036	<0.0070	<0.0034	<0.0039	<0.0062
Mass of Ethylbenzene in condensate (µg)	<0.0100	<0.0093	<0.0036	<0.0070	<0.0034	<0.0039	<0.0062
Mass of Total Xylenes in condensate (µg)	<0.0100	<0.0093	<0.0036	<0.0070	<0.0034	<0.0039	<0.0062
Sorbent Tube							
Benzene Mass (µg)	<2	34	<2	34	<2	35	18
Benzene Spike Mass (µg)	-	30	-	30	-	30	30
Benzene Concentration (mg/dscm)	<0.1	-	<0.2	-	<0.2	-	0.2
Benzene Spike Recovery (R)	-	1.09	-	1.08	-	1.12	**1.10**
Toluene Mass (µg)	<4	34	<4	33	<4	34	19
Toluene Spike Mass (µg)	-	28	-	28	-	28	28
Toluene Concentration (mg/dscm)	<0.3	-	<0.3	-	<0.3	-	0.3
Toluene Spike Recovery (R)	-	1.08	-	1.03	-	1.07	**1.06**
Ethylbenzene Mass (µg)	<4	33	<4	31	<4	32	18
Ethylbenzene Spike Mass (µg)	-	27	-	27	-	27	27
Ethylbenzene Concentration (mg/dscm)	<0.3	-	<0.3	-	<0.3	-	0.3
Ethylbenzene Spike Recovery (R)	-	1.08	-	0.99	-	1.04	**1.04**
Total Xylenes Mass (µg)	<8	63	<8	60	<8	62	35
Total Xylenes Spike Mass (µg)	-	52	-	52	-	52	52
Total Xylenes Concentration (mg/dscm)	<0.6	-	<0.7	-	<0.7	-	0.65
Total Xylenes Spike Recovery (R)	-	1.07	-	0.99	-	1.04	**1.03**
Total							
Benzene Mass in Impinger and Sorbent Tube (µg)†	<1.8		<1.9		<1.8		<1.8
Benzene Concentration (mg/dscm)†	<0.14		<0.16		<0.15		<0.15
Benzene Mass Emission Rate (lb/hr)†	**<0.00035**		**<0.00051**		**<0.00045**		**<0.00044**
Toluene Mass in Impinger and Sorbent Tube (µg)†	<3.7		<3.9		<3.7		<3.8
Toluene Concentration (mg/dscm)†	<0.28		<0.34		<0.31		<0.31
Toluene Mass Emission Rate (lb/hr)†	**<0.00071**		**<0.00108**		**<0.00095**		**<0.00091**
Ethylbenzene Mass in Impinger and Sorbent Tube (µg)†	<3.7		<4.0		<3.9		<3.9
Ethylbenzene Concentration (mg/dscm)†	<0.28		<0.35		<0.32		<0.31
Ethylbenzene Mass Emission Rate (lb/hr)†	**<0.00070**		**<0.00112**		**<0.00098**		**<0.00093**
Total Xylenes Mass in Impinger and Sorbent Tube (µg)†	<7.5		<8.1		<7.7		<7.8
Total Xylenes Concentration (mg/dscm)†	<0.56		<0.69		<0.64		<0.63
Total Xylenes Mass Emission Rate (lb/hr)†	**<0.0014**		**<0.0022**		**<0.0020**		**<0.0019**
Mass Rate of BTEX (lb/hr)	**<0.0032**		**<0.0049**		**<0.0043**		**<0.0042**
Mass Rate of BTEX (Mg/yr)	**<0.0052**		**<0.0081**		**<0.0071**		**<0.0068**

[1] Based on typical maximum operating hours for the total withdrawal season.

† Corrected for spike recovery following USEPA Method 18.

Gray shading indicates results are based on estimation, see Section 3.0 of this report for details.

Figures



Traverse Point	Distance From Stack Wall (inch)
6	0.88
5	2.9
4	5.9
3	14.1
2	17.1
1	19.1

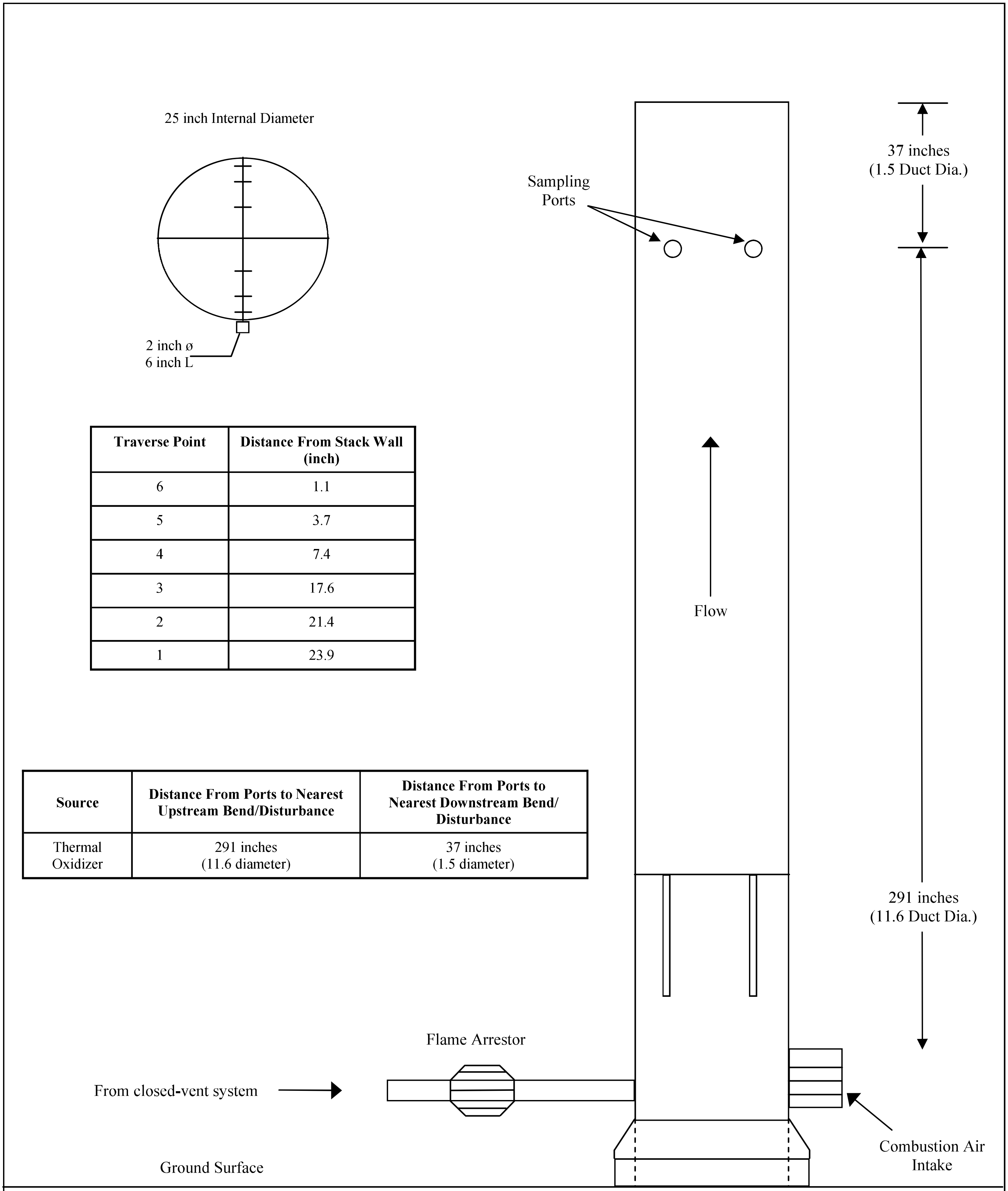
Source	Distance From Ports to Nearest Upstream Bend/Disturbance	Distance From Ports to Nearest Downstream Bend/ Disturbance
Thermal Oxidizer	304 inches (15.2 diameter)	55 inches (2.8 diameter)

Figure 1
Blue Lake Thermal Oxidizer Sampling Ports and Traverse Point Locations

TransCanada
Blue Lake Gas Storage Company
Mancelona, Michigan

Project No. 11015-000004.00

Last Revision:
March 20, 2015



Traverse Point	Distance From Stack Wall (inch)
6	1.1
5	3.7
4	7.4
3	17.6
2	21.4
1	23.9

Source	Distance From Ports to Nearest Upstream Bend/Disturbance	Distance From Ports to Nearest Downstream Bend/ Disturbance
Thermal Oxidizer	291 inches (11.6 diameter)	37 inches (1.5 diameter)

Figure 2
Cold Springs 1 Thermal Oxidizer Sampling Ports and Traverse Point Locations

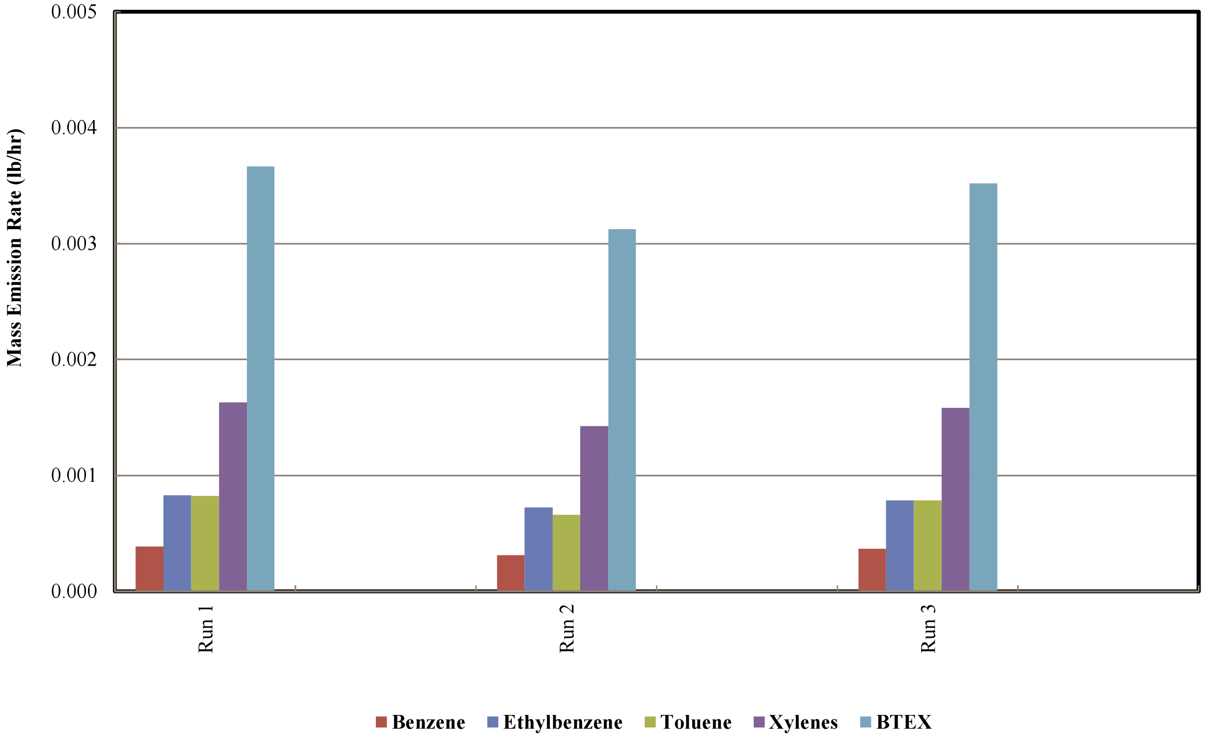
TransCanada
Cold Springs 1 Compressor Station
Mancelona, Michigan

Project No. 11015-000004.00

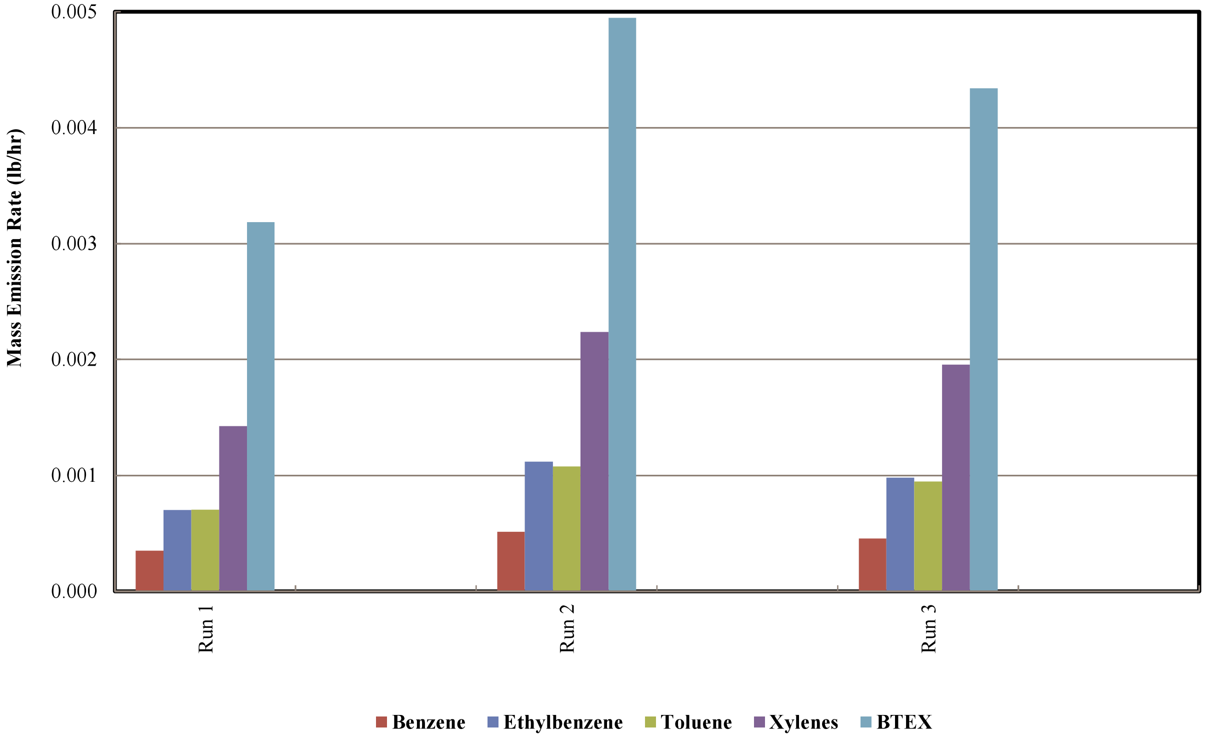
Last Revision:
March 20, 2015

Graphs

Glycol Dehydration Unit TO Exhaust BTEX Emission Rates
TransCanada - Blue Lake
Mancelona, Michigan
Bureau Veritas Project No. 11015-000004.00
Sampling Date: February 11, 2015



Glycol Dehydration Unit TO Exhaust BTEX Emission Rates
TransCanada - Cold Springs 1
Mancelona, Michigan
Bureau Veritas Project No. 11015-000004.00
Sampling Date: February 12, 2015



Appendix A

Calibration and Inspection Sheets

BUREAU VERITAS

BLUE LAKE

FID Calibration Sheet

FID Unit #: TVA 1000 B | Tech: T. SCHMELTER | Date: 02/11/20

Reference: Method 21

Instrument Number: 1013442601

Reference temperature after instrument has pre-heated: °F

		Reading (ppm)	Time Start (Min:Sec)	Time End (Min:Sec)	Re T (Diff se
Zero Gas 1: 1037	(< 10 ppm)	056 ~~0.56~~	0		
Calibration Gas 1	<10,000 ppm	482		10	
90% of Stable Reading Value	(Multiply calibration gas reading by 0.90)				
Zero Gas 2:	(< 10 ppm)	0.47	0		
Calibration Gas 2	<10,000 ppm	485		10	
90% of Stable Reading Value	(Multiply calibration gas reading by 0.90)				
Zero Gas 3:	(< 10 ppm)	0.55	0		
Calibration Gas 3	<10,000 ppm	480			
90% of Stable Reading Value	(Multiply calibration gas reading by 0.90)				
Average of Zero Gas Readings (Add Zero Gas readings and divide by 3)					
Average of Calibration Gas Readings (Add Calibration Gas Readings and divide by 3)					

Calibration Drift Assessment (End of Day) Compare to Initial Calibration Dat

		Reading (ppm)	Percentage Difference from Average Calibration Values (negative or positive)	If greater than negative 10 previous calibration, then components where reading than 100 ppm
Zero Gas	(< 10 ppm)	0.2		If greater than positive 10 previous calibration, oper choose to select compone
Calibration Gas	<10,000 ppm	459		

Note: After calibration gas is introduced, the time required to attain 90% of the fina stable reading is the Response Time.

BUREAU VERITAS NORTH AMERICA, INC.
PITOT TUBE INSPECTION

PITOT TUBE NO. 6FtA

DATE 02/11/

Pitot Tube not on Probe

Operator: B

$3/16 \leq Dt \leq 3/8$ [✓ YES] N
0.48 cm 0.95 cm
$P_A = P_B$ [✓ YES] N

$1.05 \text{ Dt} \leq P_{A,B} \leq 1.5 \text{ Dt}$ [✓ YES] N

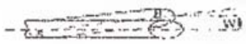
PITOT TUBE NO.
α_1 and $\alpha_2 < 10°$ [✓ α YES]

β_1 and $\beta_2 < 5°$ [✓ β YES]

3/16 ≤ Dt ≤ 3/8

$z < 0.32$ cm (1/8 in) [✓ z YES]

$w < 0.08$ cm (1/32 in) [✓ w YES]



Pitot on Probe

Pitot Tube Correction Factor: 0.8

Component Spacing OK

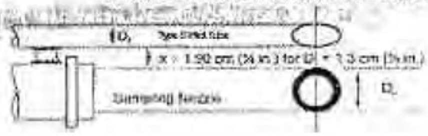


Fig. A

Fig.
A. $x \geq 1.9$ cm A. YES

B-1. $z \geq 1.9$ cm B-1. YES
$w \geq 7.62$ cm

Fig. B-1

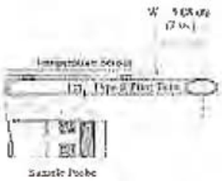
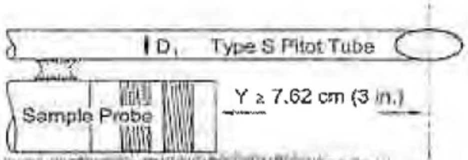


Fig. B-2

or

B-2. $z \geq 5.08$ cm B-2. YES

C. $Y \geq 7.62$ cm C. YES



Component Spacing OK

Fig. C

BUREAU VERITAS

COW SPRUSJ 1

FID Calibration Sheet

FID Unit #: TVA 1000B | Tech: T. SCHWARTZ | Date: 02/12/2

Reference: Method 21

Instrument Number: 101 3442601

Reference temperature after instrument has pre-heated: °F

		Reading (ppm)	Time Start (Min:Sec)	Time End (Min:Sec)	Re (Diff S
Zero Gas 1:	(< 10 ppm)	1.4	10:40:00		
Calibration Gas 1	<10,000 ppm	484		10:40:10	
90% of Stable Reading Value	(Multiply calibration gas reading by 0.90)				
Zero Gas 2:	(< 10 ppm)	1.2	10:42:00		
Calibration Gas 2	<10,000 ppm	480		10:42:10	
90% of Stable Reading Value	(Multiply calibration gas reading by 0.90)				
Zero Gas 3:	(< 10 ppm)	1.4	10:43:00		
Calibration Gas 3	<10,000 ppm	482		10:43:10	
90% of Stable Reading Value	(Multiply calibration gas reading by 0.90)				
Average of Zero Gas Readings (Add Zero Gas readings and divide by 3)					
Average of Calibration Gas Readings (Add Calibration Gas Readings and divide by 3)					

Calibration Drift Assessment (End of Day) Compare to Initial Calibration Dat

			Reading (ppm)	Percentage Difference from Average Calibration Values (negative or positive)	If greater than negative 10 previous calibration, then components where reading than 100 ppm
12:53	**Zero Gas**	(< 10 ppm)	2.3		If greater than positive 10 previous calibration, opera choose to select componen
	Calibration Gas	<10,000 ppm	498		

Note: After calibration gas is introduced, the time required to attain 90% of the fina stable reading is the Response Time.

BUREAU VERITAS NORTH AMERICA, INC.

PITOT TUBE INSPECTION

PITOT TUBE NO. 6F+F

DATE 02/12

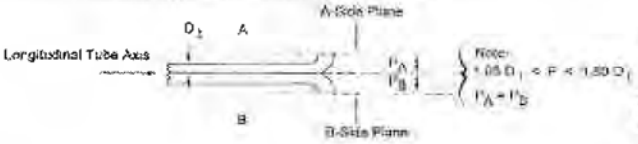
Pitot Tube not on Probe

Operator: T3

$3/16 \leq Dt \leq 3/8$ [✓ YES] N

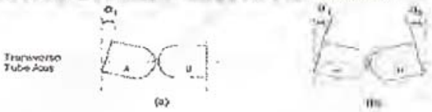
0.48 cm 0.95 cm

$P_A = P_B$ [✓ YES] N

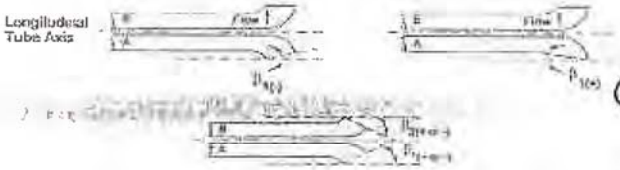


$1.05\ Dt \leq P_{A,B} \leq 1.5\ Dt$ [✓ YES] N

α_1 and $\alpha_2 < 10°$ [✓ α YES]

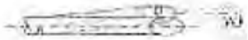


β_1 and $\beta_2 < 5°$ [✓ β YES]



$z < 0.32$ cm (1/8 in) [✓ z YES]

$w < 0.08$ cm (1/32 in) [✓ w YES]



Pitot on Probe

Pitot Tube Correction Factor: 0.8

Component Spacing OK

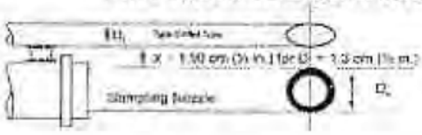


Fig. A

Fig.

A. $x \geq 1.9$ cm A. YES

B-1. $z \geq 1.9$ cm B-1. YES

$w \geq 7.62$ cm

Fig. B-1 Fig. B-2

or

B-2. $z \geq 5.08$ cm B-2. YES

C. $Y \geq 7.62$ cm C. YES

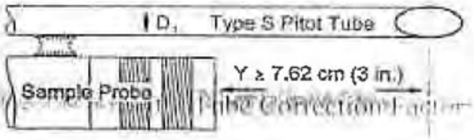


Fig. C

CS12

FID Calibration Sheet

FID Unit #: TVA 10003 | Tech: T. Schmeman | Date: 2/13/201

Reference: Method 21

Instrument Number: 101344 26001

Reference temperature after instrument has pre-heated: °F

818

		Reading (ppm)	**Time Start (Min:Sec)**	**Time End (Min:Sec)**	**Re T (Diffe se**
Zero Gas 1:	(< 10 ppm)	0.8	81600	▨	▨
Calibration Gas 1	<10,000 ppm	495	▨	81610	1
90% of Stable Reading Value	(Multiply calibration gas reading by 0.90)		▨	▨	▨
▨	▨	▨	▨	▨	▨
Zero Gas 2:	(< 10 ppm)	0.6	81900	▨	▨
Calibration Gas 2	<10,000 ppm	492	▨	81910	
90% of Stable Reading Value	(Multiply calibration gas reading by 0.90)		▨	▨	▨
▨	▨	▨	▨	▨	▨
Zero Gas 3:	(< 10 ppm)	0.9	82000	▨	▨
Calibration Gas 3	<10,000 ppm	491	▨	82010	
90% of Stable Reading Value	(Multiply calibration gas reading by 0.90)		▨	▨	▨
▨	▨	▨	▨	▨	▨
Average of Zero Gas Readings (Add Zero Gas readings and divide by 3)			▨	▨	▨
Average of Calibration Gas Readings (Add Calibration Gas Readings and divide by 3)			▨	▨	▨

Calibration Drift Assessment (End of Day) Compare to Initial Calibration Data

		Reading (ppm)	Percentage Difference from Average Calibration Values (negative or positive)	If greater than negative 10 previous calibration, then r components where reading than 100 ppm
Zero Gas	(< 10 ppm)	1.7 (9:22)		If greater than positive 10 previous calibration, opera choose to select componen
Calibration Gas	<10,000 ppm	520		

Note: After calibration gas is introduced, the time required to attain 90% of the fina stable reading is the Response Time.

Cold Springs 12

1539

FID Calibration Sheet

FID Unit #: TVA 1000B | Tech: T. SCHMELTER | Date: 2/19/201

Reference: Method 21

Instrument Number: 1013442601

Reference temperature after instrument has pre-heated: ~~°F~~

		Reading (ppm)	Time Start (Min:Sec)	Time End (Min:Sec)	Re (Diff S
Zero Gas 1:	(< 10 ppm)	2	15:39:00		
Calibration Gas 1	<10,000 ppm	505		15:39:10	1
90% of Stable Reading Value	(Multiply calibration gas reading by 0.90)				
Zero Gas 2:	(< 10 ppm)	2.2	15:40.00		
Calibration Gas 2	<10,000 ppm	505		15:40:10	1
90% of Stable Reading Value	(Multiply calibration gas reading by 0.90)				
Zero Gas 3:	(< 10 ppm)	2.1	15:41:00		
Calibration Gas 3	<10,000 ppm	505		1541:10	
90% of Stable Reading Value	(Multiply calibration gas reading by 0.90)				
Average of Zero Gas Readings (Add Zero Gas readings and divide by 3)					
Average of Calibration Gas Readings (Add Calibration Gas Readings and divide by 3)					

Calibration Drift Assessment (End of Day) Compare to Initial Calibration Dat

		Reading (ppm)	Percentage Difference from Average Calibration Values (negative or positive)	If greater than negative 1 previous calibration, then components where readin than 100 ppm
Zero Gas	(< 10 ppm)	1.1		If greater than positive 1 previous calibration, ope choose to select compone
Calibration Gas	<10,000 ppm	526		

Note: After calibration gas is introduced, the time required to attain 90% of the fin stable reading is the Response Time.

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

ENVIRONMENTAL SUPPLY COMPANY

Quality - Service - Reliability

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at tested vacuum (from Orifice Calibration Report), for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Record data and information in the **GREEN** cells, YELLOW cells are calculated.

DATE: 11/14/2014

METER PART #:

METER SERIAL #: 2

CRITICAL ORIFICE SET SERIAL #: AS

	INITIAL	FINAL	AVG (P_{bar})
BAROMETRIC PRESSURE (in Hg):	30.2	30.2	30.2

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3)			TEMPERATURES °F						ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1)	(2)	(3)	Y % Diff to Average Y	Y % Diff with other orifices	$\Delta H_@$
				INITIAL	FINAL	NET (V_m)	AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG			V_m (STD)	V_{cr} (STD)	Y			
55	1	0.4446	15	515.410	521.155	5.745	52	52	55	53	53	53.25	10.00	1.1	5.9826	5.9357	0.992			1.83
	2	0.4446	15	521.155	526.328	5.173	52	55	57	53	54	54.75	9.00	1.1	5.3712	5.3421	0.995			1.82
	3	0.4446	15	526.328	531.514	5.186	53	57	53	54	54	54.5	9.00	1.1	5.3874	5.3369	0.991			1.83
																AVG =	0.992	-0.07	0.00	
63	1	0.5721	15	531.514	536.705	5.191	54	57	61	55	55	57	7.00	1.8	5.3756	5.3361	0.993			1.80
	2	0.5721	15	536.705	541.907	5.202	55	61	63	55	56	58.75	7.00	1.8	5.3688	5.3309	0.993			1.80
	3	0.5721	15	541.907	547.128	5.221	55	63	64	56	57	60	7.00	1.8	5.3754	5.3309	0.992			1.80
																AVG =	0.992	-0.07	0.00	
73	1	0.778	15	547.128	552.235	5.107	56	64	66	57	58	61.25	5.00	3.25	5.2639	5.1732	0.983			1.76
	2	0.778	15	552.235	557.265	5.030	57	66	67	58	59	62.5	5.00	3.25	5.1721	5.1682	0.999			1.76
	3	0.778	15	557.265	562.296	5.031	56	67	68	59	59	63.25	5.00	3.25	5.1657	5.1732	1.001			1.75
																AVG =	0.994	0.14	0.21	

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:
The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = **0.993**

AVERAGE $\Delta H_@$ = **1.80**

(1) $Vm_{(std)} = K_1 * Vm * \frac{Pbar + (\Delta H / 13.6)}{Tm}$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

$$\Delta H_@ = \left(\frac{0.75\,\theta}{V_{cr}(std)}\right)^2 \Delta H \left(\frac{V_m(std)}{V_m}\right)$$

(2) $Vcr_{(std)} = K' * \frac{Pbar * \Theta}{\sqrt{Tamb}}$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $Y = \frac{Vcr_{(std)}}{Vm_{(std)}}$ = DGM calibration factor

11/14/2014

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

Quality - Service - Reliability

ENVIRONMENTAL SUPPLY COMPANY

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at tested vacuum (from Orifice Calibration Report), for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Record data and information in the **GREEN** cells, YELLOW cells are calculated.

DATE: 3/13/2015

METER PART #:

METER SERIAL #: 2

CRITICAL ORIFICE SET SERIAL #: AS

	INITIAL	FINAL	AVG (P_{bar})
BAROMETRIC PRESSURE (in Hg):	30.18	30.18	30.18

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	FINAL	NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y % Diff to Average Y	Y % Diff with other orifices	$\Delta H_@$
55	1	0.4446	15	746.50	752.270	5.770	54	53	55	53	54	53.75	10.00	1.1	5.9988	5.9202	0.987			1.84
	2	0.4446	15	752.270	759.180	6.910	54	55	58	54	54	55.25	12.00	1.1	7.1631	7.1043	0.992			1.83
	3	0.4446	15	759.180	764.385	5.205	55	58	60	54	55	56.75	9.00	1.1	5.380	5.3230	0.989			1.83
																AVG =	0.989	-0.20	0.14	
63	1	0.5721	15	764.385	769.630	5.245	54	60	63	55	56	58.5	7.00	1.85	5.4129	5.3326	0.985			1.85
	2	0.5721	15	769.630	774.880	5.250	50	63	64	56	57	60	7.00	1.85	5.4024	5.3535	0.991			1.83
	3	0.5721	15	774.880	780.160	5.280	49	64	64	57	58	60.75	7.00	1.85	5.4254	5.3587	0.988			1.82
																AVG =	0.988	-0.34	-0.14	
73	1	0.778	15	780.20	785.270	5.070	50	64	66	58	59	61.75	5.00	3.3	5.2179	5.2001	0.997			1.77
	2	0.778	15	785.274	790.320	5.046	54	66	67	59	59	62.75	5.00	3.3	5.1833	5.1799	0.999			1.78
	3	0.778	15	790.320	795.40	5.080	54	67	68	59	60	63.5	5.00	3.3	5.2107	5.1799	0.994			1.77
																AVG =	0.997	0.54	0.88	

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:

The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 0.991

AVERAGE $\Delta H_@$ = 1.81

(1) $$Vm_{(std)} = K_1 * Vm * \frac{Pbar + (\Delta H / 13.6)}{Tm}$$

= Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

$$\Delta H_@ = \left(\frac{0.75\,\theta}{V_{cr}(std)}\right)^2 \Delta H \left(\frac{V_m(std)}{V_m}\right)$$

(2) $$Vcr_{(std)} = K' * \frac{Pbar * \Theta}{\sqrt{Tamb}}$$

= Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $$Y = \frac{Vcr_{(std)}}{Vm_{(std)}}$$

= DGM calibration factor

3/13/2015

Meter Box Thermocouple Calibration Sheet

Meter Box #: 2 **Tech:** DK **Date:** 11/14/2014

Reference: **PIE TC Source**

	Reference Thermometer		Thermocouple		Difference
Source:	°F	°R	°F	°R	
Meter In:					
Ice bath	32	492	31	491	-0.20%
Boiling Water	212	672	210	670	-0.30%
Hot Oil	360	820	358	818	-0.24%
Meter Out:					
Ice bath	32	492	32	492	0.00%
Boiling Water	212	672	213	673	0.15%
Hot Oil	360	820	360	820	0.00%
Probe:					
Ice bath	32	492	31	491	-0.20%
Boiling Water	212	672	213	673	0.15%
Hot Oil	360	820	360	820	0.00%
Stack:					
Ice bath	32	492	31	491	-0.20%
Boiling Water	212	672	212	672	0.00%
Hot Oil	360	820	359	819	-0.12%
Oven:					
Ice bath	32	492	30	490	-0.41%
Boiling Water	212	672	211	671	-0.15%
Hot Oil	360	820	359	819	-0.12%
Exit:					
Ice bath	32	492	29	489	-0.61%
Boiling Water	212	672	211	671	-0.15%
Hot Oil	360	820	358	818	-0.24%
Auxiliary:					
Ice bath	32	492	30	490	-0.41%
Boiling Water	212	672	211	671	-0.15%
Hot Oil	360	820	358	818	-0.24%

Note: Tolerance is ≤1.5%

Meter Box Thermocouple Calibration Sheet

Meter Box #: 2 | **Tech:** DK | **Date:** 3/13/2015

Reference: PIE TC Source

	Reference Thermometer		Thermocouple		Difference
Source:	°F	°R	°F	°R	
Meter In:					
Ice bath	32	492	31	491	-0.20%
Boiling Water	212	672	211	671	-0.15%
Hot Oil	360	820	360	820	0.00%
Meter Out:					
Ice bath	32	492	31	491	-0.20%
Boiling Water	212	672	213	673	0.15%
Hot Oil	360	820	359	819	-0.12%
Probe:					
Ice bath	32	492	31	491	-0.20%
Boiling Water	212	672	211	671	-0.15%
Hot Oil	360	820	360	820	0.00%
Stack:					
Ice bath	32	492	31	491	-0.20%
Boiling Water	212	672	213	673	0.15%
Hot Oil	360	820	361	821	0.12%
Oven:					
Ice bath	32	492	31	491	-0.20%
Boiling Water	212	672	212	672	0.00%
Hot Oil	360	820	360	820	0.00%
Exit:					
Ice bath	32	492	30	490	-0.41%
Boiling Water	212	672	211	671	-0.15%
Hot Oil	360	820	359	819	-0.12%
Auxiliary:					
Ice bath	32	492	30	490	-0.41%
Boiling Water	212	672	212	672	0.00%
Hot Oil	360	820	359	819	-0.12%

Note: Tolerance is ≤1.5%

SPECIALTY GASES OF AMERICA, INC.
AMERICAN INDUSTRIAL GASES, INC.
AMERICAN RARE GASES, INC.

6055 BRENT DR. TOLEDO, OH 43611
419-729-7732 FAX 419-729-2411

THE AMERICAN GAS GROUP

www.americangasgroup.com

ANALYTICAL REPORT

Certificate ID: 040413032 **Date:** 4/4/2013

Customer Name: Bureau Veritas North America, Inc

Customer Address: 45525 Grand River Ave.
Suite 200
Novi MI 48374

Purchase Order: BRIAN YOUNG E-MAIL **Work Order:** 368579-01

Lot Number: 0320XA13 **Product Name:** Air, Zero CEM

Size: AS **Pressure:** 2000 PSIG @ 70 DegF

Content: NA

Serial #: EB0019307

Component	Nominal	Actual	Accuracy	Method
Oxygen	19.5- 23.5%	20.6%		Paramagnetic
Water	< 3 ppm	< 0.5 ppm		Moisture Probe
THC	< 0.1 ppm	< 0.1 ppm		FTIR
Carbon Dioxide	< 1 ppm	< 1 ppm		FTIR
Carbon Monoxide	< 0.5 ppm	< 0.5 ppm		FTIR
Nitrogen Dioxide	< 0.1 ppm	< 0.1 ppm		FTIR
Sulfur Dioxide	< 0.1 ppm	< 0.1 ppm		FTIR

Note: Certificate reflects results obtained from batch analysis of product.

Issued by: Josh Jones

Airgas

Airgas Specialty Gases
12722 South Wentworth Avenue
Chicago, IL 60628
(773) 785-3000 Fax: (773) 785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02AI99E15A3015	Reference Number:	54-124337982-1
Cylinder Number:	CC337690	Cylinder Volume:	146 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12012	Valve Outlet:	590
Gas Code:	APPVD	Analysis Date:	Sep 27, 2012

Expiration Date: Sep 27, 2020

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
METHANE	500.0 PPM	493.5 PPM	G1	+/- 1% NIST Traceable
Air	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/CH4	10060916	CC321243	500.5PPM METHANE/NITROGEN	Aug 07, 2016

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801332	FTIR	Sep 03, 2012

Triad Data Available Upon Request

Notes:

Approved for Release

Fyrite Calibration Using Standard

Operator DK
Date January 24, 2014
Time 8:45
Model No. Fyrite #1
BV Asset No. 01824

	Certified Cylinder Value (O2%)	Fyrite Response (O2%)	Certified Cylinder Value (CO2%)	Fyrite Response (CO2%)
Low-level (or zero) calibration gas	0%	0.5%	0%	0%
Mid-level calibration gas	11%	11%	11%	10.5%
High-level calibration gas	20%	20%	19.6%	19.5%

Operator DK
Date January 24, 2014
Time 8:45
Model No. Fyrite #2
BV Asset No. 01825

	Certified Cylinder Value (O2%)	Fyrite Response (O2%)	Certified Cylinder Value (CO2%)	Fyrite Response (CO2%)
Low-level (or zero) calibration gas	0%	0%	0%	0%
Mid-level calibration gas	11%	10.5%	11%	10.5%
High-level calibration gas	20%	20%	19.6%	19.5%

Completed by:

Practical Instrument Electronics
841 Holt Road, Suite 1, Webster N.Y. 14580 U.S.A.
Tel: (585) 872-9350 • Fax: (585) 872-2638

CERTIFICATE OF CALIBRATION

This is to certify that your instrument has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology (formerly NBS) within the limits of the NIST Calibration Services. Actual records pertaining to these standards are on file and are available for examination.

Certified by: Practical Instrument Electronics
Recommended Recalibration: Annually

Model Number 520
Serial No. 107222
Calibration Technician B.H
Calibration Date 1/15/15
In Service Date
Calibration Due 1/15/16

Function Parameter Tested	Low Limit	As Received	High Limit	Adjusted
SOURCE				
80.000 mV	79.979 mV	79.997	80.021 mV	80.000
40.000 mV	39.985 mV	40.000	40.015 mV	40.000
0.000 mV	-0.009 mV	0.003	0.009 mV	0.000
-13.000 mV	-13.011 mV	-12.996	-12.989 mV	0.001
COLD JUNCTION		26.34		26.07
ISOTHERMAL BLOCK TEMP		26.44		26.07
COLD JUNCTION READING	BLOCK TEMP 0.5°C	0.10	BLOCK TEMP 0.5°C	0.00

Assets	Serial Number	Last Cal'd	Cal Due
HP3457A	3114A17025	5/13/14	5/13/15
422	114934	8/11/14	8/11/15
USS1037J7P	USS-2414-004	6/10/14	6/10/16

IE
MONITORING
INSTRUMENTS

Industrial Environmental Monitoring Instruments, Inc.

7410 Worthington-Galena Road
Worthington, Ohio 43085
Phone: (614) 436-4933
Fax: (614) 436-9144

Website: www.ierents.com

Certificate of Calibration and Operation Check

Instrument: Bios DC-Lite
Serial #: 6874
Cell/Range: M / 100cc-12LPM

Date: 9/26/2014
Technician: Sam Shults

Bureau Veritas

Lab Standard Flow	Actual Flow	Deviation %
0.0591	0.0595	0.68
0.6733	0.6739	0.09
2.377	2.385	0.34
5.348	5.341	-0.13
8.235	8.224	-0.13
10.67	10.72	0.47

DC-Lite Accuracy = 1.00%

Lab Environment
Temp: 73.2F RH: 41.7% BP:29.401"hg

Calibration Standard:	Bios ML-500-10	Bios ML-500-44
Serial#	103726	10110
Calibration Due:	6/25/2015	6/25/2015

The calibration standards used are NIST traceable.
Instrument must be calibrated and operated according to manufacturers specifications

Z540.1

FLUKE®

Certificate of Calibration

Everett Service Center

Certificate Number:	41930		
Data Type:	Found-Left	**Calibration Date:**	26-Jun-2014
Result Summary:	In Tolerance	**Calibration Due:**	26-Jun-2015
Manufacturer:	Fluke	**Certificate Date:**	26-Jun-2014
Model:	51 II	**Temperature:**	22.6 °C
Serial Number:	79960002	**Humidity:**	42.2 %
Description:	Thermometer		
Procedure:	Fluke 51-II:(1 YEAR) ZCAL VER /5520	**Revision:**	1.1
Customer:	BUREAU VERITAS CONSUMER PRODUCTS AND SERVICES IN		
City:	novi	**Country:**	US
State:	MI		
Purchase Order:	260OH-000001.00.084	**RMA:**	30557059

This calibration is traceable to the International System of Units (SI), through National Metrology Institutes (NIST, PTB, NRC, NPL, etc.) , ratiometric techniques, or natural physical constants. This certificate applies only to the item identified and shall not be reproduced other than in full, without the specific written approval by Fluke Corporation. Calibration certificates without signature are not valid. The calibration has been completed in accordance with Fluke Electronics Corporation Quality System Document 111.0 Rev 116 08/12 , Fluke 17025 Quality Manual QSD 111.41 Rev. 003 01/14 and/or Fluke Customer Support Services QAM 400 Rev. 002 03/22/2012.

The Data Type found in this certificate must be interpreted as:

- As - Found Calibration data collected before the unit is adjusted and / or repaired.
- As - Left Calibration data collected after the unit has been adjusted and / or repaired.
- Found-Left Calibration data collected without any adjustment and / or repair performed.

This calibration conforms to the requirements of ANSI/NCSL Z540-1-1994 (R2002).

In the attached measurement results, deviation may be expressed with units, Measured Value (MV) - Nominal Value (NV) or as a proportion of the nominal value ((MV-NV)/NV), expressed without units with a scalar multiplier such as % (0.01), or as a ratio of the units (mA/A, µV/V, etc.) Descriptions such as µA/A, µV/V, and others, where used to annotate results or column headings are the preferred replacements for what was historically labeled as "ppm" or parts-per-million and described the results in that column, unless otherwise noted by units symbols.

Where applicable, the expanded uncertainty of measurement at the time of test is given in the following pages. They are calculated in accordance with the method described in the ISO Guide to the Expression of Uncertainty in Measurement (GUM). The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k, such that the confidence level approximates 95%.

Where applicable, the Test Uncertainty Ratio (TUR) is provided in the following pages. Unless otherwise stated, the TUR for a given measurement result is 4:1 or greater.

Results are reviewed to establish where any measurement results exceeded the manufacturer's specifications.

Measurement results greater than limits of error are indicated by "!".

Z540.1:1994 FLUKE

Cert # :	41930
Cal Date:	26-Jun-2014
Due Date:	26-Jun-2015
S/N :	79960002

www.fluke.com

Cert # : 41930
Date: 26-Jun-2014
Due: 26-Jun-2015
www.fluke.com

HaiLa

HAI LA
Issued By

Standards Used

Asset	Description	Cal-Date	Cal-Due
13783	Fluke 5520A Calibrator	11-Jun-2014	11-Dec-2014

Calibration Data

Parameter	Nominal Value	Measurement Result	Limits of Error		Test Uncertainty Ratio (TUR)
			Lower Limit	Upper Limit	
FUNCTIONAL TESTS:					
Display Test		Pass			
Keypad Test		Pass			
Thermocouple - Type K					
DEGREES CELSIUS VERIFICATION					
0.0 °C	0.00	-0.1	-0.3	0.3	2.50
20.0 °C	20.00	19.9	19.7	20.3	2.50
-190.0 °C	-190.00	-190.3	-190.7	-189.3	2.80
990.0 °C	990.00	989.9	989.2	990.8	
1200 °C	1200.0	1200	1199	1201	3.33
DEGREES FAHRENHEIT VERIFICATION					
32.0 °F	32.00	31.7	31.5	32.5	2.31
73.4 °F	73.40	73.1	72.9	73.9	2.31
-310.0 °F	-310.00	-310.5	-311.1	-308.9	2.44
1814 °F	1814.0	1814	1813	1815	2.92
2192 °F	2192.0	2192	2190	2194	3.70

Customer ID: 019573

AIRDATA MULTIMETER CERTIFICATE OF RECALIBRATION

Customer: BUREAU VERITAS NORTH AMERICA, INC. City: NOVI
As-Received Model #: ADM-880C Converted to Model #: C
PO #: Customer Eqpt ID#: Calibration Du

This instrument has been calibrated using Calibration Standards which are traceable to NIST (National Institute of Standards and Tec
Program and calibration procedures meet the requirements for ANSI/NCSL Z540-1-1994, ISO 17025, MIL-STD 45662A and m
Calibration accuracy is certified when meters are used with properly functioning accessories only. All Uncertainties are expressed i
calculated uncertainty). This report shall not be reproduced, except in full, without the written approval of Shortridge Instruments, Inc. R
calibrated. For limitations on use, see Shortridge Instruments, Inc. Instruction Manual for the use of AirData Multimeters. Proce
Differential Pressure, Absolute Pressure and Temperature Recalibration of AirData Multimeters SIP-CP02 Revision: 28 [

Calibration Technician(s): a. Gosiunoff M. Diddens Calibration
Calibration Approved by: L. Normand Title: QA Mgr
As-Received Test performed after minor repair: Yes [✓ No]

AS-Received By aa
Date 09/02/14 Rh 44 %
Ambient Temperature 76 °F
Barometric Pressure 28.36 in Hg
All within spec [✓ YES] NO NA

Final Test By M.D.
Date 9/05/14 Rh 48 %
Ambient Temperature 77 °F
Barometric Pressure 28.42 in Hg
All within spec [✓ YES] NO

Test By
~~Date~~ Rh
Ambient Temperature
Barometric Pressure
All within spec YES

ABSOLUTE PRESSURE TEST (in Hg)

TEST METER TOLERANCE = ± 2.0 % ± .1 in Hg AS-RECEIVED TEST WITHIN SPEC [✓ YES] NO N/A S

Pressure Standard: Heise #02-R S/N: 41741/42451 As-Rcvd [✓ Test 2] Test 3
Pressure Standard: Heise #04-R S/N: 41743/42453 [✓ As-Rcvd] Test 2 Test 3
Pressure Standard: Heise #06-R S/N: 41742/42452 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #08-R S/N: 42186/43328 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #10-R S/N: 42203/43352 As-Rcvd Test 2 Test 3

Pressure Standard: Heise #12-R S/N: 43166/447
Pressure Standard: Heise #14-R S/N: 43412/450
Pressure Standard: Heise #16-R S/N: 43413/450
Pressure Standard: Heise #18-R S/N: 44581/468
Pressure Standard: Heise #20-R S/N: 44582/468

Approx Set Pt	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff	Standard	T
14.0	13.90	13.9	0	14.00	14.0	0		
28.4	28.36	28.2	-.56	28.42	28.3	-.42		
40.0	39.90	39.6	-.75	40.13	39.9	-.57		

DIFFERENTIAL PRESSURE TEST (in wc)

TEST METER TOLERANCE = ± 2.0 % ± 0.001 in wc AS-RECEIVED TEST WITHIN SPEC [✓ YES] NO N/A

Pressure Standard: Heise #01-L S/N: 41739/42449 As-Rcvd [✓ Test 2] Test 3
Pressure Standard: Heise #01-R S/N: 41739/42446 As-Rcvd [✓ Test 2] Test 3
Pressure Standard: Heise #02-L S/N: 41741/42454 As-Rcvd [✓ Test 2] Test 3
Pressure Standard: Heise #03-L S/N: 41738/42448 [✓ As-Rcvd] Test 2 Test 3
Pressure Standard: Heise #03-R S/N: 41738/42445 [✓ As-Rcvd] Test 2 Test 3
Pressure Standard: Heise #04-L S/N: 41743/42456 [✓ As-Rcvd] Test 2 Test 3
Pressure Standard: Heise #05-L S/N: 41740/42450 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #05-R S/N: 41740/42447 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #06-L S/N: 41742/42455 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #07-L S/N: 42185/42186 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #07-R S/N: 42185/43326 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #08-L S/N: 42186/43329 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #09-L S/N: 42202/43351 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #09-R S/N: 42202/43350 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #10-L S/N. 42203/43353 As-Rcvd Test 2 Test 3

Pressure Standard: Heise #11-L S/N: 43165/445
Pressure Standard: Heise #11-R S/N: 43165/447
Pressure Standard: Heise #12-L S/N: 43166/447
Pressure Standard: Heise #13-L S/N: 43415/450
Pressure Standard: Heise #13-R S/N: 43415/450
Pressure Standard: Heise #14-L S/N: 43412/450
Pressure Standard: Heise #15-L S/N: 43416/450
Pressure Standard: Heise #15-R S/N: 43416/450
Pressure Standard: Heise #16-L S/N: 43413/450
Pressure Standard: Heise #17-L S/N: 44579/468
Pressure Standard: Heise #17-R S/N: 44579/468
Pressure Standard: Heise #18-L S/N: 44581/468
Pressure Standard: Heise #19-L S/N: 44580/468
Pressure Standard: Heise #19-R S/N: 44580/468
Pressure Standard: Heise #20-L S/N: 44582/468

Approx Set Pt	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff	Standard	T
.0500	.0508	.0506	-.39	.0523	.0521	-.38		
.1250	.1275	.1272	-.24	.1254	.1249	-.40		
.2250	.2280	.2273	-.31	.2258	.2251	-.31		
.2700	.2739	.2732	-.26	.2703	.2698	-.18		
2.000	2.031	2.026	-.25	2.056	2.052	-.19		
3.600	3.635	3.623	-.33	3.607	3.594	-.36		
4.400	4.432	4.436	.09	4.409	4.415	.14		
27.00	27.05	27.05	0	27.11	27.11	0		
50.00	50.03	49.88	-.30	50.05	49.97	-.16		
Overange	NA	✓	NA	NA	✓	NA	NA	

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AIRDATA MULTIMETER CERTIFICATE OF RECALIBRATION

Ord

LOW VELOCITY CONFIRMATION (FPM)

TEST METER TOLERANCE = ± 3.0% ± 7 FPM AS-RECEIVED TEST WITHIN SPEC [✓ YES] NO N/A Se

Vel Eqv Trans Std: S/N: M02009 As-Rcvd [✓ Test 2] Test 3 Vel Eqv Trans Std: S/N: M10840 As-Rcvd
Vel Eqv Trans Std: S/N: M02803 As-Rcvd Test 2 Test 3 Vel Eqv Trans Std: S/N: M10897 [✓ As-Rcvd]
Vel Eqv Trans Std: S/N: M02903 As-Rcvd Test 2 Test 3 Vel Eqv Trans Std: S/N: M10901 As-Rcvd
Vel Eqv Trans Std: S/N: M10839 As-Rcvd Test 2 Test 3 Vel Eqv Trans Std: S/N: M13492 As-Rcvd

Approx Set Point	Standard	Test Meter	Diff	Standard	Test Meter	Diff	Standard
100	113	113	0	106.2	106	-.2	
500	507	507	0	509.0	507	-2.0	

ADM-880C, ADM-870/870C and ADM-860/860C models are read in AirFoil Mode. ADM-850/850L models are read in

TEMPERATURE TEST - AIRDATA MULTIMETER (° F)

TEST METER TOLERANCE = ± 0.2° F AS-RECEIVED TEST WITHIN SPEC [✓ YES] NO N/A See No

RTD Simulator: S/N 249 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4
RTD Simulator: S/N 250 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4
RTD Simulator: S/N 253 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4
RTD Simulator: S/N 254 [✓ As-Rcvd] [✓ Test 2] Test 3 Set Point: [✓ 35.6° F] 95° F 154.4
RTD Simulator: S/N 256 [✓ As-Rcvd] [✓ Test 2] Test 3 Set Point: 35.6° F [✓ 95° F] 154.4
RTD Simulator: S/N 257 [✓ As-Rcvd] [✓ Test 2] Test 3 Set Point: 35.6° F 95° F [✓ 154.4]
RTD Simulator: S/N 292 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4
RTD Simulator: S/N 293 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4
RTD Simulator: S/N 294 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4
RTD Simulator: S/N 313 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4
RTD Simulator: S/N 314 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4
RTD Simulator: S/N 315 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4
RTD Simulator: S/N 316 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4
RTD Simulator: S/N 317 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4
RTD Simulator: S/N 318 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4

RTD Simulator Temperature Equivalent Set Point	Test Meter	Difference	Test Meter	Difference	Test Met
35.60	35.6	0	35.6	0	
95.00	95.0	0	95.0	0	
154.40	154.4	0	154.4	0	

Minor Repair(s) performed prior to As-Received Test.

Pushed dislodged ribbon cable assy back into its socket ____
Replaced internal battery clip or wire ____
Repaired broken wires that power the display ____
Replaced keypad / On, Mode or Read key nonfunctional ____

Pushed dislodged IC back into its socket
Replaced a display that cannot be read
Repaired broken wire that signals the flaps
Pushed dislodged J4 connector back into i

NOTES:

The enclosed ADM Calibration Standards for Pressure and Temperature form(s) is/are an integral part of this calibration and must re Calibration. Note: There may be more than one such form included that pertains to this calibration.

Shortridge Instruments, Inc.
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CO ID: 019573 **MULTITEMP AND/OR TEMPROBE RECALIBRATION TEST REPORT** C

Customer: BUREAU VERITAS NORTH AMERICA, INC. City: NOVI

Procedure used: Procedure for Calibration/Recalibration of MultiTemps and/or TemProbes SIP-CP14 Rev

Equipment Being Tested: MultiTemp and TemProbes ______ TemProbe(s) ✓

AS-RECEIVED TEMPERATURE TEST (° F)
MULTITEMP TOLERANCE (MULTITEMP AND TEMPROBES TESTED AS A UNIT) = ± 0.5° F
TEMPROBE TOLERANCE = ± 0.3° F

Thermometer #1 S/N 8A089 / Thermistor S/N A410660 Set Point: 35° F 95° F 155° F
Thermometer #2 S/N 8B104 / Thermistor S/N 871507 Set Point: 35° F 95° F [✓ 155° F]
Thermometer #5 S/N B11780 / Thermistor S/N B10505 Set Point: 35° F [✓ 95° F] 155° F
Thermometer #6 S/N B11782 / Thermistor S/N B10509 Set Point: [✓ 35° F] 95° F 155° F

Temperature Standard AirData Multimeter S/N M00136 Set Point: [✓ 35° F] [✓ 95° F] [✓ 155° F]
Temperature Standard AirData Multimeter S/N M96100 Set Point: 35° F 95° F 155° F

Test By: Q. [illegible] Date: 09/02/2014 Rh: 44 % Ambient Temperature: 76 °F Barometric

Approx Set Point	Temp Standard	Test Probe #1 ADT-442		Test Probe #2 ADT-446		Test Probe #3 ~~ADT-~~		Test Probe #4 ~~ADT-~~		Test Probe #5 ~~ADT-~~ NP		Test Probe #6 ~~ADT-~~		F ~~AD~~
35°	35.0	35.0		35.1										
95°	95.0	95.0		95.0						NP				
155°	155.0	155.1		155.0										

A check in the box to the right of a TemProbe reading indicates that the reading is Out Of Specification.

NOTES:

FINAL TEMPERATURE TEST (° F)
MULTITEMP TOLERANCE (MULTITEMP AND TEMPROBES TESTED AS A UNIT) = ± 0.5° F
TEMPROBE TOLERANCE = ± 0.3° F

Thermometer #1 S/N 8A089 / Thermistor S/N A410660 Set Point: 35° F 95° F 155° F
Thermometer #2 S/N 8B104 / Thermistor S/N 871507 Set Point: 35° F 95° F 155° F
Thermometer #5 S/N B11780 / Thermistor S/N B10505 Set Point: 35° F 95° F 155° F
Thermometer #6 S/N B11782 / Thermistor S/N B10509 Set Point: 35° F 95° F 155° F

Temperature Standard AirData Multimeter S/N M00136 Set Point: 35° F 95° F 155° F
Temperature Standard AirData Multimeter S/N M96100 Set Point: 35° F 95° F 155° F

~~Test By: Date: Rh:~~ NP ~~% Ambient Temperature: °F Barometric~~

Approx Set Point	Temp Standard	Test Probe #1 ~~ADT-~~		Test Probe #2 ~~ADT-~~		Test Probe #3 ~~ADT-~~ NP		Test Probe #4 ~~ADT-~~		Test Probe #5 ~~ADT-~~		Test Probe #6 ~~ADT-~~		P ~~AD~~
35°														
95°								NP						
155°														

NOTES:

Calibration standards used by Shortridge Instruments, Inc. are traceable to NIST (National Institute of Standards and Technology). accordance with ANSI/NCSL Z540-1-1994, ISO 17025, MIL-STD 45662A and manufacturer's specifications. Calibration accuracy is ce with properly functioning accessories only. This report shall not be reproduced, except in full, without the written approval of Shortridg relate only to the item calibrated. Limitations on use: See Shortridge Instruments, Inc. Instruction Manual for the use of AirData Mul

The enclosed ADM or HDM Calibration Standards form(s) is/are an integral part of this calibration and must remain with this Certificate may be more than one such form included that pertains to this calibration.

Calibration Approved by: L. Normand Title: QA Mgr

Shortridge Instruments, Inc. • 7855 E Redfield Road, Scottsdale, AZ 85260 • (480) 991-6744 • Fax (480) 443-1267

Shortridge Instruments, Inc. AirData Multimeter Calibration Equipment

Order Number: R142774 Serial Number: M13292 Test Type: Initial [✓ As-F]

ABSOLUTE PRESSURE STANDARDS

ADM #02-R	S/N: 41741/42451	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 04/08/14
ADM #04-R	S/N: 41743/42453	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/26/13
ADM #06-R	S/N: 41742/42452	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/07/14
ADM #08-R	S/N: 42186/43328	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 03/10/14
ADM #10-R	S/N: 42203/43352	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 01/14/14
ADM #12-R	S/N: 43166/44731	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/09/14
ADM #14-R	S/N: 43412/45043	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/16/13
ADM #16-R	S/N: 43413/45044	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 02/08/14
ADM #18-R	S/N: 44581/46845	Heise Model: PPM-2	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 05/13/14
ADM #20-R	S/N: 44582/46847	Heise Model: PPM-2	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 06/13/14

#02-R, 04-R, 06-R, 08-R, 10-R, 12-R, 14-R, 16-R Rated Accuracy: 0.05% fs (0.0305 in Hg) Range: 0-30 psia Resolution: 0.01
#18-R, 20-R Rated Accuracy: 0.05% fs (0.0305 in Hg) Range: 0-60 in Hg Resolution: 0.001

DIFFERENTIAL PRESSURE STANDARDS

ADM #01-L	S/N: 41739/42449	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 04/15/14
ADM #01-R	S/N: 41739/42446	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 04/14/14
ADM #02-L	S/N: 41741/42454	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 04/15/14
ADM #03-L	S/N: 41738/42448	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/13/13
ADM #03-R	S/N: 41738/42445	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/13/13
ADM #04-L	S/N: 41743/42456	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/13/13
ADM #05-L	S/N: 41740/42450	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/25/14
ADM #05-R	S/N: 41740/42447	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/26/14
ADM #06-L	S/N: 41742/42455	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/07/14
ADM #07-L	S/N: 42185/42186	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 03/11/14
ADM #07-R	S/N: 42185/43326	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 03/12/14
ADM #08-L	S/N: 42186/43329	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 03/12/14
ADM #09-L	S/N: 42202/43351	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 01/17/14
ADM #09-R	S/N: 42202/43350	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 01/17/14
ADM #10-L	S/N: 42203/43353	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 01/17/14
ADM #11-L	S/N: 43165/44551	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/15/14
ADM #11-R	S/N: 43165/44730	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/15/14
ADM #12-L	S/N: 43166/44732	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/15/14
ADM #13-L	S/N: 43415/45041	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/16/13
ADM #13-R	S/N: 43415/45039	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/16/13
ADM #14-L	S/N: 43412/45045	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/20/13
ADM #15-L	S/N: 43416/45042	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 02/06/14
ADM #15-R	S/N: 43416/45040	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 02/07/14
ADM #16-L	S/N: 43413/45046	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 02/06/14
ADM #17-L	S/N: 44579/46842	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 05/01/14
ADM #17-R	S/N: 44579/46841	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 05/12/14
ADM #18-L	S/N: 44581/46846	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 05/13/14
ADM #19-L	S/N: 44580/46844	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 06/13/14
ADM #19-R	S/N: 44580/46843	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 06/13/14
ADM #20-L	S/N: 44582/46848	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 06/14/14

#01-L, 03-L, 05-L, 07-L, 09-L, 11-L, 13-L, 15-L, 17-L, 19-L Rated Accuracy: > 0.07% fs (0.000175 in wc) Range: 0.0-0.25 in wc Res.: 0.00001
#01-R, 03-R, 05-R, 07-R, 09-R, 11-R, 13-R, 15-R, 17-R, 19-R Rated Accuracy: > 0.06% fs (0.003 in wc) Range: 0.0-5.0 in wc Res.: 0.0001
#02-L, 04-L, 06-L, 08-L, 10-L, 12-L, 14-L, 16-L, 18-L, 20-L Rated Accuracy: > 0.06% fs (0.03 in wc) Range: 0.0-50.0 in wc Res.: 0.001

Shortridge Instruments, Inc. AirData Multimeter Calibration Equipment

The Order Number, Serial Number, and Test Type are referenced on page 1

LOW VELOCITY EQUIVALENT CONFIRMATION STANDARDS

Vel Eqv Transfer Standard S/N: M02009	Model ADM-870C	Mfgd & Calibrated by Shortridge Instruments, Inc	Calibration Date: 12/10/13
Vel Eqv Transfer Standard S/N: M02803	Model ADM-870C	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 01/14/14
Vel Eqv Transfer Standard S/N: M02903	Model ADM-870C	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 12/10/13
Vel Eqv Transfer Standard S/N: M10839	Model ADM-870C	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 12/10/13
Vel Eqv Transfer Standard S/N: M10840	Model ADM-870C	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 12/10/13
Vel Eqv Transfer Standard S/N: M10897	Model ADM-870C	Mfg'd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 01/14/14
Vel Eqv Transfer Standard S/N: M10901	Model ADM-870C	Mfg'd & Calibrated by Shortridge Instruments, inc.	Calibration Date: 12/10/13
Vel Eqv Transfer Standard S/N: M13492	Model ADM-870C	Mfg'd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 08/27/14

Rated Accuracy: Velocity ± 1.5 % ± 3.5 fpm Range: 100-5000 fpm Resolution: 0.1 Uncertainty: <5.00 fpm at 100 fp

TEMPERATURE STANDARDS

RTD Simulator S/N: 249	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 03/08/12
RTD Simulator S/N: 250	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 03/08/12
RTD Simulator S/N: 253	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 03/08/12
RTD Simulator S/N: 254	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 04/18/12
RTD Simulator S/N: 256	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 04/18/12
RTD Simulator S/N: 257	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 04/18/12
RTD Simulator S/N: 292	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 12/19/11
RTD Simulator S/N: 293	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 12/19/11
RTD Simulator S/N: 294	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 12/19/11
RTD Simulator S/N: 313	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 03/13/14
RTD Simulator S/N: 314	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 03/13/14
RTD Simulator S/N: 315	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 03/13/14
RTD Simulator S/N: 316	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 04/21/14
RTD Simulator S/N: 317	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 04/21/14
RTD Simulator S/N: 318	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 04/21/14

Rated Accuracy: 0.025% of setting Range: 100.00 Ω to 11111.10 Ω Resolution: 0.01 Ω

Thermometer #1 S/N: 8A089/Thermistor S/N A410660	Model 1504/5610	Mfgd by Hart Scientific	Calibrated by Fluke	Calibration Date: 01/28/1
Thermometer #2 S/N: 8B104/Thermistor S/N 871507	Model 1504/5610	Mfgd by Hart Scientific	Calibrated by Fluke	Calibration Date: 10/24/1
Thermometer #5 S/N: B11780/Thermistor S/N B10505	Model 1504/5610	Mfgd by Hart Scientific	Calibrated by Fluke	Calibration Date: 11/07/1
Thermometer #6 S/N: B11782/Thermistor S/N B10509	Model 1504/5610	Mfgd by Hart Scientific	Calibrated by Fluke	Calibration Date: 05/31/1

Rated Accuracy(combined): 0.018° F/0.018° F Range: 32° F to 176° F Resolution: 0.001° F Combined Uncertainty wi

Temp Transfer Standard S/N M00136	Model ADM-870	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 10/08/13
Temp Transfer Standard S/N M96100	Model ADM-870	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 03/12/14

Rated Accuracy: 0.03° F Range: 33° F to 158° F Resolution: 0.01° F Uncertainty: < 0.023° F

Total combined Uncertainty for MultiTemp and TemProbe testing : ≤ 0.046° F

This form must remain with the Certificate of Calibration corresponding to the Order Number listed above.

Shortridge Instruments, Inc.
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(480) 991-6744 • Fax (480) 443-1267 • www.shortridge.com

Pitot Thermocouple Verification Sheet

Verification Date: 3/16/2015 Technician: DK	Low Temp (°F)			Medium Temp (°F)			High Temp (°F)		
Reference: Fluke	**Ice Water**			**Boiling Water**			**Hot Oil**		
Pitot Tube I.D.	Reference Temp.	Pitot Temp.	**% Difference**	Reference Temp.	Pitot Temp.	**% Difference**	Reference Temp.	Pitot Temp.	**% Difference**
6ft A	34	34	**0.00%**	212	212	**0.00%**	349	348	**-0.29%**
	34	34	**0.00%**	212	212	**0.00%**	349	348	**-0.29%**
6ft B	34	34	**0.00%**	212	212	**0.00%**	349	348	**-0.29%**
	34	34	**0.00%**	212	211	**-0.47%**	348	346	**-0.58%**

Note: Tolerance is +/- 2%

Appendix B

Sample Calculations

Sample Calculations

Note: Values obtained through sample calculations may deviate from those presented in the report based upon rounding differences.

B.1 Stack Gas Volumetric Flowrate

Moisture Content

$$V_{wc} = K_2 \cdot V_1$$

$$V_{wsg} = K_2 \cdot V_2$$

Where:

V_{wc} = volume of water vapor condensed in impingers at standard conditions (ft^3)
V_{wsg} = volume of water vapor collected in silica gel at standard conditions (ft^3)
V_1 = mass of water collected within impingers (g)
V_2 = mass of water collected by silica gel (g)
K_2 = 0.04715 ft^3/g water

For example, if 8.9 grams of water were condensed in the impingers and 1.6 grams were collected by the silica gel desiccant, the volume of water collected in each section of the sampling train, in ft^3, would be calculated as follows:

$$V_{wc} = \left(0.04715 \frac{ft^3}{g}\right)(8.9g) = 0.419635\ ft^3$$

$$V_{wsg} = \left(0.04715 \frac{ft^3}{g}\right)(1.6\ g) = 0.07544\ ft^3$$

The total volume of water collected = $V_{wc} + V_{wsg}$

= $0.419635\ ft^3 + 0.07544\ ft^3 = 0.495\ ft^3$

Gas Volume Standardization

$$V_{std} = V_m Y_m \left(\frac{T_{std}}{P_{std}}\right)\left(\frac{P_b + \frac{\Delta H}{13.6}}{T_m}\right)$$

Where:

V_{std} = volume of gas sampled at standard conditions (ft^3, standard)
V_m = volume of gas measured by dry gas meter (ft^3)
Y_m = dry-gas meter correction factor (dimensionless)
T_{std} = standard temperature ($528^oR = 460 + 68^oF$)
P_{std} = standard pressure (29.92 in Hg)
P_b = barometric pressure (in Hg)
ΔH = average orifice differential pressure (in H_2O)
T_m = average meter temperature (^oR)

For example, using the following values, the volume of gas sampled, corrected to standard conditions, is calculated:

V_m = volume of gas measured by dry-gas meter = 8.237 ft^3
Y_m = dry-gas meter correction factor (dimensionless) = 0.993
T_{std} = standard temperature ($528^oR = 460 + 68^oF$) = 528 ^oR
P_{std} = standard pressure (in Hg) = 29.92 in Hg
P_b = barometric pressure (in Hg) = 28.8 in Hg
ΔH = average orifice differential pressure (in H_2O) = 0.08 in H_2O
T_m = average meter temperature (^oR) = 506.5 ^oR

$$V_{std} = \left(8.237\ \text{ft}^3\right)\left(0.993\right)\left(\frac{528^\circ\text{R}}{29.92\ \text{in Hg}}\right)\left(\frac{28.8\ \text{in Hg} + \frac{0.08\ \text{in H}_2\text{O}}{13.6\frac{\text{in H}_2\text{O}}{\text{in Hg}}}}{506.5^\circ\text{R}}\right) = 8.209\ \text{ft}^3\text{, standard}$$

Moisture Fraction

$$B_{ws} = \frac{V_{wc} + V_{wsg}}{V_{wc} + V_{wsg} + V_{std}}$$

Where:

B_{ws} = exhaust gas moisture content

For example, using previously calculated values above, the exhaust gas moisture is computed as follows:

$$B_{ws} = \frac{0.495\,\text{ft}^3}{0.495\,\text{ft}^3 + 8.209\,\text{ft}^3} = 0.057 = 5.7\%$$

Absolute Stack Gas Temperature, T_s (^oR)

$$T_s = 460 + t_s$$

Where:

t_s = measured stack gas temperature (^oF)

For example, if the average stack temperature was 1,428°F, then the average absolute stack gas temperature is

$T_s = 460 + 1{,}428 = 1{,}888^oR$

Absolute Stack Gas Pressure, P_s (in Hg)

$$P_s = P_{bar} + \left(\frac{P_{stat}}{13.6}\right)$$

Where:

P_{bar} = barometric pressure at test site (in Hg)
P_{stat} = stack static pressure (in H_2O)
13.6 = specific gravity of mercury (in H_2O/in Hg)

For example, if the barometric and stack static pressures were 28.8 in Hg, and 0.0224 in H_2O, respectively, the absolute stack pressure would be calculated as:

$$P_s = 28.8 + \left(\frac{0.0224}{13.6}\right) = 28.80\ \text{in Hg}$$

Stack Gas Molecular Weight, Dry Basis (lb/lb-mole)

$$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$$

For example, if the average O_2 content of the exhaust gas stream was 16%, the CO_2 content of the gas stream was 4%, and the CO content was assumed to be negligible, the N_2 content is assumed to be the balance of the gas content (i.e. 100 – 16 – 4 = 80%). The dry stack gas molecular weight would be computed as follows:

$$M_d = 0.44(4\%) + 0.32(16\%) + 0.28(80\%) = 29.28\frac{\text{lb}}{\text{lb - mole}}$$

Stack Gas Molecular Weight, Wet Basis (lb/lb-mole)

$$M_s = M_d\left(1 - \frac{B_{ws}}{100}\right) + 18\frac{\text{lb}}{\text{lb - mole}}\left(\frac{B_{ws}}{100}\right)$$

If the average stack gas moisture content was 5.7%, then the wet stack gas molecular weight would be:

$$M_s = 29.28\frac{\text{lb}}{\text{lb - mole}}\left(1 - \frac{5.7}{100}\right) + 18\frac{\text{lb}}{\text{lb - mole}}\left(\frac{5.7}{100}\right) = 28.64\frac{\text{lb}}{\text{lb - mole}}$$

Stack Gas Velocity, V_s (ft/min)

$$V_s = \left(60\frac{\text{sec}}{\text{min}}\right)K_pC_p\left(\sqrt{\Delta P}\right)_{avg}\sqrt{\frac{T_s}{P_sM_s}}$$

Where:

K_p = pitot tube constant equal to 85.49 $\frac{\text{ft}}{\text{sec}}\sqrt{\frac{(\text{lb/lb}-\cdot\text{mole})(\text{inHg})}{(^\circ\text{R})(\text{in}\,H_2O)}}$

C_p = Pitot tube coefficient, dimensionless

$\left(\sqrt{\Delta P}\right)_{avg}$ = average square root of the velocity head of stack gas [$(\text{in } H_2O)^{0.5}$]

M_s = molecular weight of the stack gas, wet basis (lb/lb-mole)

For example, if the average square root of the velocity head of the stack gas was 0.1439 $(\text{in } H_2O)^{0.5}$, and using values already calculated, the average stack gas velocity would be calculated as follows:

$$V_s = \left(60\frac{\text{sec}}{\text{min}}\right)\left(85.49\frac{\text{ft}}{\text{sec}}\sqrt{\frac{(\text{lb/lb-mole})(\text{in Hg})}{(^{\circ}\text{R})(\text{in H}_2\text{O})}}\right)(0.84)$$

$$\times 0.1439\,(\text{in H}_2\text{O})^{0.5}\sqrt{\frac{(1{,}888^{\circ}\text{R})}{(28.8\,\text{in Hg})\left(28.64\frac{\text{lb}}{\text{lb-mole}}\right)}} = 938\frac{\text{ft}}{\text{min}} = 15.6\frac{\text{ft}}{\text{sec}}$$

Average Stack Gas Volumetric Flowrate, Q_s (cfm)

$$Q_s = V_s \cdot A$$

Where:

V_s = stack gas velocity (ft/min)
A = cross-sectional area of stack (ft^2)

For example, if the exhaust stack has a diameter of 25 inches, then the cross-sectional area of the stack would be:

$$\frac{\pi}{4}\left(\frac{25\,\text{in}}{12\frac{\text{in}}{\text{ft}}}\right)^2 = 3.41\,\text{ft}^2$$

If the stack gas velocity was measured to be 938 ft/min, the stack gas volumetric flowrate is:

$$Q_s = \left(938\frac{\text{ft}}{\text{min}}\right)(3.41\text{ft}^2) = 3{,}197\frac{\text{ft}^3}{\text{min}}$$

Standard Stack Gas Volumetric Flowrate, Q_{std} (scfm)

$$Q_{std} = Q_s\left(\frac{528\ {}^oR}{T_s}\right)\left(\frac{P_s}{29.92\,\text{in Hg}}\right)$$

Where:

T_s = absolute stack gas temperature (°R)

P_s = absolute stack gas pressure (in Hg)

For example, to standardize the values calculated above, the standard stack gas volumetric flowrate would be calculated as follows:

$$Q_{std} = 3{,}197\frac{ft^3}{min}\left(\frac{528°R}{1{,}888°R}\right)\left(\frac{28.8\ \text{in Hg}}{29.92\ \text{in Hg}}\right) = 861\frac{ft^3}{min}, \text{standard}$$

Dry Standard Stack Gas Volumetric Flowrate, $Q_{std,dry}$ (dscfm)

$$Q_{std,dry} = Q_{std}\left(1 - B_{ws}\right)$$

The dry standard stack gas volumetric flowrate would be calculated as follows:

$$Q_{std,dry} = 861\frac{ft^3}{min}, \text{standard}\left(1 - 0.057\right) = 812\frac{ft^3}{min}, \text{standard dry}$$

B.2 Pollutant Concentration and Emission Rate

Sample Volume Standardization

$$S_C = S_U\left(\frac{BP - PW}{760}\right)\left(\frac{293}{273 + t}\right)$$

Where:

S_C = Corrected (dry standard) sampling flow rate, L/min

S_U = Uncorrected sampling flow rate, L/min

BP = Barometric pressure at time of sampling, mm Hg

PW = Saturated partial pressure of water vapor, mm Hg at t

t Ambient temperature at time of sampling, °C

For example, if the average of the pre-test and post-test sampling flowrates, the barometric pressure, saturated partial pressure of water vapor, and the ambient temperature were:

S_U = Uncorrected sampling flow rate = 0.2019 L/min

BP = Barometric pressure at time of sampling = 731.52 mm Hg

PW = Saturated partial pressure of water vapor = 8.48 mm Hg

t = Ambient temperature at time of sampling = 8.89 °C

the corrected dry standard liter per minute sampling flowrate would be:

$$S_C = 0.2019\frac{\text{L}}{\text{min}}\left(\frac{731.52\,\text{mm Hg} - 8.48\,\text{mm Hg}}{760\,\text{mm Hg}}\right)\left(\frac{293\,\text{K}}{273 + 8.89^{\circ}\text{C}}\right) = 0.1996\ \frac{\text{dry standard L}}{\text{min}}$$

The sampling volume of a 60-minute test run would be:

$$V_{\text{dry, standard}} = 0.1996\frac{\text{dry standard L}}{\text{min}}\text{X } 60\,\text{min} = 11.98\ \text{dry standard liters}$$

Sample Concentration

The mass of benzene collected in the impingers was calculated based on the volume of water collected and the measured concentration. If 3.4 milliliters of condensate was collected and the concentration of the sample was <1 microgram per liter, the mass of benzene collected in the impingers is:

$$3.4 \text{ mililiters} \times \frac{1 \text{ Liter}}{1{,}000 \text{ millilliter}} \times \frac{< 1.0 \text{ micrograms benzene}}{1 \text{ Liter}} =< 0.0034 \text{ micrograms of benzene}$$

<2 micrograms of benzene was measured from the sorbent tube for the normal train. The stack gas concentration in milligrams per cubic meter was calculated as follows:

$$C_1 = \left(\frac{< 0.0034\ \mu g + < 2\ \mu g}{11.98 \text{ dry standard L}}\right)\left(\frac{1 \text{ mg}}{1{,}000\ \mu g}\right)\left(\frac{1{,}000 \text{ L}}{1 \text{ m}^3}\right) =< 0.17 \frac{\text{mg}}{\text{m}^3} \text{ or} < 0.17 \frac{\text{mg}}{\text{dscm}}$$

Mass per Volume of Spiked Compound Measured

$$m_v = \frac{m_s}{v_s} - \frac{m_u}{v_u}$$

Where:

m_v = mass per volume of spiked compound measured (μg/L).

m_s = total of mass of compound measured on adsorbent with spiked train (μg)

m_u = total mass of compound measured on adsorbent with unspiked normal train (μg)

v_s = volume of stack gas sampled with spiked train (dry standard L)

v_u = volume of stack gas sampled with unspiked normal train (dry standard L)

If 35 μg was detected on the spiked sorbent media when 11.96 dry standard liters of gas were sampled. <2.0 μg were detected on the unspiked normal train sorbent media, where 11.98 dry standard liters of gas were sampled.

$$m_v = \frac{35\ \mu g}{11.96 \text{ L}} - \frac{< 2.0\ \mu g}{11.98 \text{ L}} = 2.76 \frac{\mu g}{\text{L}}$$

Fraction of Spike Compound Recovered

$$R = \frac{(m_v)(v_s)}{S}$$

Where:

R = average fraction recovered.

m_v = mass per volume of spiked compound measured (µg/L).

v_s = volume of stack gas sampled with spiked train (L).

S = mass of compound spiked into adsorbent in spiked train (µg)

For example, using values already calculated where the mass per volume of spiked compound measured was 2.76 µg/L, the volume of gas sampled for the spiked train was 11.96 dry standard liters, and the average benzene spike mass measured from the spike blank sorbent tubes, was 29.5 µg, R is calculated as follows:

$$R = \frac{2.76 \frac{\mu g}{L} \times 11.96\,L}{29.5\,\mu g} = 1.12$$

Correction of Concentration for Spike Recovery

The benzene mass measured on the unspiked sorbent tubes was corrected for spike recovery. If the benzene concentration was <0.17 mg/dscm. Dividing the concentration by the spike recovery corrects the field measurements:

$$C_{1corr} = \frac{< 0.17 \frac{mg}{dscm}}{1.19} =< 0.15 \frac{mg}{dscm}$$

Corrected Concentration as ppmvd

$$C_1 = C\left(\frac{24.04}{MW}\right)$$

Where:

C = concentration as mg/dscm

C_1 = concentration as ppmvd

MW = molecular weight as gram/mole

24.04 = ideal gas molar volume at standard temperature (68°F) and pressure (29.92 in Hg)

Using the equation above, the concentration of benzene in ppmvd is:

$$C_1 =< 0.15\frac{\text{mg}}{\text{m}^3}\left(\frac{24.04\frac{\text{L}}{\text{mole}}}{78.11\frac{\text{g}}{\text{mole}}}\right)\frac{1\text{g}}{1{,}000\text{ mg}}\frac{1\text{ m}^3}{1{,}000\text{ L}}(10^6) =< 0.046\text{ ppmvd}$$

Corrected Emission Rate

The standardized exhaust gas flowrate for the respective run was 812 dscfm. The mass emission rate of benzene in pounds per hour was calculated as follows:

$$\left(< 0.15\frac{\text{mg}}{\text{m}^3}\right)\left(812\frac{\text{ft}^3}{\text{min}}\right)\left(\frac{1\text{ m}^3}{35.31\text{ ft}^3}\right)\left(\frac{1\text{ g}}{1{,}000\text{ mg}}\right)\left(\frac{1\text{ lb}}{453.59\text{ g}}\right)\left(60\frac{\text{min}}{\text{hr}}\right) =< 0.00045\frac{\text{lb}}{\text{hr}}$$

The mass emission rates for toluene, ethylbenzene, and total xylenes was measured as <0.00095, <0.00098, and <0.0020 pounds per hour. The total BTEX mass emission rate is:

$$\left(\frac{< 0.00045\text{ lb Benzene}}{\text{hr}}\right)+\left(\frac{< 0.00095\text{ lb Toluene}}{\text{hr}}\right)+\left(\frac{< 0.00098\text{ lb Ethylbenzene}}{\text{hr}}\right)+\left(\frac{< 0.0020\text{ lb Xylenes}}{\text{hr}}\right) =< 0.0043\frac{\text{lb BTEX}}{\text{hr}}$$

Mass Emission Rate (Mg/yr)

For example, from the previous calculation the BTEX mass emission rate is <0.0043 lb BTEX/hr and the estimated operating hours of 3,624 based on a withdrawal season beginning November 1, 2014 and ending March 31, 2015, the mass emission rate in megagrams per hour is:

$$\text{Emission Rate} = \left(\frac{< 0.0043\text{ lb BTEX}}{\text{hr}}\right)\times\left(\frac{3{,}624\text{ hr}}{\text{year}}\right)\times\left(\frac{\text{kg}}{2.20462\text{ lb}}\right)\times\left(\frac{1\text{ Mg}}{1{,}000\text{ kg}}\right) =< 0.0071\frac{\text{Mg}}{\text{year}}$$

Appendix C

Field Data Sheets

USEPA Method 1
Sampling and Velocity Traverse Point Determination

Plant Name: BLUE LAKE
City, State: MOWCHAUA MI
Sampling Location: TO EXHAUST

Number of Ports Available: 1
Number of Ports Used: 1
Port Inside Diameter: 2

Distance from Far Wall to Outside of Port: 23
Nipple Length and/or Wall Thickness: 3
Depth of Stack or Duct: 20
Stack or Duct Width (if Rectangular): ——

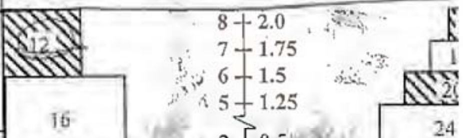
Equivalent Diameter:
~~$D_E = \frac{2 \times \text{depth} \times \text{width}}{\text{depth} + \text{width}} = \frac{2 \times (\quad) \times (\quad)}{(\quad) + (\quad)} =$~~ ______

Distance from Ports to Flow Disturbances:	Upstream	Downstream
	25' 4"	55 INCH
Diameters:	15.2	2.8

Stack/Duct Area= $\pi(10)^2$ = 314 in^2
(must be > 113 in^2)

Draw horizontal line through diameters
If more than 8 and 2 diameters and if duct diameter is 12 - 24 in, use 8 or 9 points

[✓ Velocity] Particulate



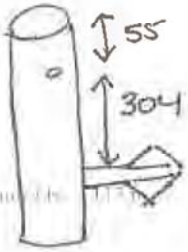
Point	% of Duct Depth	Distance From Inside Wall	Distance Outside Port
1	4.4	0.88	3.9
2	14.6	2.9	5.9
3	29.6	5.9	8.9
4	70.4	14.1	17.1
5	85.4	17.1	20.1
6	95.6	19.1	22.1
7			
8			
9			
10			
11			
12			

Location of Points in Circular Stacks or Ducts

	4	6	8	10	12
1	6 7	4.4	3 2	2.6	2.1
2	25 0	14 6	10.5	8 2	6 7
3	75.0	29 6	19.4	14 6	11 8
4	93.3	70 4	32.3	22 6	17 7
5		85.4	67.7	34 2	25 0
6		95.6	80.6	65 8	35 6
7			89 5	77 4	64 4
8			96 8	85 4	75 0
9				91 8	82 3
10				97 4	88 2
11					93 3
12					97 9

Location of Points in Rectangular Stacks or Ducts

	3	4	5
1	16.7	12.5	10.0
2	50.0	37.5	30.0
3	83.3	62.5	50.0
4		87.5	70.0
5			90.0



Do not place points closer to stack walls thar
1.0 in for stack diameter > 24 in
0.5 in for stack diameter 12 to < 24 in

For rectangular stacks, use only the followin matrices:

No Pts	Matrix
9	3 x 3
12	4 x 3
16	4 x 4
25	5 x 5

Checked for completeness: TS
Checked by (signature):

Run 1

Date 02 | 11 | 20
Time 925

USEPA Method 2
Gas Velocity Traverse and Volumetric Flowrate

Facility TRANSCANADA - BLUE LAKE
Operators

Sampling Location TO EXHAUST
Pitot Tube 6

Stack Diameter, in 20 Area, ft^2 2.1
Pitot Tube Factor, C_p 0.

Stack Dimension, in — Port Length, in 3
Cyclonic Flow Check

Gas Temperature, °F WB —
P_{bar}, Bar. Press., in Hg 28

Gas Temperature, °F DB 1289
P_{stat}, Static Press., in H_2O +0

% CO_2 4 % CO 0
% Moisture, v/v ~

% O_2 17 % N_2 79
Molecular Weight, M_d 2

Pre-Test Pitot Leak Rate ______ in H_2O for 1 min at ______ in H_2O
Molecular Weight, M_s 2

Post-Test Pitot Leak Rate ELECTRONIC in H_2O for 1 min at ______ in H_2O

Port	Traverse Point	Velocity Head Difference (ΔP) (in H_2O)	Stack Temperature °F	$(\Delta P)^{0.5}$ $(in\ H_2O)^{0.5}$	Null Angle (zero ΔP angle)	Cosine Null Angle ($\cos\theta_{y(i)}$)	V of S V_s
NE	6	0.0208	1289		0		
	5	0.0208	1289		0		
	4	0.0296	1289		0		
	3	0.0263	1289		0		
	2	0.0150	1289		0		
	1	0.0096	1289		0		
Average							

Comments

P_s		in H
V_s		ft/mi
Q_s		cfm
Q_{std}		scfm
Q		dscf

BUREAU VERITAS FIELD SHEET
USEPA METHOD 18

Site Name: TransCanada – BLUE LAKE City: Ma
State: Michi

Source Name: Glycol Dehydration Unit Exhaust

Description of Location Sampled (include description of all control devices, quenches, air inlets, etc.):
Natural gas glycol dehydration unit emissions controlled by condenser and thermal ox

Run Number: 1 NORMAL Start Time: 10:05 Date: 2/11/
Stop Time: 11:05

Measurement System Flow Rates (target is 0.200 LPM)

Average 3 flow measurements below for Pre-Sample Flow (SF) = 0.2026 LPM

1. 0.2046	2. 0.2038	3. 0.1993

Average 3 flow measurements below for Post-Sample Flow (SF) = 0.1892 LPM

1. 0.1899	2. 0.1888	3. 0.1887

Average Sample Flow Rate 0.1959 LPM

Temperature and Barometric Pressure Measurements

Ambient Temperature at Start of Run:	57	°F	Time Recorded:	10:
Ambient Temperature at End of Run:	61	°F	Time Recorded:	11:
Barometric Pressure at Start of Run:	28.4	in. Hg	Time Recorded:	10:
Barometric Pressure at End of Run:	28.4	in. Hg	Time Recorded:	11:
Temperature Heated Line at Start of Run:	302	°F	Time Recorded:	10:
Temperature Heated Line at End of Run:	299	°F	Time Recorded:	11:

Rotameter Readings (Set point is 1.2 to 1.7 LPM) Comments

2.0 Time: 10:05 Flow: 2.0
Time: 10:15 Flow: 2.0
Time: 10:25 Flow: 2.0
Time: 10:35 Flow: 2.0
Time: 10:45 Flow: 2.0
Time: 10:55 Flow: 2.0

Impinger Measurements

Pre-test mass (g)	Imp. 1 (10 ml water) 103.6	Imp. 2 (empty) 98
Post-test mass (g)	Imp. 1 104.5	Imp. 2 9
Difference (g)	Imp. 1 0.9	Imp. 2 0.

10:05

BUREAU VERITAS FIELD SHEET
USEPA METHOD 18

Site Name: TransCanada - BLUE LAKE
City: MA
State: Michi

Source Name: Glycol Dehydration Unit Exhaust

Description of Location Sampled (include description of all control devices, quenches, air inlets, etc.):
Natural gas glycol dehydration unit emissions controlled by condenser and thermal ox

Run Number: 1 SPIKE
Start Time: 10:05
Stop Time: 11:05
Date: 2/11,

Measurement System Flow Rates (target is 0.200 LPM)

Average 3 flow measurements below for Pre-Sample Flow (SF) = 0.2042 LPM

1. 0.2030 | 2. 0.2045 | 3. 0.2050

Average 3 flow measurements below for Post-Sample Flow (SF) = 0.2025 LPM

1. 0.2047 | 2. 0.2015 | 3. 0.2011

Average Sample Flow Rate: 0.20335 LPM

Temperature and Barometric Pressure Measurements

Ambient Temperature at Start of Run: 57 °F — Time Recorded: 10:
Ambient Temperature at End of Run: 61 °F — Time Recorded: 11:
Barometric Pressure at Start of Run: 28.4 in. Hg — Time Recorded: 10:
Barometric Pressure at End of Run: 28.4 in. Hg — Time Recorded: 11:
Temperature Heated Line at Start of Run: 302 °F — Time Recorded: 10:
Temperature Heated Line at End of Run: 299 °F — Time Recorded: 11:

Rotameter Readings (Set point is 1.2 to 1.7 LPM)

Comments

1.5 Time: 10:05 Flow: 1.5
Time: 10:15 Flow: 1.5
Time: 10:25 Flow: 1.5
Time: 10:35 Flow: 1.5
Time: 10:45 Flow: 1.5
Time: 10:55 Flow: 1.5

Impinger Measurements

Pre-test mass (g)	Imp. 1 (10 ml water) 111.6	Imp. 2 (empty) 103
Post-test mass (g)	Imp. 1 113.2	Imp. 2 104
Difference (g)	Imp. 1 1.6	Imp. 2 0.

Run

1

Date: (

Time:

Field Data Sheet
Moisture Content (Reference)

Source ID: BLUE LAKE

Company: TRANS CANADA

Test Location: TO EXHAUST

Meter Yd: 0.993

Meter H@: 1.80

Pre-test Leak Rate: 0.000 CFM @ 4 in Hg

Post-test Leak Rate: 0.000 CFM @ 4 in Hg

Project #: 11015 - OO

City/State: MANCELONA,

Personnel: NICK TOK

Meter ID: 2

Barometric: 28.4

Traverse Point	Sample Time	Vacuum (in Hg)	Delta H (in H_2O)	Meter Volume (ft^3)	Dum Meter Temperature Inlet (F)	Outlet (
1	0	1	0,09	625.045	56	55
	10	1	0.08	627.210	57	56
	20	1	0.08	628.401	58	57
	30	1	0.07	629.601	59	58
	40	1	0.07	630.802	60	59
	50	1	0.07	632.002	60	59
	60	1	0.07	633.202	60	59
Averages:						

Analytical Data					
	Impinger Gain (g or ml)				Silic
Final	V_f	110.2	108.6		W_f
Initial	V_i	109.0	108.7		W_i
Difference		1.2	-0.1		

$V_{wc(std)} = 0.04707$ ft³/ml of H_2O $(V_f - V_i)$ $V_{wsg(std)} = 0.04715$ ft³/g of H_2O $(W_f -$

$$V_{m(std)} = 17.64\ Y \frac{V_m\ P_m}{(T_m + 460)}$$

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

Run

2

Date 02/11/2
Time 1225

USEPA Method 2
Gas Velocity Traverse and Volumetric Flowrate

Facility TRANSCANADA — BLUE LAKE **Operators**

Sampling Location TO EXHAUST **Pitot Tube** 6

Stack Diameter, in 20 **Area, ft²** 2.2 **Pitot Tube Factor, C_p** 0

Stack Dimension, in — **Port Length, in** 3 **Cyclonic Flow Check**

Gas Temperature, °F WB — **P_{bar}, Bar. Press., in Hg** 2

Gas Temperature, °F DB 1421 **P_{stat}, Static Press., in H_2O** +

% CO_2 4 **% CO** 0 **% Moisture, v/v** ~

% O_2 17 **% N_2** 79 **Molecular Weight, M_d** 2

Pre-Test Pitot Leak Rate ______ in H_2O for 1 min at ______ in H_2O **Molecular Weight, M_s** 2

Post-Test Pitot Leak Rate ELECTRONIC in ~~H_2O~~ for 1 min at ______ in H_2O

Port	Traverse Point	Velocity Head Difference (ΔP) (in H_2O)	Stack Temperature °F	$(\Delta P)^{0.5}$ (in $H_2O)^{0.5}$	Null Angle (zero ΔP angle)	Cosine Null Angle ($\cos \theta_{y(i)}$)	of V
NE	6	0.0166	1421				
	5	0.0178	1421				
	4	0.0200	1421				
	3	0.0206	1421				
	2	0.0147	1421				
	1	0.0121	1421				
Average							

Comments

P_s		in H
V_s		ft/mi
Q_s		cfm
Q_{std}		scfm
Q		dscf

BUREAU VERITAS FIELD SHEET
USEPA METHOD 18

Site Name: TransCanada - BLUE LAKE

City: MAN

State: Michi

Source Name: Glycol Dehydration Unit Exhaust

Description of Location Sampled (include description of all control devices, quenches, air inlets, etc.): Natural gas glycol dehydration unit emissions controlled by condenser and thermal ox

Run Number: 2 NORMAL Start Time: 11:15 Stop Time: 12:15 Date: 2/

Measurement System Flow Rates (target is 0.200 LPM)

Average 3 flow measurements below for Pre-Sample Flow (SF) = 0.2002 LPM

1. 0.2001 | 2. 0.2000 | 3. 0.2004

Average 3 flow measurements below for Post-Sample Flow (SF) = 0.1956 LPM

1. 0.1975 | 2. 0.1949 | 3. 0.1944

Average Sample Flow Rate 0.1979 LPM

Temperature and Barometric Pressure Measurements

Ambient Temperature at Start of Run: 62 °F Time Recorded: 11:

Ambient Temperature at End of Run: 64 °F Time Recorded: 12

Barometric Pressure at Start of Run: 28.4" in. Hg Time Recorded: 11:

Barometric Pressure at End of Run: 28.4 in. Hg Time Recorded: 12.

Temperature Heated Line at Start of Run: 300 °F Time Recorded: 11:1

Temperature Heated Line at End of Run: 300 °F Time Recorded: 12:

Rotameter Readings (Set point is 1.2 to 1.7 LPM) Comments

Time: 11:16 Flow: 1.5

Time: 11:25 Flow: 1.5

Time: 11:35 Flow: 1.5

Time: 11:45 Flow: 1.5

Time: 11:55 Flow: 1.5

Time: 12:05 Flow: 1.5

Impinger Measurements

Pre-test mass (g)	Imp. 1 (10 ml water) 112.0	Imp. 2 (empty) 97.
Post-test mass (g)	Imp. 1 113.6	Imp. 2 97.
Difference (g)	Imp. 1 1.6	Imp. 2 0.

BUREAU VERITAS FIELD SHEET
USEPA METHOD 18

Site Name: TransCanada - BLUE LAKE

City: MAR

State: Michi

Source Name: Glycol Dehydration Unit Exhaust

Description of Location Sampled (include description of all control devices, quenches, air inlets, etc.):
Natural gas glycol dehydration unit emissions controlled by condenser and thermal ox

Run Number: 2 SPIKE

Start Time: 11:15

Stop Time: 12:15

Date: 2/1

Measurement System Flow Rates (target is 0.200 LPM)

Average 3 flow measurements below for Pre-Sample Flow (SF) = 0.2025 LPM

1. 0.2021	2. 0.2026	3. 0.2027

Average 3 flow measurements below for Post-Sample Flow (SF) = 0.1886 LPM

1. 0.1909	2. 0.1867	3. 0.1881

Average Sample Flow Rate 0.19555 LPM

Temperature and Barometric Pressure Measurements

Ambient Temperature at Start of Run:	62	°F	Time Recorded:	11:
Ambient Temperature at End of Run:	64	°F	Time Recorded:	12.
Barometric Pressure at Start of Run:	28.4	in. Hg	Time Recorded:	11:
Barometric Pressure at End of Run:	28.4	in. Hg	Time Recorded:	12
Temperature Heated Line at Start of Run:	300	°F	Time Recorded:	11:
Temperature Heated Line at End of Run:	300	°F	Time Recorded:	12:

Rotameter Readings (Set point is 1.2 to 1.7 LPM)		Comments
Time: 11:15	Flow: 1.2	
Time: 11:25	Flow: 1.2	
Time: 11:35	Flow: 1.2	
Time: 11:45	Flow: 1.2	
Time: 11:55	Flow: 1.2	
Time: 12:05	Flow: 1.2	

Impinger Measurements

Pre-test mass (g)	Imp. 1 (10 ml water)	113.4	Imp. 2 (empty)	97
Post-test mass (g)	Imp. 1	114.4	Imp. 2	98
Difference (g)	Imp. 1	1.0	Imp. 2	0

11:15

Run

2

Date:

Time:

Field Data Sheet
Moisture Content (Reference)

Source ID: BLUE LAKE

Company: TRANSCANADA

Test Location: TO EXHAUST

Meter Yd: 0.993

Meter H@: 1.80

Pre-test Leak Rate: 0.000 CFM @ 5 in Hg

Post-test Leak Rate: 0.000 CFM @ 5 in Hg

Project #: 11015 - 00000

City/State: MAUCELON

Personnel: NICK T.

Meter ID: 2

Barometric: 28.4

Traverse Point	Sample Time	Vacuum (in Hg)	Delta H (in H_2O)	Meter Volume (ft^3)	Meter Temperature	
					Inlet (F)	Outlet (
1	0	1	0.08	633.400	62	61
	10	1	0.08	634.904	62	61
	20	1	0.08	636.104	62	62
	30	1	0.08	637.406	63	63
	40	1	0.08	638.704	63	63
	50	1	0.08	640.101	64	68
	60	1	0.07	641.209	64	64
Averages:						

Analytical Data					
	Impinger Gain (g or ml)				Silic
Final	V_f	120.4	118.0		W_f
Initial	V_i	110.2	108.6		W_i
Difference		10.2	9.4		

$V_{wc(std)} = 0.04707\ ft^3/ml\ of\ H_2O\ (V_f - V_i)$

$V_{wsg(std)} = 0.04715\ ft^3/g\ of\ H_2O\ (W_f -$

$$V_{m(std)} = 17.64\ Y \frac{V_m P_m}{(T_m + 460)}$$

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

Run

3

Date 02/14/2
Time 1235

USEPA Method 2
Gas Velocity Traverse and Volumetric Flowrate

Facility TRANSCANADA - BLUE LAKE
Operators T

Sampling Location TO EXHAUST
Pitot Tube 6

Stack Diameter, in 20 **Area, ft^2** 2.2
Pitot Tube Factor, C_p 0

Stack Dimension, in — **Port Length, in** 3
Cyclonic Flow Check

Gas Temperature, °F WB —
P_{bar}, Bar. Press., in Hg 28

Gas Temperature, °F DB 1442
P_{stat}, Static Press., in H_2O +0

% CO_2 4 **% CO** 0
% Moisture, v/v ~3

% O_2 17 **% N_2** 79
Molecular Weight, M_d 29

Pre-Test Pitot Leak Rate ELECTRONIC in H_2O for 1 min at ______ in H_2O
Molecular Weight, M_s 2

Post-Test Pitot Leak Rate in H_2O for 1 min at ______ in H_2O

Port	Traverse Point	Velocity Head Difference (ΔP) (in H_2O)	Stack Temperature (°F)	$(\Delta P)^{0.5}$ $(in\ H_2O)^{0.5}$	Null Angle (zero ΔP angle)	Cosine Null Angle ($\cos \theta_{y(i)}$)	of V
NE	6	0.0192	1442				
	5	0.0216	1442				
	4	0.0290	1442				
	3	0.0249	1442				
	2	0.0156	1442				
	1	0.0129	1442				
Average							

Comments

P_s		in H
V_s		ft/m
Q_s		cfm
Q_{std}		scfm
Q		dscf

BUREAU VERITAS FIELD SHEET
USEPA METHOD 18

Site Name: TransCanada

City: Mauc

State: Michi

Source Name: Glycol Dehydration Unit Exhaust

Description of Location Sampled (include description of all control devices, quenches, air inlets, etc.): Natural gas glycol dehydration unit emissions controlled by condenser and thermal ox

Run Number: 3 NORMAL

Start Time: 12:25

Stop Time: 13:25

Date: 2/1

Measurement System Flow Rates (target is 0.200 LPM)

Average 3 flow measurements below for Pre-Sample Flow (SF) = 0.2001 LPM

1. 0.2013 2. 0.1996 3. 0.1997

Average 3 flow measurements below for Post-Sample Flow (SF) = 0.1992 LPM

1. 0.2037 2. 0.1962 3. 0.1975

Average Sample Flow Rate 0.1997 LPM

Temperature and Barometric Pressure Measurements

Ambient Temperature at Start of Run:	64	°F	Time Recorded:	12
Ambient Temperature at End of Run:	61	°F	Time Recorded:	13
Barometric Pressure at Start of Run:	28.4	in. Hg	Time Recorded:	12
Barometric Pressure at End of Run:	28.4	in. Hg	Time Recorded:	13
Temperature Heated Line at Start of Run:	300	°F	Time Recorded:	12
Temperature Heated Line at End of Run:	299	°F	Time Recorded:	13

Rotameter Readings (Set point is 1.2 to 1.7 LPM)

Comments

Time: 12:25	Flow: 1.5
Time: 12:35	Flow: 1.5
Time: 12:45	Flow: 1.5
Time: 12:55	Flow: 1.5
Time: 13:05	Flow: 1.5
Time: 13.15	Flow: 1.5

Impinger Measurements

Pre-test mass (g)	Imp. 1 (10 ml water)	102.0	Imp. 2 (empty)	9
Post-test mass (g)	Imp. 1	103.2	Imp. 2	9
Difference (g)	Imp. 1	1.2	Imp. 2	-0

12:25

BUREAU VERITAS FIELD SHEET
USEPA METHOD 18

Site Name: TransCanada

City: MANC

State: Michi

Source Name: Glycol Dehydration Unit Exhaust

Description of Location Sampled (include description of all control devices, quenches, air inlets, etc.):
Natural gas glycol dehydration unit emissions controlled by condenser and thermal ox

Run Number: 3 Spike

Start Time: 12:25

Stop Time: 13:25

Date: 2/11

Measurement System Flow Rates (target is 0.200 LPM)

Average 3 flow measurements below for Pre-Sample Flow (SF) = 0.2068 LPM

1. 0.2067 | 2. 0.2067 | 3. 0.2068

Average 3 flow measurements below for Post-Sample Flow (SF) = 0.2017 LPM

1. 0.2040 | 2. 0.1998 | 3. 0.2011

Average Sample Flow Rate 0.2043 LPM

Temperature and Barometric Pressure Measurements

Ambient Temperature at Start of Run: 64 °F Time Recorded: 12:

Ambient Temperature at End of Run: 61 °F Time Recorded: 13

Barometric Pressure at Start of Run: 28.4 in. Hg Time Recorded: 12:

Barometric Pressure at End of Run: 28.4 in. Hg Time Recorded: 13

Temperature Heated Line at Start of Run: 300 °F Time Recorded: 12:

Temperature Heated Line at End of Run: 299 °F Time Recorded: 13

Rotameter Readings (Set point is 1.2 to 1.7 LPM)

Comments

Time: 12:25 Flow: 1.5
Time: 12:35 Flow: 1.5
Time: 12:45 Flow: 1.5
Time: 12:55 Flow: 1.5
Time: 13:05 Flow: 1.5
Time: 13:15 Flow: 1.5

Impinger Measurements

Pre-test mass (g)	Imp. 1 (10 ml water)	111.6	Imp. 2 (empty)	104
Post-test mass (g)	Imp. 1	114.0	Imp. 2	104
Difference (g)	Imp. 1	2.4	Imp. 2	0.

Temperature Heated Line at Start of Run

Run

3

Date:

Time:

Field Data Sheet
Moisture Content (Reference)

Source ID: BLUE LAKE

Company: TRANS CANADA

Test Location: TO EXHAUST

Meter Yd: 0.993

Meter H@: 1.80

Pre-test Leak Rate: 0.000 CFM @ 5 in Hg

Post-test Leak Rate: 0.000 CFM @ 5 in Hg

Project #: 11015 -000

City/State: MANCELONA,

Personnel: NICK TOKA

Meter ID: 2

Barometric: 28.4

Traverse Point	Sample Time	Vacuum (in Hg)	Delta H (in H_2O)	Meter Volume (ft^3)	Meter Temperature Inlet (F)	Outlet (
1	0	~~0.08~~ NT 1	0.08	641.315	64	64
	10	1	0.08	642.809	63	63
	20	1	0.08	643.905	62	63
	30	1	0.09	645.415	61	62
	40	1	0.08	646.997	60	61
	50	1	0.08	648.008	61	61
	60	1	0.08	649.315	61	61
Averages:						

Analytical Data					
	Impinger Gain (g or ml)				Silic
Final	Vf	113.8	108.9		Wf
Initial	Vi	111.3	110.0		Wi
Difference		2.5	-1.1		

$V_{wc(std)} = 0.04707$ ft³/ml of H_2O $(V_f - V_i)$

$V_{wsg(std)} = 0.04715$ ft³/g of H_2O $(W_f -$

$$V_{m(std)} = 17.64\ Y \frac{V_m P_m}{(T_m + 460)}$$

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

USEPA Method 1
Sampling and Velocity Traverse Point Determination

Plant Name: [illegible]
City, State: [illegible], MI
Sampling Location: TO EXHAUST

Number of Ports Available: 2
Number of Ports Used: 2
Port Inside Diameter: 2 in

Distance from Far Wall to Outside of Port: 31
Nipple Length and/or Wall Thickness: 6 (4 + 2 ws
Depth of Stack or Duct: 25 in
Stack or Duct Width (if Rectangular): —

Equivalent Diameter:
$D_E = \frac{2 \times \text{depth} \times \text{width}}{\text{depth} + \text{width}} = \frac{2 \times (\quad) \times (\quad)}{(\quad) + (\quad)} =$ ______

Distance from Ports to Flow Disturbances:	**Upstream**	**Downstream**
	24' 3" 291	37 in
Diameters:	11.6	~~1.48~~ 1.5

Stack/Duct Area = $\pi(12.5)^2$ = 492.2 in^2
(must be > 113 in^2)

Draw horizontal line through diameters
If more than 8 and 2 diameters and if duct diameter is 12 - 24 in, use 8 or 9 points

[✓ **Velocity**] **Particulate**

Diameters
Up Down
8 + 2.0
12 7 + 1.75
~~6 + 1.5~~
16 5 + 1.25
2 + 0.5
24

Point	% of Duct Depth	Distance From Inside Wall	Distance Outsid Port
1	4.4	1.1	7.1
2	14.6	3.7	9.7
3	29.6	7.4	13.4
4	70.4	17.6	23.6
5	85.4	21.4	27.4
6	95.6	23.9	29.9
7			
8			
9			
10			
11			
12			

Location of Points in Circular Stacks or Ducts

	4	6	8	10	12
1	6 7	4 4	3.2	2 6	2 1
2	25.0	14 6	10.5	8 2	6 7
3	75.0	29.6	19 4	14 6	11.8
4	93 3	70 4	32.3	22 6	17 7
5		85.4	67.7	34 2	25 0
6		95.6	80 6	65 8	35 6
7			89 5	77 4	64 4
8			96.8	85.4	75.0
9				91.8	82.3
10				97.4	88.2
11					93.3
12					97.9

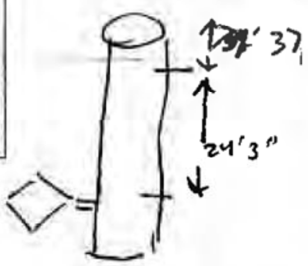
Location of Points in Rectangular Stacks or Ducts

	3	4	5
1	16.7	12.5	10.0
2	50.0	37.5	30.0
3	83.3	62.5	50.0
4		87.5	70.0
5			90.0

Do ~~not place points closer to stack walls than~~
1.0 in for stack diameter > 24 in
~~0.5 in for stack diameter 12 to < 24 in~~

For rectangular stacks, use only the following matrices:

No. Pts	Matrix
9	3 x 3
12	4 x 3
16	4 x 4
25	5 x 5



PORT IS 4 IN
W/-2 INCH INSULATION
IN STACK

Checked for completeness: B
Checked by (signature):

Run 1

Date 02/12/
Time 9:10

USEPA Method 2
Gas Velocity Traverse and Volumetric Flowrate

Facility COLD SPRINGS 1

Operators

Sampling Location TO EXHAUST

Pitot Tube 6

Stack Diameter, in 25 Area, ft² 3.4

Pitot Tube Factor, C_p 0

Stack Dimension, in — Port Length, in ~6

Cyclonic Flow Check

Gas Temperature, °F WB ~~1410~~

P_{bar}, Bar. Press., in Hg 2

Gas Temperature, °F DB 1410

P_{stat}, Static Press., in H_2O

% CO_2 4 % CO 0

% Moisture, v/v 3

% O_2 16 % N_2 80

Molecular Weight, M_d 2

Pre-Test Pitot Leak Rate ____ in H_2O for 1 min at ____ in H_2O

Molecular Weight, M_s 2

Post-Test Pitot Leak Rate BLBC[illegible] in H_2O for 1 min at ____ in H_2O

Port	Traverse Point	Velocity Head Difference (ΔP) (in H_2O)	Stack Temperature (°F)	$(\Delta P)^{0.5}$ $(in\ H_2O)^{0.5}$	Null Angle (zero ΔP angle)	Cosine Null Angle ($\cos\theta_{y(i)}$)	of V
NW	6	0.0320	1410		0		
	5	0.0342	1410		0		
	4	0.0284	1410		0		
	3	0.028	1410		0		
	2	0.051	1410		0		
	1	0.0106	1410		0		
NE	6	0.0291	1410		0		
	5	0.0360	1410		0		
	4	0.0267	1410		0		
	3	0.0235	1410		0		
	2	0.0225	1410		0		
	1	0.0147	1410		0		
Average							

Comments

P_s		in Hg
V_s		ft/min
Q_s		cfm
Q_{std}		scfm
Q		dscfm

BUREAU VERITAS FIELD SHEET
USEPA METHOD 18

Site Name: TransCanada City: MA

COLD SPRINGS 1 State: Mich

Source Name: Glycol Dehydration Unit Exhaust

Description of Location Sampled (include description of all control devices, quenches, air inlets, etc.)
Natural gas glycol dehydration unit emissions controlled by condenser and thermal o

Run Number: 1 NORMAL Start Time: 9:00 Date: 02/
Stop Time: 10:00

Measurement System Flow Rates (target is 0.200 LPM)

Average 3 flow measurements below for Pre-Sample Flow (SF) = 0.1999 LPM

1. 0.2002 | 2. 0.2003 | 3. 0.1991

Average 3 flow measurements below for Post-Sample Flow (SF) = 0.2356 LPM

1. 0.2360 | 2. 0.2362 | 3. 0.2346

Average Sample Flow Rate 0.2178 LPM

Temperature and Barometric Pressure Measurements

Ambient Temperature at Start of Run: 25 °F Time Recorded: 9
Ambient Temperature at End of Run: 35 °F Time Recorded: 10
Barometric Pressure at Start of Run: 28.9 in. Hg Time Recorded: 9
Barometric Pressure at End of Run: 28.5 in. Hg Time Recorded: 10
Temperature Heated Line at Start of Run: 300 °F Time Recorded: 9
Temperature Heated Line at End of Run: 315 °F Time Recorded: 10

Rotameter Readings (Set point is 1.2 to 1.7 LPM) Comments

Time: 7:00 Flow: [illegible]NT 1.5
Time: 7:10 Flow: 1.5
Time: 9:20 Flow: 1.5
Time: 9:30 Flow: 1.5
Time: 9:40 Flow: 1.5
Time: 9:50 Flow: 1.5

Impinger Measurements

Pre-test mass (g)	Imp. 1 (10 ml water) 106.1	Imp. 2 (empty) 9
Post-test mass (g)	Imp. 1 111.2	Imp. 2 10
Difference (g)	Imp. 1 5.1	Imp. 2 4

BUREAU VERITAS FIELD SHEET
USEPA METHOD 18

Site Name: TransCanada
COLD SPRINGS 1
City: MA
State: Mich
Source Name: Glycol Dehydration Unit Exhaust
Description of Location Sampled (include description of all control devices, quenches, air inlets, etc.)
Natural gas glycol dehydration unit emissions controlled by condenser and thermal ox

Run Number: 1 Spike
Start Time: 9:00
Stop Time: 10:00
Date: 02/

Measurement System Flow Rates (target is 0.200 LPM)

Average 3 flow measurements below for Pre-Sample Flow (SF) = 0.2032 LPM

1. 0.2037	2. 0.2031	3. 0.2028

Average 3 flow measurements below for Post-Sample Flow (SF) = 0.2034 LPM

1. 0.2031	2. 0.2035	3. 0.2034

Average Sample Flow Rate 0.2033 LPM

Temperature and Barometric Pressure Measurements

Ambient Temperature at Start of Run:	28	°F	Time Recorded:	9
Ambient Temperature at End of Run:	35	°F	Time Recorded:	10
Barometric Pressure at Start of Run:	28.8	in. Hg	Time Recorded:	9:
Barometric Pressure at End of Run:	28.6	in. Hg	Time Recorded:	10:
Temperature Heated Line at Start of Run:	300	°F	Time Recorded:	9:
Temperature Heated Line at End of Run:	375	°F	Time Recorded:	10

Rotameter Readings (Set point is 1.2 to 1.7 LPM)

Comments

Time: 7:00	Flow: ~~1.~~ NT 1.4
Time: 9:10	Flow: 1.4
Time: 9:20	Flow: 1.4
Time: 9:30	Flow: 1.4
Time: 9:40	Flow: 1.4
Time: 9:50	Flow: 1.4

Impinger Measurements

Pre-test mass (g)	Imp. 1 (10 ml water)	99.2	Imp. 2 (empty)	90
Post-test mass (g)	Imp. 1	104.0	Imp. 2	95
Difference (g)	Imp. 1	4.8	Imp. 2	4

Run

1

BUREAU VERITAS

Date:

Time:

Field Data Sheet
Moisture Content (Reference)

Source ID: COLD SPRINGS 1

Company: TRANSCANADA

Test Location: TO EXHAUST

Meter Yd: 0.993

Meter H@: 1.80

Pre-test Leak Rate: 0.000 CFM @ 5 in Hg

Post-test Leak Rate: 0.000 CFM @ 5 in Hg

Project #: 11015-000

City/State: MANCELONA

Personnel: NICK TOK

Meter ID: 2

Barometric: 28.8

Traverse Point	Sample Time	Vacuum (in Hg)	Delta H (in H_2O)	Meter Volume (ft^3)	Meter Temperature Inlet (F)	Outlet (
1	0	1	0.08	649.494	28	27
	10	1	0.05	650.355	28	28
	20	1	0.04	650.625	24	28
	30	1	0.03	651.005	29	28
	40		FREEZE - UP		30	30
	50				32	32
	60	1		651.005	34	34
Averages:						

Analytical Data

	Impinger Gain (g or ml)				Silic
Final	Vf	111.5	110.8		Wf
Initial	Vi	107.5	106.5		Wi
Difference		4.0	4.3		

$V_{wc(std)} = 0.04707$ ft³/ml of H_2O $(V_f - V_i)$

$V_{wsg(std)} = 0.04715$ ft³/g of H_2O $(W_f -$

$$V_{m(std)} = 17.64\ Y \frac{V_m\ P_m}{(T_m + 460)}$$

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

Run

2

Date 02/12/2

Time 11:15

USEPA Method 2
Gas Velocity Traverse and Volumetric Flowrate

Facility COLD SPRINGS 1

Sampling Location TO EXHAUST

Stack Diameter, in 25 **Area, ft^2** 3.4

Stack Dimension, in — **Port Length, in** 6

Gas Temperature, °F WB —

Gas Temperature, °F DB 1410

% CO_2 4 **% CO** 0

% O_2 16 **% N_2** 80

Pre-Test Pitot Leak Rate ______ in H_2O for 1 min at ______ in H_2O

Post-Test Pitot Leak Rate [illegible] in H_2O for 1 min at ______ in H_2O

Operators T

Pitot Tube 6

Pitot Tube Factor, C_p 0

Cyclonic Flow Check

P_{bar}, Bar. Press., in Hg 2

P_{stat}, Static Press., in H_2O +

% Moisture, v/v ~

Molecular Weight, M_d 2

Molecular Weight, M_s 2

Port	Traverse Point	Velocity Head Difference (ΔP) (in H_2O)	Stack Temperature °F	$(\Delta P)^{0.5}$ (in $H_2O)^{0.5}$	Null Angle (zero ΔP angle)	Cosine Null Angle ($\cos \theta_{y(i)}$)	of V
NW	6	0.0225	1410				
	5	0.0293	1410				
	4	0.0288	1410				
	3	0.0255	1410				
	2	0.0186	1410				
	1	0.0160	1410				
NB	6	0.0192	1410				
	5	0.0277	1410				
	4	0.0219	1410				
	3	0.0287	1410				
	2	0.0283	1410				
	1	0.0224	1410				
Average							

Comments

P_s		in H
V_s		ft/mi
Q_s		cfm
Q_{std}		scfm
Q		dscf

BUREAU VERITAS

BUREAU VERITAS FIELD SHEET
USEPA METHOD 18

Site Name: TransCanada
COLD SPRINGS 1
City: Mi
State: Mich
Source Name: Glycol Dehydration Unit Exhaust
Description of Location Sampled (include description of all control devices, quenches, air inlets, etc.)
Natural gas glycol dehydration unit emissions controlled by condenser and thermal o

Run Number: 2 NORMAL Start Time: 10:15 Date: 02/
Stop Time: 11:15

Measurement System Flow Rates (target is 0.200 LPM)

Average 3 flow measurements below for Pre-Sample Flow (SF) = 0.2011 LPM

1. 0.2011 | 2. 0.2004 | 3. 0.2018

Average 3 flow measurements below for Post-Sample Flow (SF) = 0.1824 LPM

1. 0.1851 | 2. 0.1813 | 3. 0.1806

Average Sample Flow Rate 0.1918 LPM

Temperature and Barometric Pressure Measurements

Ambient Temperature at Start of Run:	35	°F	Time Recorded:	10
Ambient Temperature at End of Run:	44	°F	Time Recorded:	11
Barometric Pressure at Start of Run:	28.4	in. Hg	Time Recorded:	10
Barometric Pressure at End of Run:	28.8	in. Hg	Time Recorded:	11
Temperature Heated Line at Start of Run:	330	°F	Time Recorded:	10
Temperature Heated Line at End of Run:	330	°F	Time Recorded:	11

Rotameter Readings (Set point is 1.2 to 1.7 LPM) Comments

Time: 10:15	Flow: 1.5
Time: 10:25	Flow: 1.5
Time: 10:35	Flow: 1.5
Time: 10:45	Flow: 1.5
Time: 10:55	Flow: 1.5
Time: 11:05	Flow: 1.5

Impinger Measurements

Pre-test mass (g)	Imp. 1 (10 ml water)	103.0	Imp. 2 (empty)	9
Post-test mass (g)	Imp. 1	105.7	Imp. 2	9
Difference (g)	Imp. 1	2.7	Imp. 2	0

BUREAU VERITAS FIELD SHEET
USEPA METHOD 18

Site Name: TransCanada City: MAr
COLD SPRINGS 1 State: Mich
Source Name: Glycol Dehydration Unit Exhaust
Description of Location Sampled (include description of all control devices, quenches, air inlets, etc.)
Natural gas glycol dehydration unit emissions controlled by condenser and thermal o

Run Number: 2 Spike Start Time: 10:15 Date: 2/
Stop Time: 11:15

Measurement System Flow Rates (target is 0.200 LPM)

Average 3 flow measurements below for Pre-Sample Flow (SF) = 0.2002 LPM
1. 0.2002 | 2. 0.1999 | 3. 0.2003
Average 3 flow measurements below for Post-Sample Flow (SF) = 0.2006 LPM
1. 0.2028 | 2. 0.1991 | 3. 0.1981

Average Sample Flow Rate 0.2001 LPM

Temperature and Barometric Pressure Measurements

Ambient Temperature at Start of Run: 35 °F Time Recorded: 10.
Ambient Temperature at End of Run: 44 °F Time Recorded: 11
Barometric Pressure at Start of Run: 28 8 in. Hg Time Recorded: 10:
Barometric Pressure at End of Run: 28.8 in. Hg Time Recorded: 11:
Temperature Heated Line at Start of Run: 330 °F Time Recorded: 10:
Temperature Heated Line at End of Run: 330 °F Time Recorded: 11

Rotameter Readings (Set point is 1.2 to 1.7 LPM) Comments

Time: 10:15 Flow: 1.5
Time: 10:25 Flow: 1.5
Time: 10:35 Flow: 1.5
Time: 10:45 Flow: 1.5
Time: 10:55 Flow: 1.5
Time: 11:05 Flow: 1.5

Impinger Measurements

Pre-test mass (g) Imp. 1 (10 ml water) 109.4 Imp. 2 (empty) 10
Post-test mass (g) Imp. 1 111.5 Imp. 2 10
Difference (g) Imp. 1 2.1 Imp. 2 0

Run

2

Date:

Time:

Field Data Sheet
Moisture Content (Reference)

Source ID: COLD SPRINGS 1

Company: Trans Canada

Test Location: TO EXHAUST

Meter Yd: 0.993

Meter H@: 1.80

Pre-test Leak Rate: 0.000 CFM @ 5 in Hg

Post-test Leak Rate: 0.000 CFM @ 5 in Hg

Project #: 11015-0006

City/State: MANCELONA,

Personnel: NICK TOK

Meter ID: 2

Barometric: 28.8

Traverse Point	Sample Time	Vacuum (in Hg)	Delta H (in H_2O)	Meter Volume (ft^3)	Meter Temperature Inlet (F)	Outlet (
1	0	1	0.05	651.028	35	34
	10	1	0.08	652.920	37	36
	20	1	0.09	654.035	39	37
	30	1	0.09	655.445	40	38
	40	1	0.09	656.878	42	40
	50	1	0.09	658.068	43	42
	60	1	0.09	659.446	44	43
Averages:						

Analytical Data					
	Impinger Gain (g or ml)				Silic
Final	Vf	120.7	113.0		Wf
Initial	Vi	111.5	110.8		Wi
Difference		9.2	2.2		

$V_{wc(std)} = 0.04707\ ft^3/ml\ of\ H_2O\ (V_f - V_i)$ $V_{wsg(std)} = 0.04715\ ft^3/g\ of\ H_2O\ (W_f -$

$$V_{m(std)} = 17.64\ Y \frac{V_m P_m}{(T_m + 460)}$$

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

Run

3

Date 02/12/2
Time 11:5

USEPA Method 2
Gas Velocity Traverse and Volumetric Flowrate

Facility Cold Springs 1 **Operators**

Sampling Location TO EXHAUST **Pitot Tube** 6

Stack Diameter, in 25 **Area, ft²** 3.4 **Pitot Tube Factor, C_p**

Stack Dimension, in — **Port Length, in** ~6 **Cyclonic Flow Check**

Gas Temperature, °F WB — **P_{bar}, Bar. Press., in Hg** 28

Gas Temperature, °F DB 1428 **P_{stat}, Static Press., in H_2O** +

% CO_2 4 **% CO** 0 **% Moisture, v/v** ~

% O_2 16 **% N_2** 80 **Molecular Weight, M_d** 2

Pre-Test Pitot Leak Rate ____ in H_2O for 1 min at ____ in H_2O **Molecular Weight, M_s** 2

Post-Test Pitot Leak Rate BLUE PROBE #16 in H_2O for 1 min at ____ in H_2O

Port	Traverse Point	Velocity Head Difference (ΔP) (in H_2O)	Stack Temperature °F	$(\Delta P)^{0.5}$ $(in\ H_2O)^{0.5}$	Null Angle (zero ΔP angle)	Cosine Null Angle (cos $\theta_{y(i)}$)	of V
NW	6	0.0268	1428				
	5	0.0309	1428				
	4	0.0270	1428				
	3	0.0196	1428				
	2	0.0133	1428				
	1	0.0148	1428				
NE	6	0.0143	1428				
	5	0.0312	1428				
	4	0.0290	1428				
	3	0.0185	1428				
	2	0.0129	1428				
	1	0.0168	1428				
Average							

Comments

P_s		in H
V_s		ft/m
Q_s		cfm
Q_{std}		scfm
Q		dscf

BUREAU VERITAS FIELD SHEET
USEPA METHOD 18

Site Name: TransCanada City: MAr
COLD SPRINGS 1 State: Mich

Source Name: Glycol Dehydration Unit Exhaust

Description of Location Sampled (include description of all control devices, quenches, air inlets, etc.)
Natural gas glycol dehydration unit emissions controlled by condenser and thermal ox

Run Number: 3 NORMAL Start Time: 11:25 Date: 02/
Stop Time: 12:25

Measurement System Flow Rates (target is 0.200 LPM)

Average 3 flow measurements below for Pre-Sample Flow (SF) = 0.2011 LPM

1. 0.2014	2. 0.2001	3. 0.2016

Average 3 flow measurements below for Post-Sample Flow (SF) = 0.2026 LPM

1. 0.2056	2. 0.2011	3. 0.2011

Average Sample Flow Rate 0.2019 LPM

Temperature and Barometric Pressure Measurements

Ambient Temperature at Start of Run:	45	°F	Time Recorded: 11:
Ambient Temperature at End of Run:	51	°F	Time Recorded: 12:
Barometric Pressure at Start of Run:	28.8	in. Hg	Time Recorded: 11:
Barometric Pressure at End of Run:	28.8	in. Hg	Time Recorded: 12:
Temperature Heated Line at Start of Run:	330	°F	Time Recorded: 11:2
Temperature Heated Line at End of Run:	329	°F	Time Recorded: 12:

Rotameter Readings (Set point is 1.2 to 1.7 LPM)		Comments
Time: 11:25	Flow: 1.5	
Time: 11:35	Flow: 1.5	
Time: 11:45	Flow: 1.5	
Time: 11:55	Flow: 1.5	
Time: 12:05	Flow: 1.5	
Time: 12:15	Flow: 1.5	

Impinger Measurements

Pre-test mass (g)	Imp. 1 (10 ml water) 111.8	Imp. 2 (empty) 104
Post-test mass (g)	Imp. 1 114.6	Imp. 2 104
Difference (g)	Imp. 1 2.8	Imp. 2 0

BUREAU VERITAS

BUREAU VERITAS FIELD SHEET
USEPA METHOD 18

Site Name: TransCanada City: MA
COLD SPRINGS 1 State: Mich
Source Name: Glycol Dehydration Unit Exhaust
Description of Location Sampled (include description of all control devices, quenches, air inlets, etc.)
Natural gas glycol dehydration unit emissions controlled by condenser and thermal o

Run Number: 3 SPIKE Start Time: 11:25 Date: 02/
Stop Time: 12:25

Measurement System Flow Rates (target is 0.200 LPM)

Average 3 flow measurements below for Pre-Sample Flow (SF) = 0.2026 LPM
1. 0.2021 | 2. 0.2028 | 3. 0.2028

Average 3 flow measurements below for Post-Sample Flow (SF) = 0.2007 LPM
1. 0.2051 | 2. 0.1986 | 3. 0.1983

Average Sample Flow Rate: 0.2017 LPM

Temperature and Barometric Pressure Measurements

Ambient Temperature at Start of Run:	45	°F	Time Recorded:	11
Ambient Temperature at End of Run:	51	°F	Time Recorded:	12
Barometric Pressure at Start of Run:	28.8	in. Hg	Time Recorded:	11
Barometric Pressure at End of Run:	28.8	in. Hg	Time Recorded:	12
Temperature Heated Line at Start of Run:	330	°F	Time Recorded:	11
Temperature Heated Line at End of Run:	329	°F	Time Recorded:	12

Rotameter Readings (Set point is 1.2 to 1.7 LPM) Comments

Time: 11:25	Flow: 1.5
Time: 11:35	Flow: 1.5
Time: 11:45	Flow: 1.5
Time: 11:55	Flow: 1.5
Time: 12:05	Flow: 1.5
Time: 12:15	Flow: 1.5

Impinger Measurements

Pre-test mass (g)	Imp. 1 (10 ml water)	102.9	Imp. 2 (empty)	95
Post-test mass (g)	Imp. 1	106.0	Imp. 2	96
Difference (g)	Imp. 1	3.1	Imp. 2	0

Run

3

Date:

Time:

Field Data Sheet
Moisture Content (Reference)

Source ID: COLDS SPRINGS 1
Company: TRANSCANADA
Test Location: TO EXHAUST
Meter Yd: 0.993
Meter H@: 1.80
Pre-test Leak Rate: 0.000 CFM @ 5 in Hg
Post-test Leak Rate: 0.000 CFM @ 5 in Hg

Project #: 11015-0000
City/State: MANCELONA
Personnel: NICK TOK
Meter ID: 2
Barometric: 28.8

Traverse Point	Sample Time	Vacuum (in Hg)	Delta H (in H_2O)	Meter Volume (ft^3)	Meter Temperature	
					Inlet (F)	Outlet (
1	0	1	0.09	659.512	44	43
	10	1	0.09	661.117	45	44
	20	1	0.08	662.475	46	45
	30	1	0.08	663 835	47	46
	40	1	0.08	665.172	48	47
	50	1	0.08	666.448	49	48
	60	1	0.07	667.749	50	49
Averages:						

Analytical Data						
	Impinger Gain (g or ml)				Silic	
Final	V_f	123.2	119.4		W_f	
Initial	V_i	120.7	113.0		W_i	
Difference		2.5	6.4			

$V_{wc(std)} = 0.04707$ ft^3/ml of H_2O $(V_f - V_i)$

$V_{wsg(std)} = 0.04715$ ft^3/g of H_2O $(W_f -$

$$V_{m(std)} = 17.64\ Y \frac{V_m P_m}{(T_m + 460)}$$

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

Leak Detection and Repair (LDAR) Recordkeeping Form

40 CFR 63, Subpart HHH, "National Emissions Standards for Hazardous Air Pollutants From Natural Gas Transmission and Storage Facilities

Section 1: Site Information

Facility name	Blue lake Gas Storage Company - Blue Lake					
Permit ID	MI-ROP-B7198-2014a	County	Kalkaska			
Date of Inspection	2/11/15	Inspection Type	☑	Initial AIMM	☐ Periodic	☐ Annual
Method used for inspection (i.e. Method 21, IR Camera, AVO, etc.)			M21			
Name of person completing inspection	Thomas Schrulter					

Section 2: Summary of Leaking Components

Table 1: Summary of Leaking Components			Sensory Inspection
Component Type	# of Leaks	ID Numbers	Auditory (A), Visual (V), Olfactory (O)
Valves	0		
Connectors	0		
Flanges	0		
Pump Seals	8		
Pressure Relief Devices (PRD)	0		
TOTAL	0		

Section 3: Leaking Components Details NA

Table 2: Monitoring and Repair of Leaking Components[1]

Component Id	Component Type	Monitoring Method Used	Date of 1st Repair Attempt (≤5-days)	Date(s) of Additional Repair Attempts (≤15-days)	Date(s) of Remonitoring	Result(s) of Remonitoring	Date of Successful Repair	Repair Delayed? (See Table 3)
								☐
								☐
								☐
								☐
								☐

[1] If more components need to be reported, add additional leaking components to Table 2 Addendum form on page 3 of this document.

Section 4: Delay of Repair List NA

Table 3: List of Components Added to Delay of Repair List

Component ID	Reason for Delay (detailed description)	Date Delay No Longer Exists

BlueLake

Section 5: Difficult or Inaccessible to Monitor

Table 4: List of Components Identified as Difficult or Inaccessible

Component ID or Equipment Description	Component Type	Rationale and Plan for Monitoring
101	Flange	Components that cannot be inspected without elevating the inspected personnel more than 2 meters above a support surface are considered to be "difficult to inspect" and will be inspected by the following method: During safe to inspect times, access to difficult to inspect equipment components may require use of scaffolding, extended ladders, or articulating boom lifts.
102	↓	
103	Pipe Flange	
104	Pipe	
105	↓	
106	Thermowell	
107	Threaded Pipe	
108	↓	
109		
110	Cap	

Additional Comments

Table 2 Addendum: Monitoring and Repair of Leaking Components

Component ID	Component Type	Monitoring Method Used	Date of 1st Repair Attempt (≤5-days)	Date(s) of Additional Repair Attempts (≤15-days)	Date(s) of Remonitoring	Result(s) of Remonitoring	Date of Successful Repair	Repair Delayed? (See Table 3)
								☐
								☐
								☐
								☐
								☐
								☐
								☐
								☐
								☐

BUREAU VERITAS

EPA Method 21
Leak Detection Monitoring Form

TransCanada Facility Blue Lake Gas Storage Company **Inspector** Thomas Schmelter

Sampling Location Blue lake **Date** 2/11/15

					If VOC Reading is >500 ppm	
Component Number	**Component Description**	**Background VOC Concentration (ppmv at 3-6 feet from component)**	**VOC Concentration at component interference (ppmv)**	**Time of Inspection (hh:mm)**	**Leak Detected; Record Information on LDAR Recordkeeping Form**	**Is Leak Tag Placed?**
100	Flange	80	90	11:52	NO	
101	↓	2	9.1	11:40	NO	
102	↓	2	6	11:40	NO	
103	Pipe Flange	1	1.2	11:41	NO	
104	Pipe	1	1.1	11:41	NO	
105	↓		0.5	11:42	NO	
106	Thermowell		0.8	11:42	NO	
107	Threaded Pipe		0.5	11:42	NO	
108	↓		1	11:42	NO	
109	↓		1	11:42	NO	
110	Cap		32	11:43	NO	
111	Thread Pipe	20	24	11:54	NO	
112	Flange	25	45	11:55	NO	
113	↓	80	56	11:59	NO	
114	↓	20	30	11:59	NO	
128	↓	80	50	11:59	NO	
115	↓	80	20	12:00	NO	
116	Thermowell		53	12:01	NO	
117	Pipe	26	38	12:05	NO	
118	Flange	26	61	12:06	NO	
119	↓	50	65	12:07	NO	
120	Threaded Pipe	80	90	12:08	NO	
121	↓	80	98	12:09	NO	
122	Flange	80	100	12:09	NO	
123	Threaded Pipe	80	78	12:10	NO	
124	Flange	45	33	12:12	NO	
125	↓	4	7	12:13	NO	
126	↓	3	5	12:14	NO	
127	↓	43	1	12:14	NO	

Leak Detection and Repair (LDAR) Recordkeeping Form

40 CFR 63, Subpart HHH, "National Emissions Standards for Hazardous Air Pollutants From Natural Gas Transmission and Storage Facilities

Section 1: Site Information

Facility name	Cold Springs 1 Compressor Station - Cold Springs 1						
Permit ID	MI-ROP-B7198-2014a	County	Kalkaska				
Date of Inspection	2/12/15	Inspection Type	☑	Initial AIMM	☐	Periodic	☐ Annual
Method used for inspection (i.e. Method 21, IR Camera, AVO, etc.)	M21						
Name of person completing inspection	Thomas Schmelter						

Section 2: Summary of Leaking Components

Table 1: Summary of Leaking Components			Sensory Inspection
Component Type	# of Leaks	ID Numbers	Auditory (A), Visual (V), Olfactory (O)
Valves	0		
Connectors	0		
Flanges	0		
Pump Seals	0		
Pressure Relief Devices (PRD)	0		
TOTAL	0		

Section 3: Leaking Components Details N/A

Table 2: Monitoring and Repair of Leaking Components[1]

Component Id	Component Type	Monitoring Method Used	Date of 1st Repair Attempt (≤5-days)	Date(s) of Additional Repair Attempts (≤15-days)	Date(s) of Remonitoring	Result(s) of Remonitoring	Date of Successful Repair	Repair Delayed? (See Table 3)
								☐
								☐
								☐
								☐
								☐

[1] If more components need to be reported, add additional leaking components to Table 2 Addendum form on page 3 of this document.

Section 4: Delay of Repair List N/A

Table 3: List of Components Added to Delay of Repair List

Component ID	Reason for Delay (detailed description)	Date Delay No Longer Exists

ColdSprings 1

Section 5: Difficult or Inaccessible to Monitor

Table 4: List of Components Identified as Difficult or Inaccessible

Component ID or Equipment Description	Component Type	Rationale and Plan for Monitoring
151	Thermowell	Components that cannot be inspected without elevating the inspecting personnel more than 2 meters above a support surface are considered "difficult to inspect" and will be inspected by the following method: During safe to inspect times, access to difficult to inspect equipment components may require the use of scaffolding, extended ladders, or articulating boom lifts.
152	Flange	
153	↓	
154	Union	
160	Flange	
161		
162		
163	↓	
164	Thermowell	
165	Flange	
166	Plug	

Additional Comments

Table 2 Addendum: Monitoring and Repair of Leaking Components

Component ID	Component Type	Monitoring Method Used	Date of 1st Repair Attempt (≤5-days)	Date(s) of Additional Repair Attempts (≤15-days)	Date(s) of Remonitoring	Result(s) of Remonitoring	Date of Successful Repair	Repair Delayed? (See Table 3)
								☐
								☐
								☐
								☐
								☐
								☐
								☐
								☐
								☐

EPA Method 21
Leak Detection Monitoring Form

TransCanada Facility Cold Springs 1 Compressor Station **Inspector** Thomas Schmeltor

Sampling Location Cold Springs 1 **Date** 2/12/15

					If VOC Reading is >500 ppm	
Component Number	Component Description	Background VOC Concentration (ppmv at 3-6 feet from component)	VOC Concentration at component interference (ppmv)	Time of Inspection (hh:mm)	Leak Detected; Record Information on LDAR Recordkeeping Form	Is Leak Tag Placed?
150	Flange	70	88	10:52	NO	
151	Thermowell	35	3.5	12:42	NO	
152	Flange	35	8.1	12:43	NO	
153	↓		14.7	12:43	NO	
154	Union		12.2	12:44	NO	
155	Pipe	70	89	10:55	NO	
156	Flange	300	330	10:56	NO	
157		300	327	10:57	NO	
158	↓	300	158	10:58	NO	
159	Thermowell	80	81	10:59	NO	
160	Flange	300	318	11:35	NO	
161		69	71	10:50	NO	
162		69	166	10:50	NO	
163	↓		118	10:49	NO	
164	Thermowell	69	84	10:49	NO	
165	Flange	69	64	10:49	NO	
166	Plug	69	75	10:48	NO	
167	Flange	3.8	3.8	10:46	NO	
168			3.5	10:45	NO	
169		3.5	3.6	10:44	NO	
170			3.6	10:44	NO	
171		3.5	3.5	10:43	NO	
172		3.5	3.5	10:43	NO	
173			3.2	10:42	NO	
174	↓	3	3.2	10:42	NO	
175	Plug	3	3.1	10:42	NO	

Leak Detection and Repair (LDAR) Recordkeeping Form

40 CFR 63, Subpart HHH, "National Emissions Standards for Hazardous Air Pollutants From Natural Gas Transmission and Storage Facilities

Section 1: Site Information

Facility name	Cold Springs 12 Compressor Station - Cold Springs 12					
Permit ID	MI-ROP-B7198-2014a	County	KalKaska			
Date of Inspection 2/13/15 and 2/19/15	Inspection Type	☑	Initial AIMM	☐	Periodic	☐ Annual
Method used for inspection (i.e. Method 21, IR Camera, AVO, etc.)	M21					
Name of person completing inspection	Thomas Schaelter					

Section 2: Summary of Leaking Components

Table 1: Summary of Leaking Components			Sensory Inspection
Component Type	# of Leaks	ID Numbers	Auditory (A), Visual (V), Olfactory (O)
Valves	0		
Connectors	0		
Flanges	0		
Pump Seals	0		
Pressure Relief Devices (PRD)	0		
TOTAL	0		

Section 3: Leaking Components Details NA

Table 2: Monitoring and Repair of Leaking Components[1]

Component Id	Component Type	Monitoring Method Used	Date of 1st Repair Attempt (≤5-days)	Date(s) of Additional Repair Attempts (≤15-days)	Date(s) of Remonitoring	Result(s) of Remonitoring	Date of Successful Repair	Repair Delayed? (See Table 3)
								☐
								☐
								☐
								☐
								☐

[1] If more components need to be reported, add additional leaking components to Table 2 Addendum form on page 3 of this document.

Section 4: Delay of Repair List NA

Table 3: List of Components Added to Delay of Repair List

Component ID	Reason for Delay (detailed description)	Date Delay No Longer Exists

Cold Springs 12

Section 5: Difficult or Inaccessible to Monitor

Table 4: List of Components Identified as Difficult or Inaccessible

Component ID or Equipment Description	Component Type	Rationale and Plan for Monitoring
200	Flange	
201		Components that cannot be inspected without elevating inspecting
202		
203	↓	personnel more then 2 meters above a support surface are
204	coupling	
205	elbow Pipe	considered "difficult to inspect" and will be inspected
206		
207	↓	by the following method:
208	Union	
209	Piping Tee	
210	↓	During safe to inspect times, access to difficult to inspect
211	Union	
212	Coupling	equipment components may require the use of scaffolding,
213	Thermowell	
214	Flange	extended ladders, or articulating boom lifts.
220	Piping	
221		
222		
223		
224		
225	↓	
226	Flange	

Additional Comments

Table 2 Addendum: Monitoring and Repair of Leaking Components

Component ID	Component Type	Monitoring Method Used	Date of 1st Repair Attempt (≤5-days)	Date(s) of Additional Repair Attempts (≤15-days)	Date(s) of Remonitoring	Result(s) of Remonitoring	Date of Successful Repair	Repair Delayed? (See Table 3)
								☐
								☐
								☐
								☐
								☐
								☐
								☐
								☐
								☐

EPA Method 21
Leak Detection Monitoring Form

TransCanada Facility Cold Springs 12 Compressor Station **Inspector** Thomas Schmelter

Sampling Location Cold Springs 12 **Date** 2/13/15 and 2/19/15

					If VOC Reading is >500 ppm	
Component Number	**Component Description**	**Background VOC Concentration (ppmv at 3-6 feet from component)**	**VOC Concentration at component interference (ppmv)**	**Time of Inspection (hh:mm)**	**Leak Detected; Record Information on LDAR Recordkeeping Form**	**Is Leak Tag Placed?**
200	Flange	~~4~~ 12	18	15:48	NO	
201	↓	4	4	9:02	NO	
202	↓	4	8	9:02	NO	
203	↓	4	6	9:03	NO	
204	Coupling	4	4	9:04	NO	
205	Elbow Pipe	4	10	9:05	NO	
206	↓	4	5	9:05	NO	
207	↓	4	12	9:05	NO	
208	Union	4	4	9:06	NO	
209	Piping Tee	↓	48	15:48	NO	
210	↓	↓	62	15:49	NO	
211	Union	↓	38	15:56	NO	
212	Coupling	↓	25	15:51	NO	
213	Thermo well	↓	16	15:51	NO	
214	Flange	↓	24	15:52	NO	
215	Plug	13	18	15:53	NO	
216	↓	↓	25	15:54	NO	
217	Flange	↓	22	15:55	NO	
218	↓	↓	21	15:56	NO	
219	Union	↓	10	15:56	NO	
220	Piping	↓	11.7	16:01	NO	
221	↓	↓	8.6	16:03	NO	
222	↓	↓	14	16:00	NO	
223	↓	↓	14	16:00	NO	
224	↓	↓	9.7	15:59	NO	
225	↓	↓	9.5	15:58	NO	
226	Flange	5	4.8	16:05	NO	
227	↓	↓	4.3	16:06	NO	
228	↓	↓	4.1	16:06	NO	
229	↓	↓	3.6	16:05	NO	

LDAR inspection points.
Facility
Location Blue Lake

Inspection Date 02/11/2015

Tag Number	Description of location	Type of devices- Valve, Flange, Plug, Thermowell union,etc.	1 year inspection	5 year inspection	Inspection time	
		Backround levels 2/				
100	Base of still column	Flange	90.0	9	11:52	80
101	Mid point of still column	Flange 2	9.1		11:40	2
102	Top of still column	Flange	6.0		11:40	2
103	Top of still column	Pipe Flange	1.2		11:41	1
104	Tap for temperature controler reflux	Pipe	1.1		11:41	1
105	Pipe to relief valve	Pipe	0.5		11:42	
106	Thremo well at top of still column	Thermowell	0.8		11:42	
107	Tee outlet to relief valve	Threaded pipe	0.5		11:42	
108	Pipe elbow for relief valve at top of still column	Threaded pipe	1.0		11:42	
109	Pipe at the base of the relief valve top of still	Threaded pipe	1.0		11:42	
110	Exit of relief valve	Cap	32		11:43	
111	1" valve on line coming down from still column	Threaded pipe	24		11:54	20
112	Flanged connection piping to condenser	Flange	45		11:55	25
113	Connectiion to inlet of condenser	Flange	50		11:59	80
114	End flange of condenser tube	Flange	30		[illegible]	20
128	Valve to condenser bypass	Flange	50		[illegible]	80
115	Connection to outlet of condenser	Flange	20		12:00	80
116	Temperature probe at outlet of condenser	Thermowell	53		12:01	
117	Input tube for corrosion fluid	Pipe	38		12:05	26
118	Inlet of water accumulator vessel	Flange	61		12:06	26
119	Outlet of water accumulator vessel	Flange	65		12:07	50
120	Base of tee for Betx valve	Threaded pipe	90		12:08	80
121	Top of tee for Betx valve	Threaded pipe	98		12:09	80
122	Betx valve inlet	Flange	108		12:10	80
123	Outlet tee to thermo oxidizer	Threaded pipe	78		12:11	80
124	Pipe flange in piping	Flange	33		12:12	45
125	Input to thrermo oxidizer isolation valve	Flange	7.0		12:14	4

126	Output of isolation valve to thermo oxidizer	Flange	5		
127	Output from flame arrester	Flange	1		

3

3

248-205 7423

LDAR inspection points.

Facility Location: Cold Springs 1

Date Inspected 02/12/2015

Tag Number	Description of location	Type of devices- Valve, Flange, Plug, Thermowell union,etc.	1 year inspection	5 year inspection	Time inspected	
			Backround levels =			
150	Base of still column	Flange	88		10:52	70
151	Thermowell on still column	Thermowell		3.5	12:42	3.5
152	Top of still column	Flange		8.1	12:43	3.5
153	Piping out of the top of the still column	Flange		14.7	12:43	
154	Union connection at top of still column	Union		12 2	12:44	
155	1" pipe and valve	Pipe	89		10:55	70
156	Inlet to condenser bypass valve	Flange	330		10:56	300
157	Inlet to condenser inlet valve	Flange	327		10:57	300
158	Outlet of condenser inlet valve	Flange	158		10:58	300
159	Temperature gauge	Thermowell	81		10:59	80
160	Inlet flange to condenser	Flange	318		11:35	300
161	Outlet flange from condenser	Flange		71		69
162	Inlet to condenser outlet valve	Flange	166		10:50	69
163	Outlet to condenser outlet valve	Flange	118		10:49	
164	Temperature probe	Thermowell	84		10:49	69
165	Inlet to accumulator pot	Flange		64	10.49	69
166	Plug at the top of the elbow of the vertical sep	Plug		75	10:48	69
167	Inlet to Vertical Sep	Flange	3.8		10:46	3.5
168	Outlet from Vertical Sep	Flange	2.6		10:45	
169	Inlet to Betx valve	Flange	3.6		10:45	3.5
170	Inlet to thermo oxidizer inlet valve	Flange	3.6		10:44	
171	Outlet to thermo oxidizer inlet valve	Flange	3.5		10:44	3.5
172	Pipe Flange	Flange	3.5		10:43	3.5
173	Inlet to flame arrester	Flange	3.2		10:42	
174	Outlet of flame arrester	Flange	3.2		10:42	3
175	Plug before inlet to thermo oxidizer	Plug	3.1		10:42	3

Steve
231-587-2172

LDAR inspection points.						
Facility Location	Clod Springs 12		Date Inspected			
Tag Number	Description of location	Type of devices- Valve, Flange, Plug, Thermo well union,etc.	1 year inspection	5 year inspection	Time Inspected	
			Backround levels =			
200	Base of the still column	Flange 02/19		18	15:48	12
201	Tubing to reflux valve	Flange		4	9:02	4
202	Top of the still column	Flange		8	9:02	4
203	Piping at the top of still column	Flange		6	9:03	4
204	Coupling at top of still column	Coupling		4	9:03	4
205	Piping at the top of still column	Elbow pipe		10	9:04	4
206	Piping at the top of still column	Elbow pipe		-	9:05	4
207	Piping at the top of still column	Elbow pipe		12	9:05	4
208	Union	Union		4	9:06	4
209	Temperature probe	Piping Tee		48	15:49	
210	Input for corrosion inhibitor line	Piping Tee		62	15:4[illegible]	
211	Inlet to condenser union	Union		28	15:50	
212	Outlet from condenser coupling to Tee	Coupling		23	15:51	
213	Condenser outlet temperature	Thermo well		16	15:51	
214	Outlet of bypass valve to Tee	Flange		24	15:52	
215	Bull plug to elbow into Acccumulator	Plug	—	18	15:53	13
216	Bull Inlet to elbow to accumulator tank	Plug	—	25	15:55	
217	Outlet to thermo oxidizer from accumulator tank	Flange	—	22	15:5[illegible]	
218	Outlet to thermo oxidizer from accumulator tank	Flange	—	21	15:57	
219	Union for piping to Betx valve	Union	—	10	15:57	
220	Inlet to the tee to Betex valve	Piping		11.7	1401	
221	Outlet of the tee to the betx valve	Piping		8.6	16.03	
222	Inlet to the union for the betx valve	Piping		14.0	18:06	
223	Inlet to the betx valve	Piping		14.0	15:59	
224	Drain line from Betx valve	Piping		9.7	15:69	
225	Drain line from Betx valve	Piping		9.5	15:58	
226	Inlet to thermo oxidizer iso valve	Flange		4.9	16:05	5

Appendix D

Computer-Generated Data Sheets

LDAR inspection points.

Facility Location	Blue Lake			Inspection Date 02/11/2015	
Tag Number	Description of location	Type of devices- Valve, Flange, Plug, Thermowell union,etc.	1 year inspection	5 year inspection	Inspection time
		Backround levels= 1 to 80 ppm			
100	Base of still column	Flange	90		11:52
101	Mid point of still column	Flange		9.1	11:40
102	Top of still column	Flange		6	11:40
103	Top of still column	Pipe Flange		1.2	11:41
104	Tap for temperature controler reflux	Pipe		1.1	11:41
105	Pipe to relief valve	Pipe		0.5	11:42
106	Thremo well at top of still column	Thermowell		0.8	11:42
107	Tee outlet to relief valve	Threaded pipe		0.5	11:42
108	Pipe elbow for relief valve at top of still column	Threaded pipe		1	11:42
109	Pipe at the base of the relief valve top of still	Threaded pipe		1	11:42
110	Exit of relief valve	Cap		32	11:43
111	1" valve on line coming down from still column	Threaded pipe	24		11:54
112	Flanged connection piping to condenser	Flange	45		11:55
113	Connectiion to inlet of condenser	Flange	50		11:59
114	End flange of condenser tube	Flange	30		11:59
128	Valve to condenser bypass	Flange	50		11:59
115	Connection to outlet of condenser	Flange	20		12:00
116	Temperature probe at outlet of condenser	Thermowell	53		12:01
117	Input tube for corrosion fluid	Pipe	38		12:05
118	Inlet of water accumulator vessel	Flange	61		12:06
119	Outlet of water accumulator vessel	Flange	65		12:07
120	Base of tee for Betx valve	Threaded pipe	90		12:08
121	Top of tee for Betx valve	Threaded pipe	98		12:09
122	Betx valve inlet	Flange	100		12:09
123	Outlet tee to thermo oxidizer	Threaded pipe	78		12:10
124	Pipe flange in piping	Flange	33		12:12
125	Input to thrermo oxidizer isolation valve	Flange	7		12:13
126	Output of isolation valve to thermo oxidizer	Flange	5		12:14
127	Output from flame arrester	Flange	1		12:14

LDAR inspection points.					
Facility Location	Cold Springs 1			Date Inspected 02/12/2015	
Tag Number	Description of location	Type of devices- Valve, Flange, Plug, Thermowell union,etc.	1 year inspection	5 year inspection	Time inspected
			Backround levels = 3- 300 ppm		
150	Base of still column	Flange	88		10:52
151	Thermowell on still column	Thermowell		3.5	12:42
152	Top of still column	Flange		8.1	12:43
153	Piping out of the top of the still column	Flange		14.7	12:43
154	Union connection at top of still column	Union		12.2	12:44
155	1" pipe and valve	Pipe	89		10:55
156	Inlet to condenser bypass valve	Flange	330		10:56
157	Inlet to condenser inlet valve	Flange	327		10:57
158	Outlet of condenser inlet valve	Flange	158		10:58
159	Temperature gauge	Thermowell	81		10:59
160	Inlet flange to condenser	Flange		318	11:35
161	Outlet flange from condenser	Flange		71	10:50
162	Inlet to condenser outlet valve	Flange		166	10:50
163	Outlet to condenser outlet valve	Flange		118	10:49
164	Temperature probe	Thermowell		84	10:49
165	Inlet to accumulator pot	Flange		64	10:49
166	Plug at the top of the elbow of the vertical sep	Plug		75	10:48
167	Inlet to Vertical Sep	Flange	3.8		10:46
168	Outlet from Vertical Sep	Flange	3.5		10:45
169	Inlet to Betx valve	Flange	3.6		10:44
170	Inlet to thermo oxidizer inlet valve	Flange	3.6		10:44
171	Outlet to thermo oxidizer inlet valve	Flange	3.5		10:43
172	Pipe Flange	Flange	3.5		10:43
173	Inlet to flame arrester	Flange	3.2		10:42
174	Outlet of flame arrester	Flange	3.2		10:42
175	Plug before inlet to thermo oxidizer	Plug	3.1		10:42

LDAR inspection points.					
Facility Location	Cold Springs 12			Date Inspected 02/13/2015 02/19/2015	
Tag Number	Description of location	Type of devices- Valve, Flange, Plug, Thermo well union,etc.	1 year inspection	5 year inspection	Time Inspected
			Backround levels = 4 to 13 ppm		
200	Base of the still column	Flange		18	15:48
201	Tubing to reflux valve	Flange		4	9:02
202	Top of the still column	Flange		8	9:02
203	Piping at the top of still column	Flange		6	9:03
204	Coupling at top of still column	Coupling		4	9:04
205	Piping at the top of still column	Elbow pipe		10	9:05
206	Piping at the top of still column	Elbow pipe		5	9:05
207	Piping at the top of still column	Elbow pipe		12	9:05
208	Union	Union		4	9:06
209	Temperature probe	Piping Tee		48	15:48
210	Input for corrosion inhibitor line	Piping Tee		62	15:49
211	Inlet to condenser union	Union		38	15:50
212	Outlet from condenser coupling to Tee	Coupling		25	15:51
213	Condenser outlet temperature	Thermo well		16	15:51
214	Outlet of bypass valve to Tee	Flange		24	15:52
215	Bull plug to elbow into Acccumulator	Plug	18		15:53
216	Bull Inlet to elbow to accumulator tank	Plug	25		15:54
217	Outlet to thermo oxidizer from accumulator tank	Flange	22		15:55
218	Outlet to thermo oxidizer from accumulator tank	Flange	21		15:56
219	Union for piping to Betx valve	Union	10		15:56
220	Inlet to the tee to Betex valve	Piping		11.7	16:01
221	Outlet of the tee to the betx valve	Piping		8.6	16:03
222	Inlet to the union for the betx valve	Piping		14	16:00
223	Inlet to the betx valve	Piping		14	16:00
224	Drain line from Betx valve	Piping		9.7	15:59
225	Drain line from Betx valve	Piping		9.5	15:58
226	Inlet to thermo oxidizer iso valve	Flange		4.8	16:05
227	Outlet from thermo oxidizer iso valve	Flange	4.3		16:06
228	Outlet of flane aresster	Flange	4.1		16:06
229	Input to thermo oxidizer	Flange	3.6		16:05

Thermal Oxidizer Moisture Content Results

TransCanada - Blue Lake

Mancelona, Michigan

Bureau Veritas Project No. 11015-000004.00

Sampling Date: February 11, 2015

Parameter	Run 1	Run 2	Run 3	Average
Start Time	10:05	11:15	12:25	
Barometric Pressure (in Hg)	28.4	28.4	28.4	28.4
Average Orifice Differential Pressure (in H_2O)	0.08	0.08	0.08	0.08
Meter Correction Factor (γ)	0.993	0.993	0.993	0.993
Average Meter Temperature (°F)	58.1	62.7	61.9	60.9
Average Meter Pressure (in Hg)	28.41	28.41	28.41	28.41
Gas Volume Sampled (ft^3)	7.557	7.809	8.000	7.789
Gas Volume Sampled (standard ft^3)	7.261	7.436	7.630	7.442
Mass of Condensate Collected (g)	1.1	19.6	1.4	7.4
Silica Gel Mass Gain (g)	2.0	2.1	1.7	1.9
Moisture Volume (standard ft^3)	0.1	1.0	0.1	0.4
Moisture Content (%)	**2.0**	**12.1**	**1.9**	**5.3**

in H_2O	inch of water
°F	degree Fahrenheit
in Hg	inch of mercury
ft^3	cubic foot
g	gram
standard temperature, °F	68
standard pressure, in Hg	29.92

Run
1

Date Feb 11, 2015
Time 9:25

USEPA Method 2
Gas Velocity Traverse and Volumetric Flowrate

Facility TransCanada - Blue Lake
Operators TS
Sampling Location Thermal Oxidizer Exhaust
Pitot Tube 6FtA
Stack Diameter, in 20
Area, ft^2 2.182
Pitot Tube Factor, C_p 0.84
Stack Dimension, in NA
Port Length, in 3
Cyclonic Flow Check 0
Gas Temperature, °F WB NA
P_{bar}, Bar. Press., in Hg 28.4
Gas Temperature, °F DB 1,289
P_{stat}, Static Press., in H_2O 0.0607
% CO_2 4
% CO 0
% Moisture, v/v 2.0
% O_2 17
% N_2 79
Molecular Weight, M_d 29.32
Molecular Weight, M_s 29.10

Sample Port	Traverse Point	Velocity Head Difference (ΔP) (in H_2O)	Stack Temperature °F	$(\Delta P)^{0.5}$ (in $H_2O)^{0.5}$	Null Angle (zero ΔP angle)	Cosine Null Angle ($\cos \theta_{y(i)}$)	Velocity of Stack Gas V_{ai} (ft/sec)
NE	6	0.0208	1,289	0.1442	0		
	5	0.0208	1,289	0.1442	0		
	4	0.0296	1,289	0.1720	0		
	3	0.0263	1,289	0.1622	0		
	2	0.0150	1,289	0.1225	0		
	1	0.0096	1,289	0.0980	0		
Average		0.0204	1,289	0.1405	0		

Comments

P_s	**28.40**	in Hg
V_s	**881**	ft/min
Q_s	**1,922**	cfm
Q_{std}	**551**	scfm
Q	**540**	dscfm

Run

2

Date Feb 11, 2015
Time 12:25

USEPA Method 2
Gas Velocity Traverse and Volumetric Flowrate

Facility TransCanada - Blue Lake
Operators TS
Sampling Location Thermal Oxidizer Exhaust
Pitot Tube 6FtA
Stack Diameter, in 20
Area, ft^2 2.182
Pitot Tube Factor, C_p 0.84
Stack Dimension, in NA
Port Length, in 3
Cyclonic Flow Check 0
Gas Temperature, °F WB NA
P_{bar}, Bar. Press., in Hg 28.4
Gas Temperature, °F DB 1,421
P_{stat}, Static Press., in H_2O 0.0477
% CO_2 4
% CO 0
% Moisture, v/v 12.1
% O_2 17
% N_2 79
Molecular Weight, M_d 29.32
Molecular Weight, M_s 27.95

Sample Port	Traverse Point	Velocity Head Difference (ΔP) (in H_2O)	Stack Temperature °F	$(\Delta P)^{0.5}$ (in $H_2O)^{0.5}$	Null Angle (zero ΔP angle)	Cosine Null Angle ($\cos \theta_{y(i)}$)	Velocity of Stack Gas V_{ai} (ft/sec)
NE	6	0.0166	1,421	0.1288			
	5	0.0178	1,421	0.1334			
	4	0.0200	1,421	0.1414			
	3	0.0206	1,421	0.1435			
	2	0.0147	1,421	0.1212			
	1	0.0121	1,421	0.1100			
Average		0.0170	1,421	0.1297			

Comments

P_s	**28.40**	in Hg
V_s	**860**	ft/min
Q_s	**1,877**	cfm
Q_{std}	**500**	scfm
Q	**440**	dscfm

Run

3

Date	Feb 11, 2015
Time	12:35

USEPA Method 2
Gas Velocity Traverse and Volumetric Flowrate

Facility TransCanada - Blue Lake

Operators TS

Sampling Location Thermal Oxidizer Exhaust

Pitot Tube 6FtA

Stack Diameter, in 20 **Area, ft^2** 2.182

Pitot Tube Factor, C_p 0.84

Stack Dimension, in NA **Port Length, in** 3

Cyclonic Flow Check 0

Gas Temperature, °F WB NA

P_{bar}, Bar. Press., in Hg 28.4

Gas Temperature, °F DB 1,442

P_{stat}, Static Press., in H_2O 0.0414

% CO_2 4 **% CO** 0

% Moisture, v/v 1.9

% O_2 17 **% N_2** 79

Molecular Weight, M_d 29.32

Molecular Weight, M_s 29.11

Sample Port	Traverse Point	Velocity Head Difference (ΔP) (in H_2O)	Stack Temperature °F	$(\Delta P)^{0.5}$ (in $H_2O)^{0.5}$	Null Angle (zero ΔP angle)	Cosine Null Angle ($\cos \theta_{y(i)}$)	Velocity of Stack Gas V_{ai} (ft/sec)
NE	6	0.0192	1,442	0.1386			
	5	0.0216	1,442	0.1470			
	4	0.0290	1,442	0.1703			
	3	0.0249	1,442	0.1578			
	2	0.0156	1,442	0.1249			
	1	0.0129	1,442	0.1136			
Average		0.0205	1,442	0.1420			

Comments

P_s	**28.40**	in Hg
V_s	**928**	ft/min
Q_s	**2,025**	cfm
Q_{std}	**534**	scfm
Q	**524**	dscfm

Thermal Oxidizer Moisture Content Results

TransCanada - Cold Springs 1

Mancelona, Michigan

Bureau Veritas Project No. 11015-000004.00

Sampling Date: February 12, 2015

Parameter	Run 1	Run 2	Run 3	Average
Start Time	9:00	10:15	11:25	
Barometric Pressure (in Hg)	28.8	28.8	28.8	28.8
Average Orifice Differential Pressure (in H_2O)	0.05	0.08	0.08	0.1
Meter Correction Factor (γ)	0.993	0.993	0.993	0.993
Average Meter Temperature (°F)	29.8	39.3	46.5	38.5
Average Meter Pressure (in Hg)	28.80	28.81	28.81	28.81
Gas Volume Sampled (ft^3)	1.521	8.418	8.237	6.059
Gas Volume Sampled (standard ft^3)	1.567	8.511	8.209	6.096
Mass of Condensate Collected (g)	8.3	11.4	8.9	9.5
Silica Gel Mass Gain (g)	5.1	3.7	1.6	3.5
Moisture Volume (standard ft^3)	0.6	0.7	0.5	0.6
Moisture Content (%)	**28.7**	**7.7**	**5.7**	**14.0**

in H_2O	inch of water
°F	degree Fahrenheit
in Hg	inch of mercury
ft^3	cubic foot
g	gram
standard temperature, °F	68
standard pressure, in Hg	29.92

Run
1

Date Feb 12, 2015
Time 9:10

USEPA Method 2
Gas Velocity Traverse and Volumetric Flowrate

Facility TransCanada - Cold Springs 1
Operators TS
Sampling Location Thermal Oxidizer Exhaust
Pitot Tube 6FtA
Stack Diameter, in 25 **Area, ft^2** 3.409 **Pitot Tube Factor, C_p** 0.84
Stack Dimension, in NA **Port Length, in** 6 **Cyclonic Flow Check** 0
Gas Temperature, °F WB NA **P_{bar}, Bar. Press., in Hg** 28.8
Gas Temperature, °F DB 1,410 **P_{stat}, Static Press., in H_2O** 0.0393
% CO_2 4 **% CO** 0 **% Moisture, v/v** 28.7
% O_2 16 **% N_2** 80 **Molecular Weight, M_d** 29.28
Molecular Weight, M_s 26.04

Sample Port	Traverse Point	Velocity Head Difference (ΔP) (in H_2O)	Stack Temperature °F	$(\Delta P)^{0.5}$ (in H_2O)$^{0.5}$	Null Angle (zero ΔP angle)	Cosine Null Angle (cos $\theta_{y(i)}$)	Velocity of Stack Gas V_{ai} (ft/sec)
NW	6	0.0320	1,410	0.1789	0		
	5	0.0342	1,410	0.1849	0		
	4	0.0284	1,410	0.1685	0		
	3	0.0128	1,410	0.1131	0		
	2	0.0151	1,410	0.1229	0		
	1	0.0106	1,410	0.1030	0		
NE	6	0.0291	1,410	0.1706	0		
	5	0.0360	1,410	0.1897	0		
	4	0.0267	1,410	0.1634	0		
	3	0.0235	1,410	0.1533	0		
	2	0.0225	1,410	0.1500	0		
	1	0.0147	1,410	0.1212	0		
Average		0.0238	1,410	0.1516	0		

Comments

P_s	**28.80**	in Hg
V_s	**1,032**	ft/min
Q_s	**3,517**	cfm
Q_{std}	**956**	scfm
Q	**681**	dscfm

Run

2

Date Feb 12, 2015
Time 11:15

USEPA Method 2
Gas Velocity Traverse and Volumetric Flowrate

Facility TransCanada - Cold Springs 1
Operators TS
Sampling Location Thermal Oxidizer Exhaust
Pitot Tube 6FtA
Stack Diameter, in 25 **Area, ft^2** 3.409
Pitot Tube Factor, C_p 0.84
Stack Dimension, in NA **Port Length, in** 6
Cyclonic Flow Check 0
Gas Temperature, °F WB NA
P_{bar}, Bar. Press., in Hg 28.8
Gas Temperature, °F DB 1,410
P_{stat}, Static Press., in H_2O 0.0406
% CO_2 4 **% CO** 0
% Moisture, v/v 7.7
% O_2 16 **% N_2** 80
Molecular Weight, M_d 29.28
Molecular Weight, M_s 28.41

Sample Port	Traverse Point	Velocity Head Difference (ΔP) (in H_2O)	Stack Temperature °F	$(\Delta P)^{0.5}$ (in $H_2O)^{0.5}$	Null Angle (zero ΔP angle)	Cosine Null Angle (cos $\theta_{y(i)}$)	Velocity of Stack Gas V_{ai} (ft/sec)
NW	6	0.0225	1,410	0.1500			
	5	0.0293	1,410	0.1712			
	4	0.0288	1,410	0.1697			
	3	0.0255	1,410	0.1597			
	2	0.0186	1,410	0.1364			
	1	0.0160	1,410	0.1265			
NE	6	0.0192	1,410	0.1386			
	5	0.0277	1,410	0.1664			
	4	0.0219	1,410	0.1480			
	3	0.0287	1,410	0.1694			
	2	0.0283	1,410	0.1682			
	1	0.0224	1,410	0.1497			
Average		0.0241	1,410	0.1545			

Comments

P_s	**28.80**	in Hg
V_s	**1,006**	ft/min
Q_s	**3,430**	cfm
Q_{std}	**932**	scfm
Q	**860**	dscfm

Run

3

Date	Feb 12, 2015
Time	11:50

BUREAU VERITAS

USEPA Method 2
Gas Velocity Traverse and Volumetric Flowrate

Facility TransCanada - Cold Springs 1

Operators TS

Sampling Location Thermal Oxidizer Exhaust

Pitot Tube 6FtA

Stack Diameter, in 25

Area, ft^2 3.409

Pitot Tube Factor, C_p 0.84

Stack Dimension, in NA

Port Length, in 6

Cyclonic Flow Check 0

Gas Temperature, °F WB NA

P_{bar}, Bar. Press., in Hg 28.8

Gas Temperature, °F DB 1,428

P_{stat}, Static Press., in H_2O 0.0224

% CO_2 4

% CO 0

% Moisture, v/v 5.7

% O_2 16

% N_2 80

Molecular Weight, M_d 29.28

Molecular Weight, M_s 28.64

Sample Port	Traverse Point	Velocity Head Difference (ΔP) (in H_2O)	Stack Temperature °F	$(\Delta P)^{0.5}$ (in $H_2O)^{0.5}$	Null Angle (zero ΔP angle)	Cosine Null Angle (cos $\theta_{y(i)}$)	Velocity of Stack Gas V_{ai} (ft/sec)
NW	6	0.0268	1,428	0.1637			
	5	0.0309	1,428	0.1758			
	4	0.0270	1,428	0.1643			
	3	0.0196	1,428	0.1400			
	2	0.0133	1,428	0.1153			
	1	0.0148	1,428	0.1217			
NE	6	0.0143	1,428	0.1196			
	5	0.0312	1,428	0.1766			
	4	0.0290	1,428	0.1703			
	3	0.0185	1,428	0.1360			
	2	0.0129	1,428	0.1136			
	1	0.0168	1,428	0.1296			
Average		0.0213	1,428	0.1439			

Comments

P_s	**28.80**	in Hg
V_s	**938**	ft/min
Q_s	**3,197**	cfm
Q_{std}	**861**	scfm
Q	**812**	dscfm

Appendix E

Laboratory Data

February 20, 2015

Thom Schmelter
BVNA, INC. ES DETROIT
22345 Roethel Drive
Novi, MI 48375-

Bureau Veritas Work Order No. 15020688

Reference: 11015-000004.00/

Dear Thom Schmelter:

Bureau Veritas North America, Inc. received 16 samples on February 13, 2015 for the analyses presented in the following report.

Enclosed is a copy of the Chain-of-Custody record, acknowledging receipt of these samples. Please note that any unused portion of the samples will be discarded 30 days after the date of this report, unless you have requested otherwise.

This material is confidential and is intended solely for the person to whom it is addressed. If this is received in error, please contact the number provided below.

We appreciate the opportunity to assist you. If you have any questions concerning this report, please contact a Client Services Representative at (800) 806-5887.

Sincerely,

Scott Caillouette

Scott Caillouette
Client Services Representative
Electronic signature authorized through password protection

Bureau Veritas North America, Inc.
[illegible]
22345 Roethel Drive
Novi, MI 48375

Main: 2
Fax: 2
www.us.b

CASE NARRATIVE

Date: *20-Feb-15*

CLIENT:	BVNA, INC. ES DETROIT
Project:	11015-000004.00/
Work Order No	15020688

The results of this report relate only to the samples listed in the body of this report.

Unless otherwise noted below, the following statements apply: 1) all samples were received in acceptable condition, 2) all quality control results associated with this sample set were within acceptable limits and/or do not adversely affect the reported results, and 3) the industrial hygiene results have not been blank corrected.

ANALYTICAL RESULTS

Date: *20-Feb-15*

Client: BVNA, INC. ES DETROIT

Project: 11015-000004.00/

Work Order No: 15020688

Sample Identification: BLUE LAKE RUN 1 NORMAL

Lab Number: 001A

Date Sampled: 2/11/2015

Sample Type: Charcoal Tube

Date Received: 2/13/2015

Analyst: CAW

Air Volume (L): NA

Analyte	Analytical Results			Reporting Limit (µg)	Test Method	Date Analyzed
	(µg)	(mg/m^3)	(ppm)			
Benzene	<2	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	<8	--	--	8	BTEX by OSHA 7	02/19/2015

Sample Identification: BLUE LAKE RUN 1 SPIKE

Lab Number: 002A

Date Sampled: 2/11/2015

Sample Type: Charcoal Tube

Date Received: 2/13/2015

Analyst: CAW

Air Volume (L): NA

Analyte	Analytical Results			Reporting Limit (µg)	Test Method	Date Analyzed
	(µg)	(mg/m^3)	(ppm)			
Benzene	30	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	28	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	29	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	55	--	--	8	BTEX by OSHA 7	02/19/2015

ANALYTICAL RESULTS

Date: *20-Feb-15*

Client: BVNA, INC. ES DETROIT

Project: 11015-000004.00/

Work Order No: 15020688

Sample Identification: BLUE LAKE RUN 2 NORMAL

Lab Number: 003A

Date Sampled: 2/11/2015

Sample Type: Charcoal Tube

Date Received: 2/13/2015

Analyst: CAW

Air Volume (L): NA

Analyte	Analytical Results (µg)	Analytical Results (mg/m³)	Analytical Results (ppm)	Reporting Limit (µg)	Test Method	Date Analyzed
Benzene	<2	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	<8	--	--	8	BTEX by OSHA 7	02/19/2015

Sample Identification: BLUE LAKE RUN 2 SPIKE

Lab Number: 004A

Date Sampled: 2/11/2015

Sample Type: Charcoal Tube

Date Received: 2/13/2015

Analyst: CAW

Air Volume (L): NA

Analyte	Analytical Results (µg)	Analytical Results (mg/m³)	Analytical Results (ppm)	Reporting Limit (µg)	Test Method	Date Analyzed
Benzene	30	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	26	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	29	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	51	--	--	8	BTEX by OSHA 7	02/19/2015

ANALYTICAL RESULTS

Date: *20-Feb-15*

Client: BVNA, INC. ES DETROIT

Project: 11015-000004.00/ **Work Order No:** 15020688

Sample Identification: BLUE LAKE RUN 3 NORMAL

Lab Number: 005A **Date Sampled:** 2/11/2015

Sample Type: Charcoal Tube **Date Received:** 2/13/2015

Analyst: CAW **Air Volume (L):** NA

Analyte	Analytical Results (µg)	(mg/m³)	(ppm)	Reporting Limit (µg)	Test Method	Date Analyzed
Benzene	<2	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	<8	--	--	8	BTEX by OSHA 7	02/19/2015

Sample Identification: BLUE LAKE RUN 3 SPIKE

Lab Number: 006A **Date Sampled:** 2/11/2015

Sample Type: Charcoal Tube **Date Received:** 2/13/2015

Analyst: CAW **Air Volume (L):** NA

Analyte	Analytical Results (µg)	(mg/m³)	(ppm)	Reporting Limit (µg)	Test Method	Date Analyzed
Benzene	30	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	28	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	29	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	54	--	--	8	BTEX by OSHA 7	02/19/2015

ANALYTICAL RESULTS

Date: *20-Feb-15*

Client: BVNA, INC. ES DETROIT

Project: 11015-000004.00/

Work Order No: 15020688

Sample Identification: BTEX BLANK1

Lab Number: 007A

Date Sampled: 2/11/2015

Sample Type: Charcoal Tube

Date Received: 2/13/2015

Analyst: CAW

Air Volume (L): NA

Analyte	Analytical Results (µg)	(mg/m³)	(ppm)	Reporting Limit (µg)	Test Method	Date Analyzed
Benzene	<2	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	<8	--	--	8	BTEX by OSHA 7	02/19/2015

Sample Identification: BTEX SPIKE BLANK 1

Lab Number: 008A

Date Sampled: 2/11/2015

Sample Type: Charcoal Tube

Date Received: 2/13/2015

Analyst: CAW

Air Volume (L): NA

Analyte	Analytical Results (µg)	(mg/m³)	(ppm)	Reporting Limit (µg)	Test Method	Date Analyzed
Benzene	29	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	27	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	28	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	52	--	--	8	BTEX by OSHA 7	02/19/2015

ANALYTICAL RESULTS

Date: *20-Feb-15*

Client: BVNA, INC. ES DETROIT

Project: 11015-000004.00/ **Work Order No:** 15020688

Sample Identification: COLD SPRINGS RUN 1 NORMAL

Lab Number: 009A **Date Sampled:** 2/12/2015

Sample Type: Charcoal Tube **Date Received:** 2/13/2015

Analyst: CAW **Air Volume (L):** NA

Analyte	Analytical Results (µg)	(mg/m³)	(ppm)	Reporting Limit (µg)	Test Method	Date Analyzed
Benzene	<2	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	<8	--	--	8	BTEX by OSHA 7	02/19/2015

Sample Identification: COLD SPRINGS RUN 1 SPIKE

Lab Number: 010A **Date Sampled:** 2/12/2015

Sample Type: Charcoal Tube **Date Received:** 2/13/2015

Analyst: CAW **Air Volume (L):** NA

Analyte	Analytical Results (µg)	(mg/m³)	(ppm)	Reporting Limit (µg)	Test Method	Date Analyzed
Benzene	34	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	33	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	34	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	63	--	--	8	BTEX by OSHA 7	02/19/2015

ANALYTICAL RESULTS

Date: *20-Feb-15*

Client:	**BVNA, INC. ES DETROIT**		
Project:	**11015-000004.00/**	**Work Order No:**	**15020688**

Sample Identification:	**COLD SPRINGS RUN 2 NORMAL**		
Lab Number:	**011A**	**Date Sampled:**	**2/12/2015**
Sample Type:	**Charcoal Tube**	**Date Received:**	**2/13/2015**
Analyst:	**CAW**	**Air Volume (L):**	**NA**

Analyte	Analytical Results (µg)	(mg/m³)	(ppm)	Reporting Limit (µg)	Test Method	Date Analyzed
Benzene	<2	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	<8	--	--	8	BTEX by OSHA 7	02/19/2015

Sample Identification:	**COLD SPRINGS RUN 2 SPIKE**		
Lab Number:	**012A**	**Date Sampled:**	**2/12/2015**
Sample Type:	**Charcoal Tube**	**Date Received:**	**2/13/2015**
Analyst:	**CAW**	**Air Volume (L):**	**NA**

Analyte	Analytical Results (µg)	(mg/m³)	(ppm)	Reporting Limit (µg)	Test Method	Date Analyzed
Benzene	34	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	31	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	33	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	60	--	--	8	BTEX by OSHA 7	02/19/2015

ANALYTICAL RESULTS

Date: *20-Feb-15*

Client: BVNA, INC. ES DETROIT

Project: 11015-000004.00/

Work Order No: 15020688

Sample Identification: COLD SPRINGS RUN 3 NORMAL

Lab Number: 013A

Date Sampled: 2/12/2015

Sample Type: Charcoal Tube

Date Received: 2/13/2015

Analyst: CAW

Air Volume (L): NA

Analyte	Analytical Results (µg)	(mg/m³)	(ppm)	Reporting Limit (µg)	Test Method	Date Analyzed
Benzene	<2	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	<8	--	--	8	BTEX by OSHA 7	02/19/2015

Sample Identification: COLD SPRINGS RUN 3 SPIKE

Lab Number: 014A

Date Sampled: 2/12/2015

Sample Type: Charcoal Tube

Date Received: 2/13/2015

Analyst: CAW

Air Volume (L): NA

Analyte	Analytical Results (µg)	(mg/m³)	(ppm)	Reporting Limit (µg)	Test Method	Date Analyzed
Benzene	35	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	32	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	34	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	62	--	--	8	BTEX by OSHA 7	02/19/2015

ANALYTICAL RESULTS

Date: *20-Feb-15*

Client: **BVNA, INC. ES DETROIT**

Project: **11015-000004.00/**

Work Order No: **15020688**

Sample Identification: **BTEX BLANK 2**

Lab Number: **015A**

Date Sampled: **2/12/2015**

Sample Type: **Charcoal Tube**

Date Received: **2/13/2015**

Analyst: **CAW**

Air Volume (L): **NA**

Analyte	Analytical Results (µg)	Analytical Results (mg/m³)	Analytical Results (ppm)	Reporting Limit (µg)	Test Method	Date Analyzed
Benzene	<2	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	<4	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	<8	--	--	8	BTEX by OSHA 7	02/19/2015

Sample Identification: **BTEX SPIKE BLANK 2**

Lab Number: **016A**

Date Sampled: **2/12/2015**

Sample Type: **Charcoal Tube**

Date Received: **2/13/2015**

Analyst: **CAW**

Air Volume (L): **NA**

Analyte	Analytical Results (µg)	Analytical Results (mg/m³)	Analytical Results (ppm)	Reporting Limit (µg)	Test Method	Date Analyzed
Benzene	30	--	--	2	BTEX by OSHA 7	02/19/2015
Ethylbenzene	27	--	--	4	BTEX by OSHA 7	02/19/2015
Toluene	28	--	--	4	BTEX by OSHA 7	02/19/2015
Xylene, Total	52	--	--	8	BTEX by OSHA 7	02/19/2015

General Notes:
<: Less than the indicated reporting limit (RL).
--: Information not available or not applicable.
Back sections (if applicable) were checked and showed no significant breakthrough unless otherwise noted.

Request for Laboratory Analytical Services

IMPORTANT Date results required Standard TAT
Rush charges authorized? Yes ☐ No ☒
Fax or ☐ E-mail results ☒
E-mail Address thomas.schmelter@us.bureauveritas.com

Page: 1 of 2
For Lab Use Only
Lab Project No.
15020688

Bureau Veritas North America, Inc.

Report results to: **Client Project Number:** 11015-000004.00
Name Thomas Schmelter - Novi, MI - HSE
Company Bureau Veritas North America, Inc.
Mailing Address 22345 Roethel Drive
City, State, Zip Novi, MI, 48375
Telephone No 248.344.3003 Fax No. 248.344.2656

Send invoice to: **P.O. No.** 11015-000004.00
Name AccountsPayableHSEMail@us.bureauveritas.com
Company
Address
City, State, Zip

Special instructions and/or specific regulatory requirements
(method, limit of detection, etc.)
Client: TransCanada - Blue Lake
Analyze for: Benzene, Toluene, Ethylbenzene, and Xylenes

Soil samples only: Which state are these from?
Water samples are:
Drinking water Groundwater
Wastewater

Client Sample Identification	Date Sampled	Time Sampled	Matrix/Media	Air Volume (Liters)	# of Jars	ANALYSIS REQUESTED (List each analyte on the lines below, multiple analytes per line)
Blue Lake Run 1 Normal	2/11/15	10:05	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX
Blue Lake Run 1 Spike	2/11/15	10:05	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX
Blue Lake Run 2 Normal	2/11/15	11:15	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX
Blue Lake Run 2 Spike	2/11/15	11:15	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX
Blue Lake Run 3 Normal	2/11/15	12:25	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX
Blue Lake Run 3 Spike	2/11/15	12:25	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX
BTEX Blank 1	2/11/15	13:00	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX
BTEX Spike Blank 1	2/11/15	13:00	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX

Collected by: Thomas Schmelter ***Date/Time*** 2/12/2015 - 15:00 ***Collector's Signature:*** Thomas R. Schmelter ***Date/Time*** 2/12/2015 - 15:00
Relinquished by: ***Date/Time*** 2/13/15 4:11 ***Received by:*** ***Date/Time***
Relinquished by: ***Date/Time*** ***Received by:*** ***Date/Time*** 2/13 411
Method of Shipment: ***Sample Condition on Receipt:*** [✓ Acceptable] ***Other:*** ***(Explain)***
Authorized by: Thomas R. Schmelter
(Signature MUST accompany request!)

Ship to:

Detroit Lab
22345 Roethel Drive
Novi, MI 48375
248.344.2652
800.806.5887
Fax: 248.344.2655

Atlanta Lab
3380 Chastain Meadows Pkwy., Ste 300
Kennesaw, GA 30144
770.499.7500
800.252.9919
Fax: 770.499.7511

Chicago Lab
95 Oakwood Road
Lake Zurich, IL 60047
888.576.7522
847.726.3320
Fax: 847.726.3323

Canadian Clients
1415 Janette Ave
Windsor, ON N8X 1Z1

Visit our Website:
www.us.bureauveritas.com/hse

Request for Laboratory Analytical Services

IMPORTANT Date results required: Standard TAT
Rush charges authorized? Yes ☐ No ☒
Fax or ☐ E-mail results ☒
E-mail Address: thomas.schmelter@us.bureauveritas.com

Page: 2 of 2
For Lab Use Only
Lab Project No.

Bureau Veritas North America, Inc.

Report results to: **Client Project Number:** 11015-000004.00
Name Thomas Schmelter - Novi, MI - HSE
Company Bureau Veritas North America, Inc.
Mailing Address 22345 Roethel Drive
City, State, Zip Novi, MI, 48375
Telephone No. 248.344.3003 Fax No. 248.344.2656

Send invoice to: **P.O. No.** 11015-000004.00
Name AccountsPayableHSEMail@us.bureauveritas.com
Company
Address
City, State, Zip

Special instructions and/or specific regulatory requirements:
(method, limit of detection, etc.)
Client: TransCanada - Cold Springs 1
Analyze for: Benzene, Toluene, Ethylbenzene, and Xylenes

Soil samples only: Which state are these from?
Water samples are:
Drinking water Groundwater
Wastewater

Client Sample Identification	Date Sampled	Time Sampled	Matrix/Media	Air Volume (Liters)	# of Jars	ANALYSIS REQUESTED (List each analyte on the lines below, multiple analytes per line)
Cold Springs 1 Run 1 Normal	2/12/15	9:00	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX
Cold Springs 1 Run 1 Spike	2/12/15	9:00	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX
Cold Springs 1 Run 2 Normal	2/12/15	10:15	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX
Cold Springs 1 Run 2 Spike	2/12/15	10:15	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX
Cold Springs 1 Run 3 Normal	2/12/15	11:25	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX
Cold Springs 1 Run 3 Spike	2/12/15	11:26	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX
BTEX Blank 2	2/12/15	12:00	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX
BTEX Spike Blank 2	2/12/15	12:00	Sorbent tube		1	EPA Method 18 / OSHA 7 - BTEX

Collected by: Thomas Schmelter **Date/Time** 2/12/2015 - 15:00
Collector's Signature: Thomas R. Schmelter **Date/Time** 2/12/2015 - 15:00
Relinquished by: **Date/Time** 2/13/15 4:11
Received by: **Date/Time**
Relinquished by: **Date/Time**
Received by: **Date/Time** 2/13 4:11
Method of Shipment:
Sample Condition on Receipt: [✓ Acceptable] **Other:** **(Explain)**
Authorized by: Thomas R. Schmelter
(Signature MUST accompany request!)

Ship to:

Detroit Lab
22345 Roethel Drive
Novi, MI 48375
248.344.2652
800.806.5887
Fax: 248.344.2655

Atlanta Lab
3380 Chastain Meadows Pkwy., Ste 300
Kennesaw, GA 30144
770.499.7500
800.252.9919
Fax: 770.499.7511

Chicago Lab
95 Oakwood Road
Lake Zurich, IL 60047
888.576.7522
847.726.3320
Fax: 847.726.3323

Canadian Clients
1415 Janette Ave
Windsor, ON N8X 1Z1

Visit our Website:
www.us.bureauveritas.com/hse

Your P.O. #: 11015-000004.00
Your Project #: 11015-000004.00
Site Location: TRANSCANADA-BLUE LAKE /COLD SPRINGS 1

Attention:Thomas Schmelter

Bureau Veritas North America, Inc.
22345 Roethel Drive
Novi, MI
USA 48375

Report Date: 2015/02/23
Report #: R3337655
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B529205
Received: 2015/02/17, 19:34

Sample Matrix: Stack Sampling Train
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
VOST Condensate (8260Cmod)	8	N/A	2015/02/20	CAM SOP-00226	EPA 8260C m

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total Cover Pages : 1

Maxxam Job #: B529205
Report Date: 2015/02/23

Bureau Veritas North America, Inc.
Client Project #: 11015-000004.00
Site Location: TRANSCANADA-BLUE LAKE /COLD SPRINGS 1
Your P.O. #: 11015-000004.00

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		ZO5236	ZO5238	ZO5241	ZO5243	ZO5244			
Sampling Date		2015/02/11 13:00	2015/02/11 10:05	2015/02/11 11:15	2015/02/11 12:25	2015/02/12 12:00			
	Units	**WATER BLANK 1**	**BLUE LAKE RUN 1 NORMAL IMPINGERS**	**BLUE LAKE RUN 2 SPIKE IMPINGERS**	**BLUE LAKE RUN 3 SPIKE IMPINGERS**	**WATER BLANK 2**	**RDL**	**QC Batch**	**MDL**
Volatile Organics									
Benzene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	3923018	0.50
Toluene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	3923018	0.50
Ethylbenzene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	3923018	0.50
p+m-Xylene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	3923018	0.50
o-Xylene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	3923018	0.50
Total Xylenes	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	3923018	0.50
Surrogate Recovery (%)									
4-Bromofluorobenzene	%	96	97	98	98	97		3923018	
D4-1,2-Dichloroethane	%	94	101	104	104	103		3923018	
D8-Toluene	%	99	97	96	95	97		3923018	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		ZO5248	ZO5249	ZO5250			
Sampling Date		2015/02/12 10:15	2015/02/12 11:25	2015/02/12 11:25			
	Units	**COLD SPRINGS 1 RUN 2 SPIKE IMPINGERS**	**COLD SPRINGS 1 RUN 3 NORMAL IMPINGERS**	**COLD SPRINGS 1 RUN 3 SPIKE IMPINGERS**	**RDL**	**QC Batch**	**MDL**
Volatile Organics							
Benzene	ug/L	<1.0	<1.0	<1.0	1.0	3923018	0.50
Toluene	ug/L	<1.0	<1.0	<1.0	1.0	3923018	0.50
Ethylbenzene	ug/L	<1.0	<1.0	<1.0	1.0	3923018	0.50
p+m-Xylene	ug/L	<1.0	<1.0	<1.0	1.0	3923018	0.50
o-Xylene	ug/L	<1.0	<1.0	<1.0	1.0	3923018	0.50
Total Xylenes	ug/L	<1.0	<1.0	<1.0	1.0	3923018	0.50
Surrogate Recovery (%)							
4-Bromofluorobenzene	%	99	98	98		3923018	
D4-1,2-Dichloroethane	%	102	103	104		3923018	
D8-Toluene	%	97	97	96		3923018	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

TEST SUMMARY

Maxxam ID: ZO5236
Sample ID: WATER BLANK 1
Matrix: Stack Sampling Train

Collected: 2015/02/11
Shipped:
Received: 2015/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST Condensate (8260Cmod)	P&T/MS	3923018	N/A	2015/02/20	Sarah Lam

Maxxam ID: ZO5238
Sample ID: BLUE LAKE RUN 1 NORMAL IMPINGERS
Matrix: Stack Sampling Train

Collected: 2015/02/11
Shipped:
Received: 2015/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST Condensate (8260Cmod)	P&T/MS	3923018	N/A	2015/02/20	Sarah Lam

Maxxam ID: ZO5241
Sample ID: BLUE LAKE RUN 2 SPIKE IMPINGERS
Matrix: Stack Sampling Train

Collected: 2015/02/11
Shipped:
Received: 2015/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST Condensate (8260Cmod)	P&T/MS	3923018	N/A	2015/02/20	Sarah Lam

Maxxam ID: ZO5243
Sample ID: BLUE LAKE RUN 3 SPIKE IMPINGERS
Matrix: Stack Sampling Train

Collected: 2015/02/11
Shipped:
Received: 2015/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST Condensate (8260Cmod)	P&T/MS	3923018	N/A	2015/02/20	Sarah Lam

Maxxam ID: ZO5244
Sample ID: WATER BLANK 2
Matrix: Stack Sampling Train

Collected: 2015/02/12
Shipped:
Received: 2015/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST Condensate (8260Cmod)	P&T/MS	3923018	N/A	2015/02/20	Sarah Lam

Maxxam ID: ZO5248
Sample ID: COLD SPRINGS 1 RUN 2 SPIKE IMPINGERS
Matrix: Stack Sampling Train

Collected: 2015/02/12
Shipped:
Received: 2015/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST Condensate (8260Cmod)	P&T/MS	3923018	N/A	2015/02/20	Sarah Lam

Maxxam ID: ZO5249
Sample ID: COLD SPRINGS 1 RUN 3 NORMAL IMPINGERS
Matrix: Stack Sampling Train

Collected: 2015/02/12
Shipped:
Received: 2015/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST Condensate (8260Cmod)	P&T/MS	3923018	N/A	2015/02/20	Sarah Lam

TEST SUMMARY

Maxxam ID: ZO5250
Sample ID: COLD SPRINGS 1 RUN 3 SPIKE IMPINGERS
Matrix: Stack Sampling Train

Collected: 2015/02/12
Shipped:
Received: 2015/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST Condensate (8260Cmod)	P&T/MS	3923018	N/A	2015/02/20	Sarah Lam

GENERAL COMMENTS

VOC Analysis: Due to insufficient sample volume, samples required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
3923018	SLM	Spiked Blank	4-Bromofluorobenzene	2015/02/20		102	%	70 - 130
			D4-1,2-Dichloroethane	2015/02/20		99	%	70 - 130
			D8-Toluene	2015/02/20		100	%	70 - 130
			Benzene	2015/02/20		97	%	70 - 130
			Toluene	2015/02/20		93	%	70 - 130
			Ethylbenzene	2015/02/20		97	%	70 - 130
			p+m-Xylene	2015/02/20		98	%	70 - 130
			o-Xylene	2015/02/20		97	%	70 - 130
3923018	SLM	Method Blank	4-Bromofluorobenzene	2015/02/20		97	%	70 - 130
			D4-1,2-Dichloroethane	2015/02/20		105	%	70 - 130
			D8-Toluene	2015/02/20		97	%	70 - 130
			Benzene	2015/02/20	<0.50		ug/L	
			Toluene	2015/02/20	<0.50		ug/L	
			Ethylbenzene	2015/02/20	<0.50		ug/L	
			p+m-Xylene	2015/02/20	<0.50		ug/L	
			o-Xylene	2015/02/20	<0.50		ug/L	
			Total Xylenes	2015/02/20	<0.50		ug/L	

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

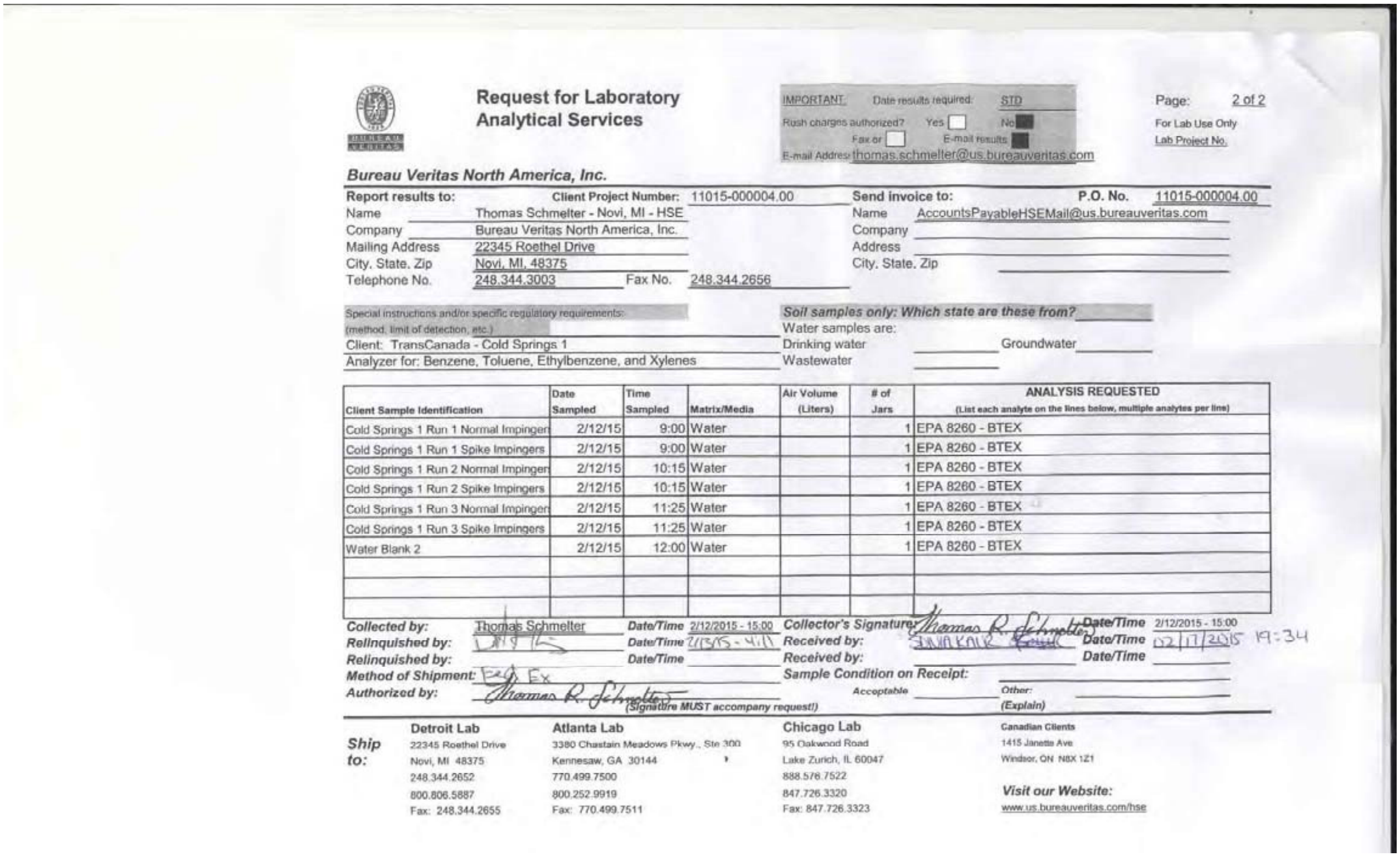
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere

Cristina Carriere, Scientific Services



Request for Laboratory Analytical Services

IMPORTANT: Date results required: STD
Rush charges authorized? Yes ☐ No ■
Fax or ☐ E-mail results ■
E-mail Address: thomas.schmelter@us.bureauveritas.com

Page: 2 of 2
For Lab Use Only
Lab Project No.

Bureau Veritas North America, Inc.

Report results to:
Client Project Number: 11015-000004.00
Name: Thomas Schmelter - Novi, MI - HSE
Company: Bureau Veritas North America, Inc.
Mailing Address: 22345 Roethel Drive
City, State, Zip: Novi, MI, 48375
Telephone No.: 248.344.3003
Fax No.: 248.344.2656

Send invoice to:
P.O. No. 11015-000004.00
Name: AccountsPayableHSEMail@us.bureauveritas.com
Company:
Address:
City, State, Zip:

Special instructions and/or specific regulatory requirements: (method, limit of detection, etc.)
Client: TransCanada - Cold Springs 1
Analyzer for: Benzene, Toluene, Ethylbenzene, and Xylenes

Soil samples only: Which state are these from?
Water samples are:
Drinking water ________ Groundwater ________
Wastewater ________

Client Sample Identification	Date Sampled	Time Sampled	Matrix/Media	Air Volume (Liters)	# of Jars	ANALYSIS REQUESTED (List each analyte on the lines below, multiple analytes per line)
Cold Springs 1 Run 1 Normal Impinger	2/12/15	9:00	Water		1	EPA 8260 - BTEX
Cold Springs 1 Run 1 Spike Impingers	2/12/15	9:00	Water		1	EPA 8260 - BTEX
Cold Springs 1 Run 2 Normal Impinger	2/12/15	10:15	Water		1	EPA 8260 - BTEX
Cold Springs 1 Run 2 Spike Impingers	2/12/15	10:15	Water		1	EPA 8260 - BTEX
Cold Springs 1 Run 3 Normal Impinger	2/12/15	11:25	Water		1	EPA 8260 - BTEX
Cold Springs 1 Run 3 Spike Impingers	2/12/15	11:25	Water		1	EPA 8260 - BTEX
Water Blank 2	2/12/15	12:00	Water		1	EPA 8260 - BTEX

Collected by: Thomas Schmelter ***Date/Time*** 2/12/2015 - 15:00
Collector's Signature: Thomas R. Schmelter ***Date/Time*** 2/12/2015 - 15:00
Relinquished by: ***Date/Time*** 2/13/15 - 4:11
Received by: SUVIA KAUR ***Date/Time*** 02/17/2015 19:34
Relinquished by: ***Date/Time***
Received by: ***Date/Time***
Method of Shipment: Fed Ex
Sample Condition on Receipt:
Authorized by: Thomas R. Schmelter
(Signature MUST accompany request!)
Acceptable ________ *Other: (Explain)* ________

Ship to:

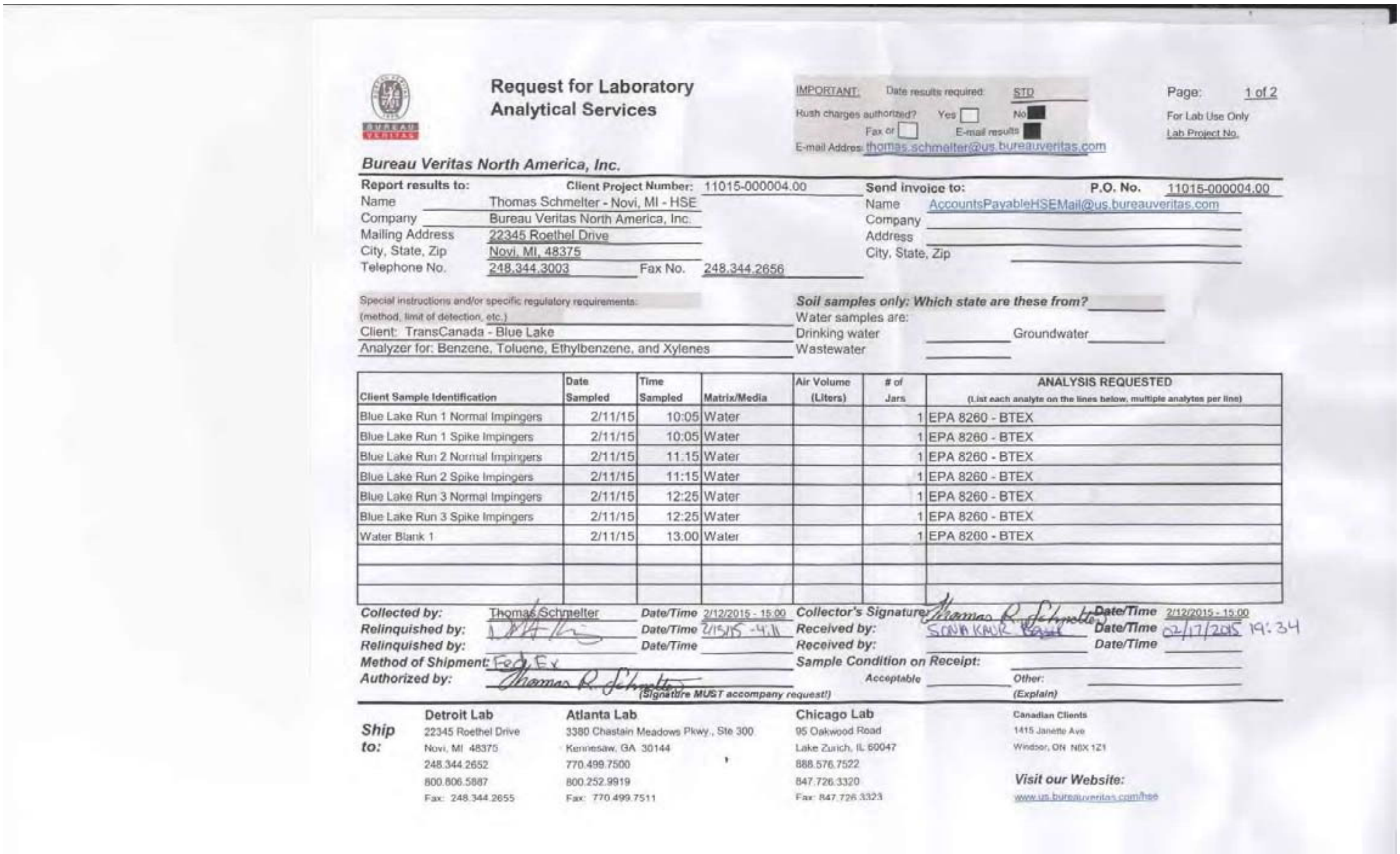
Detroit Lab
22345 Roethel Drive
Novi, MI 48375
248.344.2652
800.806.5887
Fax: 248.344.2655

Atlanta Lab
3380 Chastain Meadows Pkwy., Ste 300
Kennesaw, GA 30144
770.499.7500
800.252.9919
Fax: 770.499.7511

Chicago Lab
95 Oakwood Road
Lake Zurich, IL 60047
888.576.7522
847.726.3320
Fax: 847.726.3323

Canadian Clients
1415 Janette Ave
Windsor, ON N8X 1Z1

Visit our Website:
www.us.bureauveritas.com/hse



Request for Laboratory Analytical Services

IMPORTANT: Date results required: STD
Rush charges authorized? Yes ☐ No ☒
Fax or ☐ E-mail results ☒
E-mail Address: thomas.schmelter@us.bureauveritas.com

Page: 1 of 2
For Lab Use Only
Lab Project No.

Bureau Veritas North America, Inc.

Report results to: **Client Project Number:** 11015-000004.00
Name Thomas Schmelter - Novi, MI - HSE
Company Bureau Veritas North America, Inc.
Mailing Address 22345 Roethel Drive
City, State, Zip Novi, MI, 48375
Telephone No. 248.344.3003 Fax No. 248.344.2656

Send invoice to: **P.O. No.** 11015-000004.00
Name AccountsPayableHSEMail@us.bureauveritas.com
Company
Address
City, State, Zip

Special instructions and/or specific regulatory requirements:
(method, limit of detection, etc.)
Client: TransCanada - Blue Lake
Analyzer for: Benzene, Toluene, Ethylbenzene, and Xylenes

Soil samples only: Which state are these from?
Water samples are:
Drinking water
Groundwater
Wastewater

Client Sample Identification	Date Sampled	Time Sampled	Matrix/Media	Air Volume (Liters)	# of Jars	ANALYSIS REQUESTED (List each analyte on the lines below, multiple analytes per line)
Blue Lake Run 1 Normal Impingers	2/11/15	10:05	Water		1	EPA 8260 - BTEX
Blue Lake Run 1 Spike Impingers	2/11/15	10:05	Water		1	EPA 8260 - BTEX
Blue Lake Run 2 Normal Impingers	2/11/15	11:15	Water		1	EPA 8260 - BTEX
Blue Lake Run 2 Spike Impingers	2/11/15	11:15	Water		1	EPA 8260 - BTEX
Blue Lake Run 3 Normal Impingers	2/11/15	12:25	Water		1	EPA 8260 - BTEX
Blue Lake Run 3 Spike Impingers	2/11/15	12:25	Water		1	EPA 8260 - BTEX
Water Blank 1	2/11/15	13:00	Water		1	EPA 8260 - BTEX

Collected by: Thomas Schmelter **Date/Time** 2/12/2015 - 15:00 **Collector's Signature** Thomas R. Schmelter **Date/Time** 2/12/2015 - 15:00
Relinquished by: **Date/Time** 2/15/15 - 4:11 **Received by:** SONA KAUR **Date/Time** 02/17/2015 19:34
Relinquished by: **Date/Time** **Received by:** **Date/Time**
Method of Shipment: FedEx **Sample Condition on Receipt:**
Authorized by: Thomas R. Schmelter *(Signature MUST accompany request!)* *Acceptable* *Other:* *(Explain)*

Ship to:

Detroit Lab
22345 Roethel Drive
Novi, MI 48375
248.344.2652
800.806.5887
Fax: 248.344.2655

Atlanta Lab
3380 Chastain Meadows Pkwy., Ste 300
Kennesaw, GA 30144
770.499.7500
800.252.9919
Fax: 770.499.7511

Chicago Lab
95 Oakwood Road
Lake Zurich, IL 60047
888.576.7522
847.726.3320
Fax: 847.726.3323

Canadian Clients
1415 Janette Ave
Windsor, ON N8X 1Z1

Visit our Website:
www.us.bureauveritas.com/hse

Appendix F

Facility Operating Data

Date: 02/11/2015 Blue Lake TOX Test 1

Time ETZ	Stat #/CND TP Max	Actual Cond Temp	Alarm	Prv Hrs	TOX MIN	Actual TOX Temp		Gas Flow Rate MMCFH	Glycol Flow Rate GPM
10:05	BL18 ● 80	25	Off	0.0	● 1400	1455		26.465	77.4
10:15	BL18 ● 80	25	Off	0.0	● 1400	1442		26.739	71.2
10:25	BL18 ● 80	26	Off	0.0	● 1400	1445		26.938	71.6
10:35	BL18 ● 80	27	Off	0.0	● 1400	1450		26.953	76.8
10:45	BL18 ● 80	27	Off	0.0	● 1400	1444		26.77	76.2
10:55	BL18 ● 80	27	Off	0.0	● 1400	1461		27.052	70.6
11:05	BL18 ● 80	27	Off	0.0	● 1400	1453		26.838	67.9

Date: 02/11/2015 Blue Lake TOX Test 2

Time ETZ	Stat #/CND TP Max	Actual Cond Temp	Alarm	Prv Hrs	TOX MIN	Actual TOX Temp		Gas Flow Rate MMCFH	Glycol Flow Rate GPM
11:15	BL18 ● 80	28	Off	0.0	● 1400	1456		26.823	72.1
11:25	BL18 ● 80	28	Off	0.0	● 1400	1476		26.961	75.9
11:35	BL18 ● 80	28	Off	0.0	● 1400	1455		26.976	76
11:45	BL18 ● 80	28	Off	0.0	● 1400	1474		26.991	72
11:55	BL18 ● 80	28	Off	0.0	● 1400	1460		26.922	72.3
12:05	BL18 ● 80	28	Off	0.0	● 1400	1464		26.961	80.2
12:15	BL18 ● 80	28	Off	0.0	● 1400	1469		26.938	79.8

Date: 02/11/2015 Blue Lake TOX Test 3

		Actual				Actual			
Time ETZ	Stat #/CND TP Max	Cond Temp	Alarm	Prv Hrs	TOX MIN	TOX Temp		Gas Flow Rate MMCFH	Glycol Flow Rate GPM
12:25	 BL18 ● 80	28	Off	0.0	● 1400	1463		27.067	78.2
12:35	 BL18 ● 80	28	Off	0.0	● 1400	1481		26.915	74
12:45	 BL18 ● 80	28	Off	0.0	● 1400	1477		26.938	73.6
12:55	 BL18 ● 80	28	Off	0.0	● 1400	1462		27.083	72.9
13:05	 BL18 ● 80	28	Off	0.0	● 1400	1472		27.037	78.1
13:15	 BL18 ● 80	28	Off	0.0	● 1400	1475		26.899	78.7
13:25	 BL18 ● 80	27	Off	0.0	● 1400	1486		27.052	74.4

Date: 02/12/2015 Cold Springs_1 TOX Test 1 Glycol Flow Rate = 16 GPM

Time ETZ	Stat#/CND TP Max	Actual Cond Temp	Alarm	Prv Hrs	TOX MIN	Actual TOX Temp	Alarm	Prv Hrs	Gas Flow Rate MMCFH
9:00	 CS1 ● 100	-3	Off	0.0	● 1400	1455	Off	0.0	8.345
9:10	 CS1 ● 100	-3	Off	0.0	● 1400	1469	Off	0.0	8.363
9:20	 CS1 ● 100	-3	Off	0.0	● 1400	1461	Off	0.0	8.376
9:30	 CS1 ● 100	-2	Off	0.0	● 1400	1474	Off	0.0	8.317
9:40	 CS1 ● 100	-2	Off	0.0	● 1400	1451	Off	0.0	8.318
9:50	 CS1 ● 100	-2	Off	0.0	● 1400	1466	Off	0.0	8.291
10:00	 CS1 ● 100	-1	Off	0.0	● 1400	1461	Off	0.0	8.37

Date: 02/12/2015　　Cold Springs_1 TOX Test 2　　Glycol Flow Rate = 16 GPM

		Actual				Actual			
Time ETZ	Stat#/CND TP Max	Cond Temp	Alarm	Prv Hrs	TOX MIN	TOX Temp	Alarm	Prv Hrs	Gas Flow Rate MMCFH
10:15	CS1 ● 100	-1	Off	0.0	● 1400	1457	Off	20.9	8.335
10:25	CS1 ● 100	0	Off	0.0	● 1400	1469	Off	20.9	8.289
10:35	CS1 ● 100	0	Off	0.0	● 1400	1466	Off	20.9	8.235
10:45	CS1 ● 100	1	Off	0.0	● 1400	1469	Off	20.9	8.202
10:55	CS1 ● 100	1	Off	0.0	● 1400	1464	Off	20.9	8.112
11:05	CS1 ● 100	1	Off	0.0	● 1400	1464	Off	20.9	8.079
11:15	CS1 ● 100	2	Off	0.0	● 1400	1454	Off	20.9	7.661

Date: 02/12/2015 Cold Springs_1 TOX Test 3 Glycol Flow Rate = 16 GPM

		Actual				Actual			
Time ETZ	Stat#/CND TP Max	Cond Temp	Alarm	Prv Hrs	TOX MIN	TOX Temp	Alarm	Prv Hrs	Gas Flow Rate MMCFH
11:25	CS1 ● 100	2	Off	0.0	● 1400	1461	Off	20.9	7.459
11:35	CS1 ● 100	2	Off	0.0	● 1400	1468	Off	20.9	6.96
11:45	CS1 ● 100	3	Off	0.0	● 1400	1454	Off	20.9	6.52
11:55	CS1 ● 100	3	Off	0.0	● 1400	1482	Off	20.9	6.193
12:05	CS1 ● 100	3	Off	0.0	● 1400	1449	Off	20.9	5.651
12:15	CS1 ● 100	4	Off	0.0	● 1400	1454	Off	20.9	5.134
12:25	CS1 ● 100	4	Off	0.0	● 1400	1462	Off	20.9	4.559

Date: 02/19/2015 Cold Springs 12 Glycol Flow Rate = GPM

Readings taken from local HMI

Actual

Time ETZ		Cond Temp		Tox Temp				Gas Flow Rate MMCFH
15:00				1454				

Appendix D-2

Cold Springs 12, Blue Lake, and Cold Springs 1 Preventative Maintenance / Malfunction Abatement Plan (PM/MAP)

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
GAYLORD FIELD OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

December 11, 2014

Mr. Anthony M. Kornaga
ANR Storage Company
5250 Corporate Drive
Troy, Michigan 48908

SRN: B7198, Kalkaska County

Dear Mr. Kornaga:

SUBJECT: Preventative Maintenance/Malfunction Abatement Plan for Cold Springs 12, Blue Lake and Cold Springs 1

The Department of Environmental Quality (DEQ), Air Quality Division (AQD), reviewed the Preventative Maintenance/Malfunction Abatement Plan (PM/MAP) for the ANR Storage Company located in Mancelona, Kalkaska County, Michigan. The PM/MAP covers Cold Springs 12, Blue Lake, and Cold Springs 1. The PM/MAP is dated December 10, 2014 and was received by the AQD on December 10, 2014. This letter provides the AQD District Supervisor's approval of the PM/MAP which replaces any previous PM/MAP. A copy of the PM/MAP is enclosed.

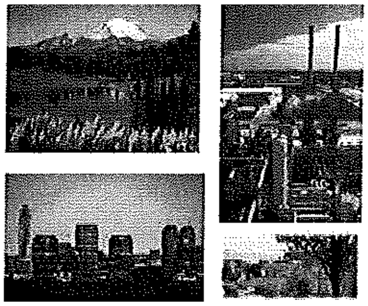
If you have any questions on this issue, please contact Gloria Torello, Environmental Quality Analyst, AQD at 989-705-3410.

Sincerely,

Gloria Torello, for

Janis Ransom
Cadillac District Supervisor
Air Quality Division
231-499-9235

Enclosure
cc/enc/via email: Ms. Melinda Holdsworth, TransCanada
Mr. Brad Stermer, TransCanada
cc: Ms. Gloria Torello, DEQ



ANR Storage Company
Cold Springs 12 Compressor Station
Blue Lake Compressor Station
Cold Springs 1 Compressor Station
Kalkaska County, Michigan

Preventive Maintenance / Malfunction Abatement Plan (PM/MAP)

Renewable Operating Permit No.: MI-ROP-B7198-2014

Revision Date: December 10, 2014

ANR Storage Company
700 Louisiana Street, Suite 700
Houston, TX 77002

TransCanada
In business to deliver

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Preventative Maintenance / Malfunction Abatement Plan (PM/MAP) ANR Compressor Stations: Cold Springs 12, Blue Lake, Cold Springs 1

1.0 Introduction

Cold Springs 12 (CS12), Blue Lake Gas Storage (BL), and Cold Springs 1 facilities are natural gas compressor stations which are designed to inject and withdraw natural gas from nearby underground storage fields. The Cold Springs 12 (CS12) facility is comprised of natural gas fired compressor engines, and natural gas fired emergency generators, and a glycol dehydration system. The Blue Lake (BL) compressor station consists of natural gas fired compressor engines, natural gas fired electrical generator engines, and a glycol dehydration system. The Cold Springs 1 (CS1) has three components: an electric compression motor, a glycol dehydration system, and a liquid stabilization system.

Contact Person

Any questions in regard to this PM/MAP should be directed to Melinda Holdsworth, Senior Air Specialist with TransCanada.

Name: Melinda Holdsworth, Senior Air Specialist
Phone: (832) 320-5665
E-mail: Melinda_Holdsworth@TransCanada.com
Address: TransCanada
700 Louisiana Street, Suite 700
Houston, TX 77002

Supervisory Personnel

Station Personnel are responsible for inspection and maintenance.

2.0 Cold Springs 12

2.1 Compressor Engines

Cold Springs 12 has three, four-stroke, lean burn compressor engines.

Engine ID	Manufacturer and Model	Rating	Engine Type[1]	Add-On Control
EUCS12CMPR-A	Ingersoll Rand 410-KVR-IC	3,750 hp	4SLB	None
EUCS12CMPR-B	Ingersoll Rand 410-KVR-IC	3,750 hp	4SLB	None
EUCS12CMPR-C	Ingersoll Rand 410-KVR-IC	3,750 hp	4SLB	None

1. 4SLB: Four-Stroke, Lean Burn

2.1.1 Compressor Engine Operation Variables to be Monitored

Engine Operating Variable	Frequency	Additional information
Engine power cylinder temperature Range: 750°F – 980°F	Continuous on-screen monitoring	Cold Springs 12 does not have a printout. This component is automated for all engines.
Air manifold temperature Range: 95°F – 140°F Fixed Temperature: 110°F	Continuous	Cold Springs 12 does not have a printout. This component is automated for all engines.
Air manifold pressure: Range (10-21 lbs)	Continuous on-screen monitoring	Cold Springs 12 does not have a printout. This component is automated for all engines.
Engine fuel flow	Continuous	Cold Springs 12 Efficiency Alarm: Actual fuel use compared to Predictive fuel use.

2.1.2 Compressor Engine Maintenance Log

Preventative Maintenance Task	Frequency
Replace spark plugs	1500 hours
Replace oil filters	Annually or as required
Replace air intake filter	As required
Replace fuel valves	As required
Change strainers	As required
Lube Oil Analysis	Annually or as required
Calibration of Pressure and Temperature Transducers	Annually
Maintenance/performance analysis	1,500 – 2,000 hours Engine & Compressor Analysis Report generated for each unit.
Engine Power cylinder balance	~ 400 hours Report kept by station technicians.
AFRC	Per Manufacturer's Specification

2.1.3 Compressor Engine Corrective Actions

In the event of a malfunction as defined by Michigan's Air Pollution Control Rules, facility personnel will perform the following corrective actions. A malfunction is defined as any sudden, infrequent and not reasonably preventable failure of the equipment to operate in a normal or usual manner. Failures caused in part by poor maintenance or careless operation is not a malfunction.

If the engine operates outside the engine operating variables, the following actions will be completed. If the engine continues to operate outside the variable, the unit will be shutdown.

Engine Operating Variable	Corrective Procedure
Engine power cylinder temperature Range: 750°F – 980°F	Inspect and troubleshoot engine ignition, fuel and cooling systems.
Air manifold temperature Range: 95°F – 140°F Fixed Temperature: 110°F	Inspect and troubleshoot engine cooling system.
Air manifold pressure: Range (10-21 lbs)	Inspect and troubleshoot engine air supply system
Engine Fuel Flow	Inspect and troubleshoot engine fuel metering and measurement systems.
Maintenance/performance analysis Time Frame: 1,500 – 2,000 hours	Monitor, troubleshoot and repair mechanical engine items which could lead to poor engine performance.

Engine Operating Variable	Corrective Procedure
Engine power cylinder balance Time Frame: 400 hours +	Adjust individual power cylinder fuel flow to evenly distribute load across the engine.

3.0 Blue Lake Compressor Station

3.1 Compressor Engines

Blue Lake Gas Storage has three, two-stroke lean burn engines with a Parameter Monitoring System.

Engine ID	Manufacturer and Model	Rating	Engine Type[1]	Add-On Control
EUBLCMPR-A	Dresser-Rand TCVD-12	6,000 hp	2SLB	None
EUBLCMPR-B	Dresser-Rand TCVD-12	6,000 hp	2SLB	None
EUBLCMPR-C	Dresser-Rand TCVD-12	6,000 hp	2SLB	None

1. 2SLB: Two-Stroke Lean Burn

3.1.1 Compressor Engine Operation Variables to be Monitored

For the Blue Lake Station, the permittee has developed, with concurrence of the Air Quality Division, an "operating envelope" within which the compressor engines have been shown by emissions testing to operate in compliance with all applicable NOx and CO emission limits. Ranges of engine torque and speed define this operating envelope. The permittee shall continually monitor engine torque and speed. Except under startup and shutdown conditions, the permittee shall operate the compressor engines inside their established operating envelope. Operating outside the established operating envelope shall be considered a deviation and shall be reported to the Air Quality Division as required by, and in the manner specified by, R336.1912.

Engine Operating Variable*	Frequency	Additional information
Air manifold temperature Range: 100°F – 118°F Fixed: 105°F	Continuous on-screen monitoring	Rockwell Software View. The system will automatically shut down at 118°F.
Air Manifold Pressure Range: 11.5 – 20 psi	Recorded Hourly	The system will alarm at > 19 psi.
Speed Range: 275 – 335.5 rpm	Recorded Hourly	The system will alarm and shut down if out of range for over one hour.
Torque Range: 77% – 104%	Recorded Hourly	The system will alarm and shut down if out of range for over one hour.

* See the most recent stack test operating envelope results.

3.1.2 Compressor Engine Maintenance Log

Preventative Maintenance Task	Frequency
Replace spark plugs	1500 hours
Replace oil filters	Annually or as required
Replace air intake filter	As required
Replace fuel valves	As required
Change strainers	As required
Lube Oil Analysis	Annually or as required
Calibration of Pressure and Temperature Transducers	Annually
Maintenance/performance analysis	1,500 – 2,000 hours Engine & Compressor Analysis Report generated for each unit.
Engine Power cylinder balance	~ 400 hours Report kept by Station Technicians.
AFRC	Per Manufacturer's Specifications

3.1.3 Compressor Engine Corrective Actions

In the event of a malfunction as defined by Michigan's Air Pollution Control Rules, facility personnel will perform the following corrective actions. A malfunction is defined as any sudden, infrequent and not reasonably preventable failure of the equipment to operate in a normal or usual manner. Failures caused in part by poor maintenance or careless operation is not a malfunction.

If the engine operates outside the engine operating variables, the following will be actions will be completed. If the engine continues to operate outside the variable, the unit will be shutdown.

Engine Operating Variable*	Corrective Procedure
Air manifold temperature Range: 100°F – 118°F Fixed: 105°F	Inspect and troubleshoot engine cooling system and temperature controller.
Air Manifold Pressure Range: 11.5 – 20 psi	Inspect and troubleshoot engine air supply system and turbo waste gate control.
Speed Range: 275 – 335.5 rpm	Inspect and troubleshoot governor/fuel system.
Torque Range: 77% – 104%	Inspect and troubleshoot engine valves, ignitions system and fuel system.
Maintenance/performance analysis Time Frame: 1,500 – 2,000 hours	Monitor, troubleshoot and repair mechanical engine items which could lead to poor engine performance.
Engine power cylinder balance Time Frame: 400 hours +	Adjust individual power cylinder fuel flow to evenly distribute load across the engine.

* See the most recent stack test operating envelope results.

3.2 Generator Engines and Catalytic Control Units

Blue Lake utilizes three Caterpillar four-stroke lean burn generators with Catalytic Oxidizers for primary electrical power.

Engine ID	Manufacturer and Model	Rating	Engine Type [1]	Add-On Control	Air to Fuel Ratio Controller
EUBLGEN-A	Caterpillar 3516 generator engine	1,125 hp	4SLB	Catalytic Oxidizer	IGEM Controller FIXED by Caterpillar
EUBLGEN-B	Caterpillar 3516 generator engine	1,125 hp	4SLB	Catalytic Oxidizer	IGEM Controller FIXED by Caterpillar
EUBLGEN-C	Caterpillar 3516 generator engine	1,125 hp	4SLB	Catalytic Oxidizer	IGEM Control FIXED by Caterpillar

1. 4SLB: Four-Stroke, Lean Burn

3.2.1 Generator Engine Operation Variables to be Monitored

These are the engine operating variables to be monitored.

Engine Variable	Frequency	Additional Information
Speed Fixed at 1,200 rpms	Continuous on-screen monitoring	Rockwell Software
Fuel Range: 4 mcfh – 11 mcfh	Hourly with PMS	PEMS or COMET
Air manifold pressure Range: 14.7 psia – 35 psia	Continuous on-screen monitoring	Rockwell Software
Air manifold temperature Range: 123 – 140° F	Continuous on-screen monitoring	Rockwell Software

3.2.2 Generator Engine Maintenance Log

Preventative Maintenance Task	Frequency
Replace Spark plugs	3,000 hours
Replace Oil Filter	1,500 hours
Valve adjustments	1,500 hours
Compression tests	3,000 hours
Replace Fuel Valves	As required
IGEM calibration	Annually
AFRC	Per Manufacturer's Specifications

3.2.3 Generator Engine Corrective Actions

In the event of a malfunction as defined by Michigan's Air Pollution Control Rules, facility personnel will perform the following corrective actions. A malfunction is defined as any sudden, infrequent and not reasonably preventable failure of the equipment to operate in a normal or usual manner. Failures caused in part by poor maintenance or careless operation is not a malfunction.

If the engine operates outside the engine operating variables, the following will be actions will be completed. If the engine continues to operate outside the variable, the unit will be shutdown.

Engine Operating Variable	Corrective Procedure
Speed Fixed at 1,200 rpms	Inspect and troubleshoot IGEMS and governor/fuel system.
Fuel Range: 4 mcfh – 11 mcfh	Inspect and troubleshoot fuel gas regulators and control system.
Air manifold pressure Range: 14.7 psia – 35 psia	Inspect and troubleshoot engine air supply system and IGEMS system.
Air manifold temperature Range: 123 – 140° F	Inspect and troubleshoot engine air supply system and cooler.

3.2.4 Catalytic Oxidizer Operation Variables to be Monitored

At the Blue Lake Station, the permittee shall continuously monitor the temperature difference across each catalytic oxidizer and once per hour record the temperature difference across each catalytic oxidizer. As an alternative, the permittee shall continuously monitor the pressure drop across the catalyst and record the pressure drop across the catalyst once a day.

<table>
<tr><th>Catalyst Variable</th><th>Frequency</th><th>Additional Information</th></tr>
<tr><td>Temperature Differential across the catalyst.
The temperature differential across the catalyst shall be higher on the outlet than the inlet probe. The temperature will be variable with kw load.
As an alternative to monitoring temperature, the pressure drop may be monitored as described below.</td><td>Recorded Hourly</td><td>PEMS</td></tr>
<tr><td>Pressure drop across the catalyst.
The pressure drop across the catalyst shall be established during permit compliance testing, or testing done after a catalyst change.
The pressure drop across the catalyst was established during performance testing in August 2014 with these results:
Table 2 shows the differential pressure baseline for each engine.
<table>
<tr><th>Unit</th><th>DP Baseline ("H₂O)</th></tr>
<tr><td>Gen-A</td><td>5</td></tr>
<tr><td>Gen-B</td><td>6</td></tr>
<tr><td>Gen-C</td><td>6</td></tr>
</table>
</td><td>Recorded Daily</td><td>PEMS or COMET</td></tr>
</table>

3.2.5 Catalytic Oxidizer Maintenance Log

Activity	Equipment Status	Frequency
The catalytic converter shall be removed, inspected and cleaned. Cleaning will consist of vacuuming or blowing clean the catalyst face and clearing fouling and built-up ash. Within 14 days of cleaning, the catalyst outlet emissions for CO shall be calculated using the results from the portable analyzer (lb/hr). (CO is a surrogate for VOC). If the CO exceeds the permitted emission limit, then the catalyst is not responding. If the catalyst does not respond to the cleaning, vacuum or blowing treatment, then the catalyst will be removed and washed. A "swing" catalyst insert shall be used until a new or refurbished catalyst is installed. The used catalyst will not be returned to service unless it can be rejuvenated.	Off line	Once per 12-14 months; or before startup from a shutdown due to the temperature inversion operating outside the range (4 or more times in a calendar day,)
The catalytic converter shall be removed, inspected and cleaned. Cleaning will consist of vacuuming or blowing clean the catalyst face and clearing fouling and built-up ash. Within 1 day of cleaning, the pressure drop must be measured to ensure operating within the range. If the engine is operating outside of the pressure drop range, then the catalyst is not responding. If the catalyst does not respond to the cleaning, vacuum or blowing treatment, then the catalyst will be removed and washed. A "swing" catalyst insert shall be used until a new or refurbished catalyst is installed. The used catalyst will not be returned to service unless it can be rejuvenated.	Offline	Before startup from a shutdown due to operating outside the pressure drop range
Replace catalyst insert or swing Within 14 days of the replacement or swing, the catalyst outlet emissions for CO shall be calculated using the results from the portable analyzer (lb/hr). (CO is a surrogate for VOC). If the CO exceeds the permitted emission limit, then the permittee shall inspect the catalysts, and repair or replace the catalyst.	Off line	After replacement or swing of catalyst

3.2.6 Catalytic Oxidizer Corrective Actions

In the event of a malfunction as defined by Michigan's Air Pollution Control Rules, facility personnel will perform the following corrective actions. A malfunction is defined as any sudden, infrequent and not reasonably preventable failure of the equipment to operate in a normal or usual manner. Failures caused in part by poor maintenance or careless operation is not a malfunction.

If a Catalytic Oxidizer operates outside its operating variables, the following will be actions will be completed.

Engine Variable	Corrective Action
Temperature Differential across the catalyst Higher on the outlet than the inlet probe, Variable with kw load. As an alternative to monitoring temperature, the pressure drop may be monitored as described below.	If the temperature differential is inverted across the catalyst (catalyst outlet temperature is less than inlet temperature), 4 or more times in a calendar day, this may indicate that the catalyst is malfunctioning and the unit will be shutdown within 2 business days. The catalyst will be maintained as described in Catalytic Oxidizer Maintenance Log. Records of all monitoring and inspections for these actions shall be kept on file.
Pressure drop across the catalyst. The pressure drop across the catalyst shall be established during permit compliance testing, or testing done after a catalyst change.	If the pressure drop across the catalyst changes by more than (+/-) two inches of water from the pressure drop measured during the most recent performance test, this may indicate the catalyst is malfunctioning and within two business days the unit will be shutdown. The catalyst will be maintained as described in Catalytic Oxidizer Maintenance Log. Records of the inspections shall be kept of these actions.

4.0 Cold Springs 1

4.1 Storage Tanks

The liquid stabilization system uses four condensate storage tanks, each with a maximum capacity of 16,800 gallons, are used to store stabilized condensate liquids. A natural gas blanket is used to minimize VOC and toxic air contaminants (TAC) emissions from these storage tanks. Condensate liquids are transferred from the storage tanks to a pipeline. A thermal oxidizer is used to control hydrocarbon vapors resulting from breathing and working losses from the condensate storage tanks. The thermal oxidizer is expected to have a minimum VOC control efficiency of 98%.

Tank ID	Manufacturer	Model	Capacity	Add-On Control	Additional Information
EUCS1CNDTANK1	Thermal Oxidizer (ThOx) is Tornado Technologies Inc.; Tank is Palmer Mfg. & Tank, Inc.	Tanks Built to UL-142; Working on ThOx	16,800 gallons	Thermal Oxidizer SV011C, 98% Control Efficiency	Tanks will be operated at slight positive pressure with all vapor routed to ThOx.
EUCS1CNDTANK2	Thermal Oxidizer (ThOx) is Tornado Technologies Inc.; Tank is Palmer Mfg. & Tank, Inc.	Tanks Built to UL-142; Working on ThOx	16,800 gallons	Thermal Oxidizer SV011C, 98% Control Efficiency	Tanks will be operated at slight positive pressure with all vapor routed to ThOx.
EUCS1CNDTANK3	Thermal Oxidizer (ThOx) is Tornado Technologies Inc.; Tank is Palmer Mfg. & Tank, Inc.	Tanks Built to UL-142; Working on ThOx	16,800 gallons	Thermal Oxidizer SV011C, 98% Control Efficiency	Tanks will be operated at slight positive pressure with all vapor routed to ThOx~~..~~.
EUCS1CNDTANK4	Thermal Oxidizer (ThOx) is Tornado Technologies Inc.; Tank is Palmer Mfg. & Tank, Inc.	Tanks Built to UL-142; Working on ThOx	16,800 gallons	Thermal Oxidizer SV011C, 98% Control Efficiency	Tanks will be operated at slight positive pressure with all vapor routed to ThOx.

4.1.1 Thermal Oxidizer Operation Variables to be Monitored

The four storage tanks are designed similarly. The variables are the same for each tank.

Tank Operating Variable	Frequency	Additional information
TT-6041 A-D (Oxidizer Temperature) **Minimum Operating Temperature: 1400°F** **Maximum Operating Temperature: 2200°F**	Continuous	In Station Control Room Computer with an Alarm.

4.1.2 Thermal Oxidizer Maintenance Log

Preventative Maintenance Task	Frequency
TT-6041 (Oxidizer Temp); XV-6040 (Oxidizer SD Valve)	Annual Calibration & PM Check
TIC-6040 (Controls Oxidizer Fuel & Comb. Air)	Annual Calibration & PM Check

4.1.3 Thermal Oxidizer Corrective Actions

In the event of a malfunction as defined by Michigan's Air Pollution Control Rules, facility personnel will perform the following corrective actions. A malfunction is defined as any sudden, infrequent and not reasonably preventable failure of the equipment to operate in a normal or usual manner. Failures caused in part by poor maintenance or careless operation is not a malfunction.

Tank Operating Variable	Corrective Procedure
TT-6041	If Oxidizer can't be promptly restored to proper temperature; plant inlet will be shut-in until restored in accordance with the permit.

5.0 Major Parts Inventory and Replacement

Cold Springs 12 and Cold Springs 1 use an off-site central warehousing system. The Blue Lake Station will keep two catalyst elements in stock on site. Other major parts at Blue Lake are ordered as needed through the vendors and not kept on site.

6.0 Responsible Person for Inspection, Maintenance and Repair of Add-On Equipment

The responsible person for maintenance of the control equipment at Blue Lake is:
Name: Keith Campbell/Mark Jacobs
Phone: (231)587-2130/(231)587-2125

7.0 Retention of Records

All records shall be retained for 5 years.

8.0 Updates of PM/MAP

The PM/MAP will be reviewed annually and any updates shall be submitted to the AQD District Supervisor for approval.

Appendix D-3

Cold Springs 12 40 CFR Part 63 Subpart HHH Site Monitoring Plan

ANR Storage Company
Cold Springs 12 Compressor Station
Kalkaska County, Michigan

40 CFR Part 63 Subpart HHH
Site Monitoring Plan

Effective Date: December 21, 2015
Version: 01
Status: Issued
Driver: Regulatory

ANR Storage Company
700 Louisiana Street, Suite 700
Houston, TX 77002

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40 CFR Part 63 Subpart HHH Site Monitoring Plan
ANR Compressor Stations: Cold Springs 12

1.0 Purpose

The purpose of this Procedure is to describe the continuous parameter monitoring system (CPMS) to be used at Cold Springs 12 Compressor Station to meet the requirements for National Emission Standards for Hazardous Air Pollutants (NESHAPS) from Natural Gas Transmission and Storage Facilities Maximum Achievable Control Technology (MACT), Subpart HHH of 40 CFR part 63. These regulations require the control and continuous parameter monitoring of air pollution control equipment associated with glycol dehydration systems, such as condensers and thermal oxidizers. This Facility Monitoring Procedure must be available for review if requested by the EPA or delegated state or local air quality agencies.

Contact Person

Any questions in regard to this Site Monitoring Plan should be directed to Melinda Holdsworth, Senior Air Specialist with TransCanada.

Name:	Melinda Holdsworth, Senior Air Specialist
Phone:	(832) 320-5665
E-mail:	Melinda_Holdsworth@TransCanada.com
Address:	TransCanada 700 Louisiana Street, Suite 700 Houston, TX 77002

2.0 Scope

This Procedure applies to the TransCanada ANR Cold Springs 12 Compressor Station located at 1000 Pflum Road, Mancelona, MI, 49659 which is wholly owned and operated by TransCanada.

3.0 References

CS&E and all other TOP documents can be accessed from the TOPs database using this link TOPs.

Note: TOP documents referenced in this document will have their titles underlined and can be opened up by using the hyperlink below or going to the TOPs database using the above TOPs link.

- Thermal Oxidizer Inspection and Maintenance (EDMS No. 009423217)
- Glycol Dehydration Exchanger Condenser Inspection and Maintenance (EDMS No. 005249224)
- Temperature Measurement Device Specifications (EDMS No. 003834760)

4.0 Procedure

Notes:

1. Each Activity should be performed after reviewing the appropriate CS&E TOPs (Procedures).
   Special Resources: N/A
   Qualification Requirement(s): N/A.

4.1 Affected Source(s) and Associated CPMS Equipment

Note: This section provides information on the affected air pollution control equipment across TransCanada's Glycol Dehydration Systems and their associated CPMS. Per §63.1283(d)(1)(ii-iv), the Site Monitoring Plan must include design specification and equipment performance criteria for the pollution control system equipment; including but not limited to sample interface, detector signal analyzer, data acquisition and calculations.

4.1.1 Affected Source(s) Description

TransCanada Pipelines uses a Condenser and Thermal Oxidizer at Cold Springs 12 CS for air emission control. As such, it is subject to limitations and control requirements per MACT HHH. See table 1 below for details.

Table 1 – Glycol Dehydration System to MACT HHH & Provisions of this Plan

Station	State	Unit ID	Control Device	CPMS Metric	CPMS Value	Device Manufacturer	Device Model
Cold Springs 12	MI	EGCSGLYDEH	Condenser	Temp	120 °F (95% BTEX Control)	Rosemount	3144D1K5B4M5
Cold Springs 12	MI	EGCSGLYDEH	Thermal Oxidizer	Temp	Max 1400 °F	Omron	E5CK-AA1-500

4.1.2 System Design Considerations

The purpose of the CPMS is to ensure that across TransCanada's Pipelines, temperature data of air pollution control equipment in glycol dehydration systems are:

- Continuously monitored (or at a minimum, take temperature readings every 15 minutes and average hourly, not including periods of startup, shutdown or malfunction).
- Average the temperature data on a daily basis

- Average the temperature data on 12 month rolling basis.
- Ensure the air pollution control device(s) operating temperature is maintained within the established temperature range specified by manufacturer (for thermal oxidizers) and below the maximum operating temperature specified by manufacturer (for condensers).

4.1.3 Temperature Measurement Device Specifications

The following specifications apply to the temperature measurement device:

Thermal Oxidizer Control Device:

Parameter	Specification
Location	The temperature sensor shall be installed at a location representative of the combustion zone temperature.
Device Type	A temperature monitoring device equipped with a continuous recorder.
Tolerance	The monitoring device shall have a minimum accuracy of ±2 percent of the temperature being monitored in °C, or ±2.5 °C, whichever value is greater. [§63.1283(d)(3)(A)]

Condenser Control Device:

Parameter	Specification
Location	For a condenser, a temperature monitoring device equipped with a continuous recorder. The temperature monitoring device shall have a minimum accuracy of ±2 percent of the temperature being monitored in °C, or ±2.5 °C, whichever value is greater. The temperature sensor shall be installed at a location in the exhaust vent stream from the condenser that provides a representative measurement
Device Type	A temperature monitoring device equipped with a continuous recorder.
Tolerance	The monitoring device shall have a minimum accuracy of ±2 percent of the temperature being monitored in °C, or ±2.5 °C, whichever value is greater. [§63.1283(d)(3)(E)]

4.1.4 Wiring

Conduit cable will be installed per the appropriate edition of the National Electric Code and TransCanada standards reflective of the time of installation.

4.1.5 Data Acquisition System

The Data Acquisition System (DAS, aka PLC) shall be in continuous operation and will provide the operator with the following local readouts: [§63.8(c) (2) (ii)]

- Instantaneous readings of control device exhaust gas temperature.
- 15-minute snapshot temperature readings.
- 1-hour average temperatures.
- Readout or other indication of operation must be readily accessible on site.

Data will be retained for at least five (5) years in the DAS for retrieval in the event of a failure reporting system. Additionally, the operator will have the capability of generating a screen print from the DAS in the event of a failure of the reporting system.

4.1.6 Reporting System

A PC with reporting software installed will be connected to the DAS for data retention and report generation. The software is used to collect the data from the DAS, collate into a report formatted for printing and for long term retention of the data.

4.2 Temperature Monitoring System Performance Evaluation & QA/QC

4.2.1 Periodicity

An initial verification of the CPMS was performed upon original equipment installation. [§63.8(c)(3)] Annual QA/QC evaluations of the CPMS shall be conducted as described below. [§63.1283(d)(1)]

4.2.2 Methodology

One of the following methods shall be used for performance evaluations:

RTD Replacement

The RTD shall be replaced with a factory calibrated unit meeting the design requirements listed above. The calibration certification sheets or other appropriate documentation shall be retained demonstrating factory calibration.

Concurrently, a calibrated RTD simulator shall be used to test the remaining elements of the CPMS system in accordance with manufacturer's recommendations and company policies and procedures. A written work plan or SAP work order documenting steps to be followed shall be used. [§63.8(d)(2) – (3)]

Calibration

The calibration of the RTD shall be checked in place in accordance with manufacturer's recommendations and company policies and procedures. The methods used shall address both the RTD and the DAS. A written work plan or SAP work order documenting steps to be followed shall be used. [§63.8(d)(2) – (3)]

4.2.3 Notification

Notification to MDEQ prior to conducting the performance evaluation or with results after testing is required.

4.2.4 Troubleshooting a Malfunctioning CPMS

Malfunctioning CPMS shall be evaluated and repaired in accordance with manufacturer's recommendations, company policy and procedures and good operating practices.

4.3 CPMS Operation and Maintenance

4.3.1 CPMS Operation

The CPMS will be in operation whenever the monitored control device (condenser or thermal oxidizer) is in service and exhaust gases are being vented to the atmosphere with the exception of monitoring malfunctions, associated repairs, and required quality assurance or control activities. Data will be collected as follows:

- Sample the control device exhaust gas temperature at least once every 15 minutes.

- Average the 15-minute samples on an hourly basis. Average the hourly average on a daily basis and the daily basis on a monthly and 12 month rolling basis.
- An hour is defined as a 60 minute period beginning at the o-clock (i.e. 1:00, 2:00 etc.).
- If the system starts midway through an hour, record 15-minute data points but begin averaging only if there are at least two data points for the first clock based 60 minute period. Each of the two data points should represent a 15-minute period.
- If a unit stops midway through an hour, the 15-minute data points will be monitored and recorded; however, the average for that last clock based 60 minute period should only be computed if at least two data points are available. Each of the two data points should represent a 15-minute period.
- Each daily average calculation will include all hourly averages starting with the hour of 9:00 a.m. Central US Time Zone and concluding 24 hours later (i.e., 8:59 p.m.).
- The CPMS shall alarm, at a minimum, when the control device exhaust gas temperature hourly average approaches 10% of the permitted limit.
- The CPMS shall divert exhaust gas flow to the secondary control device (i.e., condenser vent) and record temperature infraction from the lower limit (i.e., 1400 °F for Thermal Oxidizer and 135°F for the condenser).
- Alarms shall be disabled as follows:
    - Thermal Oxidizer Low Temperature: Never.
    - Condenser Exhaust High Temperature: Never

4.3.2 CPMS Maintenance

Preventive Maintenance

CPMS Maintenance will be conducted in accordance with company policy and procedures [§63.8(d)(2)(iii)]. Alternately, the RTDs may be replaced annually with a concurrent performance evaluation as described above. Additionally, station walk downs take place at least weekly (when the station is manned) to check on obvious signs of physical failure of the equipment.

Corrective Maintenance

Corrective maintenance will be conducted according to manufacturer’s recommendations, company policy and procedures and good operating practices in a manner consistent with safety and good air pollution control practices for minimizing emissions in the event of a CPMS malfunction, impending malfunction, or out-of-control CPMS. In lieu of conducting immediate corrective maintenance, Operations may shutdown the dehy system until such time as corrective maintenance can be performed as per above.

Corrective Maintenance actions taken will be documented in SAP. To the extent practical, a written plan will be used when conducting corrective maintenance. [63.8(d)(2)(vi)]

4.4 Data Management

4.4.1 Valid Data

Valid data is defined as data not “recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities.” [§63.6635] Specifically, valid data is comprised of:

- 15-minute readings not recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities.
- Hourly averages consisting of two (2) valid 15-minute readings.
- Daily averages consisting of a single (1) valid hourly average.
- Monthly averages consisting of at least one (1) valid daily averages.
- 12 Month rolling averages consisting of the current month and prior eleven (11) months.

4.4.2 Data Review

Operations shall review the CPMS data daily reports to: [§63.8(c)(6)]

- Confirm all required data was collected.
- Identify any data collected that was not valid data as defined above.
- Confirm that no exceedances of temperature limits occurred. Missing data may be recovered by:
    - Calling the Automation group to assist in recovering data from the DAS/PLC.
    - Generating a screen print from the HMI panel.

If missing data is unrecoverable (e.g., due to power failure), exceedances are identified, or non-valid data is identified, the Environment Department shall be notified immediately. Additionally, in the event of repeated instances of missing data, whether recoverable or unrecoverable, over a short duration of time, the Environment Department shall be notified such that an investigation as to the causes can be conducted.

5.0 DOCUMENTATION/REPORTING REQUIREMENTS

1. Closeout of the SAP work order shall be considered sufficient documentation provided field readings and/or other results as appropriate are included in the closeout comments or attached to the work order.
2. Logs documenting the malfunction of the CPMS, immediate actions and corrective actions shall be taken in accordance with Section 5.1.1 of this plan. Additionally the Environment Department shall be notified immediately of the malfunction. The Environment Department is responsible for reporting the malfunction in accordance with Section 5.1.2 of this plan.
3. The Environment Department shall review the data prior to filing Quarterly Deviation Reports, Semiannual Reports, or Annual Compliance Certifications as appropriate.
4. Revisions to this monitoring plan must be retained for 5 years from the date of the revision per §63.8(d) (2).

5.1 Recordkeeping

The following records collected by the CPMS are required to be retained for a period of five years. At minimum the most recent two year data shall be available on site. The other three years data may be stored off site but should be accessible within a reasonable time. [§63.10(b)(1) and §63.6660] These records can be retained either electronically, via hard copy or both and shall be easily accessible.

- 12-month rolling average. (COMET/File 1.5.5)

- Monthly average BTEX. (COMET/File 1.5.5)
- Each daily average. (COMET/File 1.5.5)
- Each hourly average used to calculate the daily average values. (COMET/File 1.5.5)
- Each 15-minute data point used to calculate hourly average values, as well as 15-minute data points during start-up and shutdowns. [§63.10(b)(2)(vii)] (COMET/File 1.5.5)
- The algorithm/calculation procedure used to reduce data. (this document)
- All readings taken during periods of CPMS breakdowns and out-of-control periods. (File 1.5.5) Additionally, the following records shall be created and retained by Operations regarding the CPMS:
- The date and time identifying each period during which the CPMS was inoperative except for zero
- (low-level) and high-level checks. (File 1.5.5)
- The date and time identifying each period during which the CMS was out of control. (File 1.5.5)
- The date and time of commencement and completion of each time period of where the CPMS 4-hour rolling temperature was out of the specified limits in this plan other than during periods other than startups, shutdowns, and malfunctions of the affected source. (File 1.5.5)
- The nature and cause of any malfunction (if known). (File 1.5.5)
- The corrective action taken or preventive measures adopted. (File 1.5.5)
- The nature of the repairs or adjustments to the CPMS that was inoperative or out of control. (File 1.5.5)
- The total process operating time during the reporting period. (File 1.5.5)
- Documentation of any QA/QC procedures performed for CPMS.

5.2 Compliance Reports

The Environment Department is responsible for compiling all compliance reports to be sent to regulatory agencies, including, but not limited to:

- Immediate notifications of non-compliance where required by state rules.
- Quarterly deviation reports where required by state rules.
- Semiannual Reports and Annual Compliance Reports.
- Notification of malfunctioning and out-of-control CPMS events.
- Notification of intent to conduct performance tests.
- Notification of Compliance Status at the completion of performance tests.
- Notification within 2 working days if an action taken during a startup, shutdown, or malfunction (including an action taken to correct a malfunction) is not consistent with this Procedure and the source exceeds any applicable emission limitation per §63.6(e)(3)(iv).

6.0 Definitions

Malfunction:	Any sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner which causes or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions. This definition is provided for information only. Operations should consult with the Environmental Coordinator to determine whether or not a malfunction has occurred due to any unit alarm or shutdown for purposes related to the MACT rules.
Out-of-Control:	A CPMS is out-of-control if the zero (low-level), mid-level (if applicable), or high-level calibration drift (CD) exceeds two times the applicable CD specification in the applicable performance specification or in the relevant standard; or The CPMS fails a performance test audit, relative accuracy audit, relative accuracy test audit, or linearity test audit.

7.0 Latest Revisions

Description:	Revision 01: Section 4.1.1 – Updated CPMS values
Rationale Statement:	Updated to account for the 95% BTEX control.
Impact Assessment Summary:	The update provided more precise limitations and control requirements for the station’s Condenser.

Attachment A

Regulatory Cross Reference (40 CFR Part 63, Subpart HHH)

NESHAP From Natural Gas Transmission and Storage Facilities (40 CFR 63 Subpart HHH)	Description of Section	Plan Section
§ 63.1283(d)(ii)(A)	Performance and design criteria for monitoring system requirement	Sections 4.2 and 4.4
§63.1283(d)(ii)(B)	Sampling location	Section 4.1
§63.1283(d)(ii)(C)	Audit procedures	Sections 4.2.2(2) and 4.3.2(2)
§63.1283(d)(ii)(D)	Ongoing operational and maintenance procedures	Section 4.3.2(2)
§63.1283(d)(ii)(D)(i)	Operating CMS with good air pollution control practices	Section 4.3.2(2)
§63.1283(d)(ii)(E)	Ongoing reporting and recordkeeping procedures	Section 5.0
§63.1283(d)(ii)(E)(i)	Required CMS measurements	Section 5.1.1
§63.1283(d)(ii)(E)(ii)	Identifying inoperative periods for CMS	Section 5.1.1
§63.1283(d)(ii)(E)(iii)	Identifying each period when the CMS was out of control	Section 5.1.1
§63.1283(d)(ii)(E)(iv)	Specific identification	Section 4.1
§63.1283(d)(ii)(E)(vi)	Corrective actions and preventative measures	Section 4.3.1
§63.1283(d)(ii)(E)(vii)	Corrective actions and preventative measures	Section 4.3.1
§63.1283(d)(ii)(E)(viii)	Operating time during reporting period	Section 4.3.1
§63.1283(d)(ii)(E)(x)	Results of CMS performance evaluation	Section 4.2.2(2)
§63.1283(d)(ii)(E)(xi)	Duration of each malfunction	Section 4.2.4
§63.1283(d)(ii)(E)(xvi)	Measurements to comply with standards	Section 4.1.2(3)
§63.1283(d)(ii)(E)(xvii)	Results of performance tests and emission observations	Section 5.1.2(1)
§63.1283(d)(ii)(E)(xix)	CMS calibration checks	Section 4.2.2(2)
§63.1283(d)(ii)(E)(xx)	CMS maintenance	Section 4.3

NESHAP From Natural Gas Transmission and Storage Facilities (40 CFR 63 Subpart HHH)	**Description of Section**	**Plan Section**
§63.1283(d)(ii)(E)(xxii)	Notification of compliance status	Section 5.1.2(1)
§63.1283(d)(iii)	CPMS equipment performance check	Section 4.3
§63.1283(d)(iiv)	CPMS equipment performance check	Section 4.3

Appendix D-4

Blue Lake 40 CFR Part 63 Subpart HHH Site Monitoring Plan

ANR Storage Company
Blue Lake Compressor Station
Kalkaska County, Michigan

40 CFR Part 63 Subpart HHH
Site Monitoring Plan

Effective Date: December 21, 2015
Version: 01
Status: Issued
Driver: Regulatory

ANR Storage Company
700 Louisiana Street, Suite 700
Houston, TX 77002

TABLE OF CONTENTS

40 CFR Part 63 Subpart HHH Site Monitoring Plan
ANR Compressor Stations: Blue Lake

1.0 Purpose

The purpose of this Procedure is to describe the continuous parameter monitoring system (CPMS) to be used at Blue Lake Compressor Station to meet the requirements for National Emission Standards for Hazardous Air Pollutants (NESHAPS) from Natural Gas Transmission and Storage Facilities Maximum Achievable Control Technology (MACT), Subpart HHH of 40 CFR part 63. These regulations require the control and continuous parameter monitoring of air pollution control equipment associated with glycol dehydration systems, such as condensers and thermal oxidizers. This Facility Monitoring Procedure must be available for review if requested by the EPA or delegated state or local air quality agencies.

Contact Person

Any questions in regard to this Site Monitoring Plan should be directed to Melinda Holdsworth, Senior Air Specialist with TransCanada.

Name: Melinda Holdsworth, Senior Air Specialist
Phone: (832) 320-5665
E-mail: Melinda_Holdsworth@TransCanada.com
Address: TransCanada
700 Louisiana Street, Suite 700
Houston, TX 77002

2.0 Scope

This Procedure applies to the TransCanada ANR Blue Lake Compressor Station located at 1000 Pflum Road, Mancelona, MI, 49659 which is wholly owned and operated by TransCanada.

3.0 References

CS&E and all other TOP documents can be accessed from the TOPs database using this link TOPs.

Note: TOP documents referenced in this document will have their titles underlined and can be opened up by using the hyperlink below or going to the TOPs database using the above TOPs link.

- Thermal Oxidizer Inspection and Maintenance (EDMS No. 009423217)
- Glycol Dehydration Exchanger Condenser Inspection and Maintenance (EDMS No. 005249224)
- Temperature Measurement Device Specifications (EDMS No. 003834760)

4.0 Procedure

Notes:

1. Each Activity should be performed after reviewing the appropriate CS&E TOPs (Procedures).

Special Resources: N/A
Qualification Requirement(s): N/A

4.1 Affected Source(s) and Associated CPMS Equipment

Note: This section provides information on the affected air pollution control equipment across TransCanada's Glycol Dehydration Systems and their associated CPMS. Per §63.1283(d)(1)(ii-iv), the Site Monitoring Plan must include design specification and equipment performance criteria for the pollution control system equipment; including but not limited to sample interface, detector signal analyzer, data acquisition and calculations.

4.1.1 Affected Source(s) Description

TransCanada Pipelines uses a Condenser and Thermal Oxidizer at Blue Lake CS for air emission control. As such, it is subject to limitations and control requirements per MACT HHH. See table 1 below for details.

Table 1 – Glycol Dehydration System to MACT HHH & Provisions of this Plan

Station	State	Unit ID	Control Device	CPMS Metric	CPMS Value	Device Manufacturer	Device Model
Blue Lake	MI	EUBLGLYREG-S2	Condenser	Temp	80 °F (95% BTEX Control)	Rosemount	1151
Blue Lake	MI	EUBLGLYREG-S2	Thermal Oxidizer	Temp	Max 1400 °F	INOR	701pl00001

4.1.2 System Design Considerations

The purpose of the CPMS is to ensure that across TransCanada's Pipelines, temperature data of air pollution control equipment in glycol dehydration systems are:

- Continuously monitored (or at a minimum, take temperature readings every 15 minutes and average hourly, not including periods of startup, shutdown or malfunction).

- Average the temperature data on a daily basis
- Average the temperature data on 12 month rolling basis.
- Ensure the air pollution control device(s) operating temperature is maintained within the established temperature range specified by manufacturer (for thermal oxidizers) and below the maximum operating temperature specified by manufacturer (for condensers).

4.1.3 Temperature Measurement Device Specifications

The following specifications apply to the temperature measurement device:

Thermal Oxidizer Control Device:

Parameter	Specification
Location	The temperature sensor shall be installed at a location representative of the combustion zone temperature.
Device Type	A temperature monitoring device equipped with a continuous recorder.
Tolerance	The monitoring device shall have a minimum accuracy of ±2 percent of the temperature being monitored in °C, or ±2.5 °C, whichever value is greater. [§63.1283(d)(3)(A)]

Condenser Control Device:

Parameter	Specification
Location	For a condenser, a temperature monitoring device equipped with a continuous recorder. The temperature monitoring device shall have a minimum accuracy of ±2 percent of the temperature being monitored in °C, or ±2.5 °C, whichever value is greater. The temperature sensor shall be installed at a location in the exhaust vent stream from the condenser that provides a representative measurement.
Device Type	A temperature monitoring device equipped with a continuous recorder.
Tolerance	The monitoring device shall have a minimum accuracy of ±2 percent of the temperature being monitored in °C, or ±2.5 °C, whichever value is greater. [§63.1283(d)(3)(E)]

4.1.4 Wiring

Conduit cable will be installed per the appropriate edition of the National Electric Code and TransCanada standards reflective of the time of installation.

4.1.5 Data Acquisition System

The Data Acquisition System (DAS, aka PLC) shall be in continuous operation and will provide the operator with the following local readouts: [§63.8(c) (2) (ii)]

- Instantaneous readings of control device exhaust gas temperature.
- 15-minute snapshot temperature readings.
- 1-hour average temperatures.
- Readout or other indication of operation must be readily accessible on site.

Data will be retained for at least five (5) years in the DAS for retrieval in the event of a failure reporting system. Additionally, the operator will have the capability of generating a screen print from the DAS in the event of a failure of the reporting system.

4.1.6 Reporting System

A PC with reporting software installed will be connected to the DAS for data retention and report generation. The software is used to collect the data from the DAS, collate into a report formatted for printing and for long term retention of the data.

4.2 Temperature Monitoring System Performance Evaluation & QA/QC

4.2.1 Periodicity

An initial verification of the CPMS was performed upon original equipment installation. [§63.8(c)(3)] Annual QA/QC evaluations of the CPMS shall be conducted as described below. [§63.1283(d)(1)]

4.2.2 Methodology

One of the following methods shall be used for performance evaluations:

RTD Replacement

The RTD shall be replaced with a factory calibrated unit meeting the design requirements listed above. The calibration certification sheets or other appropriate documentation shall be retained demonstrating factory calibration.

Concurrently, a calibrated RTD simulator shall be used to test the remaining elements of the CPMS system in accordance with manufacturer's recommendations and company policies and procedures. A written work plan or SAP work order documenting steps to be followed shall be used. [§63.8(d)(2) – (3)]

Calibration

The calibration of the RTD shall be checked in place in accordance with manufacturer's recommendations and company policies and procedures. The methods used shall address both the RTD and the DAS. A written work plan or SAP work order documenting steps to be followed shall be used. [§63.8(d)(2) – (3)]

4.2.3 Notification

Notification to MDEQ prior to conducting the performance evaluation or with results after testing is required.

4.2.4 Troubleshooting a Malfunctioning CPMS

Malfunctioning CPMS shall be evaluated and repaired in accordance with manufacturer's recommendations, company policy and procedures and good operating practices.

4.3 CPMS Operation and Maintenance

4.3.1 CPMS Operation

The CPMS will be in operation whenever the monitored control device (condenser or thermal oxidizer) is in service and exhaust gases are being vented to the atmosphere with the exception of monitoring malfunctions, associated repairs, and required quality assurance or control activities. Data will be collected as follows:

- Sample the control device exhaust gas temperature at least once every 15 minutes.
- Average the 15-minute samples on an hourly basis. Average the hourly average on a daily basis and the daily basis on a monthly and 12 month rolling basis.

- An hour is defined as a 60 minute period beginning at the o-clock (i.e. 1:00, 2:00 etc.).
- If the system starts midway through an hour, record 15-minute data points but begin averaging only if there are at least two data points for the first clock based 60 minute period. Each of the two data points should represent a 15-minute period.
- If a unit stops midway through an hour, the 15-minute data points will be monitored and recorded; however, the average for that last clock based 60 minute period should only be computed if at least two data points are available. Each of the two data points should represent a 15 minute period.
- Each daily average calculation will include all hourly averages starting with the hour of 9:00 a.m. Central US Time Zone and concluding 24 hours later (i.e., 8:59 p.m.).
- The CPMS shall alarm, at a minimum, when the control device exhaust gas temperature hourly average approaches 10% of the permitted limit.
- The CPMS shall divert exhaust gas flow to the secondary control device (i.e., condenser vent) and record temperature infraction from the lower limit (i.e., 1400 °F for Thermal Oxidizer and 135°F for the condenser).
- Alarms shall be disabled as follows:
    - Thermal Oxidizer Low Temperature: Never.
    - Condenser Exhaust High Temperature: Never

4.3.2 CPMS Maintenance

Preventive Maintenance

CPMS Maintenance will be conducted in accordance with company policy and procedures [§63.8(d)(2)(iii)]. Alternately, the RTDs may be replaced annually with a concurrent performance evaluation as described above. Additionally, station walk downs take place at least weekly (when the station is manned) to check on obvious signs of physical failure of the equipment.

Corrective Maintenance

Corrective maintenance will be conducted according to manufacturer's recommendations, company policy and procedures and good operating practices in a manner consistent with safety and good air pollution control practices for minimizing emissions in the event of a CPMS malfunction, impending malfunction, or out-of-control CPMS. In lieu of conducting immediate corrective maintenance, Operations may shutdown the dehy system until such time as corrective maintenance can be performed as per above.

Corrective Maintenance actions taken will be documented in SAP. To the extent practical, a written plan will be used when conducting corrective maintenance. [63.8(d)(2)(vi)]

4.4 Data Management

4.4.1 Valid Data

Valid data is defined as data not "recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities." [§63.6635] Specifically, valid data is comprised of:

- 15-minute readings not recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities.
- Hourly averages consisting of two (2) valid 15-minute readings.
- Daily averages consisting of a single (1) valid hourly average.
- Monthly averages consisting of at least one (1) valid daily averages.
- 12 Month rolling averages consisting of the current month and prior eleven (11) months.

4.4.2 Data Review

Operations shall review the CPMS data daily reports to: [§63.8(c)(6)]

- Confirm all required data was collected.
- Identify any data collected that was not valid data as defined above.
- Confirm that no exceedances of temperature limits occurred. Missing data may be recovered by:
    - Calling the Automation group to assist in recovering data from the DAS/PLC.
    - Generating a screen print from the HMI panel.

If missing data is unrecoverable (e.g., due to power failure), exceedances are identified, or non-valid data is identified, the Environment Department shall be notified immediately. Additionally, in the event of repeated instances of missing data, whether recoverable or unrecoverable, over a short duration of time, the Environment Department shall be notified such that an investigation as to the causes can be conducted.

5.0 DOCUMENTATION/REPORTING REQUIREMENTS

1. Closeout of the SAP work order shall be considered sufficient documentation provided field readings and/or other results as appropriate are included in the closeout comments or attached to the work order.
2. Logs documenting the malfunction of the CPMS, immediate actions and corrective actions shall be taken in accordance with Section 5.1.1 of this plan. Additionally the Environment Department shall be notified immediately of the malfunction. The Environment Department is responsible for reporting the malfunction in accordance with Section 5.1.2 of this plan.
3. The Environment Department shall review the data prior to filing Quarterly Deviation Reports, Semiannual Reports, or Annual Compliance Certifications as appropriate.
4. Revisions to this monitoring plan must be retained for 5 years from the date of the revision per §63.8(d) (2).

5.1 Recordkeeping

The following records collected by the CPMS are required to be retained for a period of five years. At minimum the most recent two year data shall be available on site. The other three years data may be stored off site but should be accessible within a reasonable time. [§63.10(b)(1) and §63.6660] These records can be retained either electronically, via hard copy or both and shall be easily accessible.

- 12-month rolling average. (COMET/File 1.5.5)
- Monthly average BTEX. (COMET/File 1.5.5)
- Each daily average. (COMET/File 1.5.5)
- Each hourly average used to calculate the daily average values. (COMET/File 1.5.5)
- Each 15-minute data point used to calculate hourly average values, as well as 15-minute data points during start-up and shutdowns. [§63.10(b)(2)(vii)] (COMET/File 1.5.5)
- The algorithm/calculation procedure used to reduce data. (this document)
- All readings taken during periods of CPMS breakdowns and out-of-control periods. (File 1.5.5) Additionally, the following records shall be created and retained by Operations regarding the CPMS:
- The date and time identifying each period during which the CPMS was inoperative except for zero (low-level) and high-level checks. (File 1.5.5)
- The date and time identifying each period during which the CMS was out of control. (File 1.5.5)
- The date and time of commencement and completion of each time period of where the CPMS 4-hour rolling temperature was out of the specified limits in this plan other than during periods other than startups, shutdowns, and malfunctions of the affected source. (File 1.5.5)
- The nature and cause of any malfunction (if known). (File 1.5.5)
- The corrective action taken or preventive measures adopted. (File 1.5.5)
- The nature of the repairs or adjustments to the CPMS that was inoperative or out of control. (File 1.5.5)
- The total process operating time during the reporting period. (File 1.5.5)
- Documentation of any QA/QC procedures performed for CPMS.

5.2 Compliance Reports

The Environment Department is responsible for compiling all compliance reports to be sent to regulatory agencies, including, but not limited to:

- Immediate notifications of non-compliance where required by state rules.
- Quarterly deviation reports where required by state rules.
- Semiannual Reports and Annual Compliance Reports.
- Notification of malfunctioning and out-of-control CPMS events.
- Notification of intent to conduct performance tests.
- Notification of Compliance Status at the completion of performance tests.
- Notification within 2 working days if an action taken during a startup, shutdown, or malfunction (including an action taken to correct a malfunction) is not consistent with this Procedure and the source exceeds any applicable emission limitation per §63.6(e)(3)(iv).

6.0 Definitions

Malfunction:	Any sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner which causes or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions. This definition is provided for information only. Operations should consult with the Environmental Coordinator to determine whether or not a malfunction has occurred due to any unit alarm or shutdown for purposes related to the MACT rules.
Out-of-Control:	A CPMS is out-of-control if the zero (low-level), mid-level (if applicable), or high-level calibration drift (CD) exceeds two times the applicable CD specification in the applicable performance specification or in the relevant standard; or The CPMS fails a performance test audit, relative accuracy audit, relative accuracy test audit, or linearity test audit.

7.0 Latest Revisions

Description:	Revision 01: Section 4.1.1 – Updated CPMS values
Rationale Statement:	Updated to identify for the 95% BTEX control requirement.
Impact Assessment Summary:	The update elaborated on regulatory control requirements for the station's Condenser.

Attachment A

Regulatory Cross Reference (40 CFR Part 63, Subpart HHH)

NESHAP From Natural Gas Transmission and Storage Facilities (40 CFR 63 Subpart HHH)	Description of Section	Plan Section
§ 63.1283(d)(ii)(A)	Performance and design criteria for monitoring system requirement	Sections 4.2 and 4.4
§63.1283(d)(ii)(B)	Sampling location	Section 4.1
§63.1283(d)(ii)(C)	Audit procedures	Sections 4.2.2(2) and 4.3.2(2)
§63.1283(d)(ii)(D)	Ongoing operational and maintenance procedures	Section 4.3.2(2)
§63.1283(d)(ii)(D)(i)	Operating CMS with good air pollution control practices	Section 4.3.2(2)
§63.1283(d)(ii)(E)	Ongoing reporting and recordkeeping procedures	Section 5.0
§63.1283(d)(ii)(E)(i)	Required CMS measurements	Section 5.1.1
§63.1283(d)(ii)(E)(ii)	Identifying inoperative periods for CMS	Section 5.1.1
§63.1283(d)(ii)(E)(iii)	Identifying each period when the CMS was out of control	Section 5.1.1
§63.1283(d)(ii)(E)(iv)	Specific identification	Section 4.1
§63.1283(d)(ii)(E)(vi)	Corrective actions and preventative measures	Section 4.3.1
§63.1283(d)(ii)(E)(vii)	Corrective actions and preventative measures	Section 4.3.1
§63.1283(d)(ii)(E)(viii)	Operating time during reporting period	Section 4.3.1
§63.1283(d)(ii)(E)(x)	Results of CMS performance evaluation	Section 4.2.2(2)
§63.1283(d)(ii)(E)(xi)	Duration of each malfunction	Section 4.2.4
§63.1283(d)(ii)(E)(xvi)	Measurements to comply with standards	Section 4.1.2(3)
§63.1283(d)(ii)(E)(xvii)	Results of performance tests and emission observations	Section 5.1.2(1)
§63.1283(d)(ii)(E)(xix)	CMS calibration checks	Section 4.2.2(2)
§63.1283(d)(ii)(E)(xx)	CMS maintenance	Section 4.3

NESHAP From Natural Gas Transmission and Storage Facilities (40 CFR 63 Subpart HHH)	**Description of Section**	**Plan Section**
§63.1283(d)(ii)(E)(xxii)	Notification of compliance status	Section 5.1.2(1)
§63.1283(d)(iii)	CPMS equipment performance check	Section 4.3
§63.1283(d)(iiv)	CPMS equipment performance check	Section 4.3

Appendix D-5

Cold Springs 1 40 CFR Part 63 Subpart HHH Site Monitoring Plan

ANR Storage Company
Cold Springs 1 Compressor Station
Kalkaska County, Michigan

40 CFR Part 63 Subpart HHH
Site Monitoring Plan

Effective Date: December 21, 2015
Version: 01
Status: Issued
Driver: Regulatory

ANR Storage Company
700 Louisiana Street, Suite 700
Houston, TX 77002

TransCanada
In business to deliver

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40 CFR Part 63 Subpart HHH Site Monitoring Plan
ANR Compressor Stations: Cold Springs 1

1.0 Purpose

The purpose of this Procedure is to describe the continuous parameter monitoring system (CPMS) to be used at Cold Springs 1 Compressor Station to meet the requirements for National Emission Standards for Hazardous Air Pollutants (NESHAPS) from Natural Gas Transmission and Storage Facilities Maximum Achievable Control Technology (MACT), Subpart HHH of 40 CFR part 63. These regulations require the control and continuous parameter monitoring of air pollution control equipment associated with glycol dehydration systems, such as condensers and thermal oxidizers. This Facility Monitoring Procedure must be available for review if requested by the EPA or delegated state or local air quality agencies.

Contact Person

Any questions in regard to this Site Monitoring Plan should be directed to Melinda Holdsworth, Senior Air Specialist with TransCanada.

Name:	Melinda Holdsworth, Senior Air Specialist
Phone:	(832) 320-5665
E-mail:	Melinda_Holdsworth@TransCanada.com
Address:	TransCanada 700 Louisiana Street, Suite 700 Houston, TX 77002

2.0 Scope

This Procedure applies to the TransCanada ANR Cold Springs 1 Compressor Station located at 1000 Pflum Road, Mancelona, MI, 49659 which is wholly owned and operated by TransCanada.

3.0 References

CS&E and all other TOP documents can be accessed from the TOPs database using this link TOPs.

Note: TOP documents referenced in this document will have their titles underlined and can be opened up by using the hyperlink below or going to the TOPs database using the above TOPs link.

- Thermal Oxidizer Inspection and Maintenance (EDMS No. 009423217)
- Glycol Dehydration Exchanger Condenser Inspection and Maintenance (EDMS No. 005249224)
- Temperature Measurement Device Specifications (EDMS No. 003834760)

4.0 Procedure

Notes:

1. Each Activity should be performed after reviewing the appropriate CS&E TOPs (Procedures).

Special Resources: N/A
Qualification Requirement(s): N/A.

4.1 Affected Source(s) and Associated CPMS Equipment

Note: This section provides information on the affected air pollution control equipment across TransCanada's Glycol Dehydration Systems and their associated CPMS. Per §63.1283(d)(1)(ii-iv), the Site Monitoring Plan must include design specification and equipment performance criteria for the pollution control system equipment; including but not limited to sample interface, detector signal analyzer, data acquisition and calculations.

4.1.1 Affected Source(s) Description

TransCanada Pipelines uses a Condenser and Thermal Oxidizer at Cold Springs 1 CS for air emission control. As such, it is subject to limitations and control requirements per MACT HHH. See table 1 below for details.

Table 1 – Glycol Dehydration System to MACT HHH & Provisions of this Plan

Station	State	Unit ID	Control Device	CPMS Metric	CPMS Value	Device Manufacturer	Device Model
Cold Springs 1	MI	EUCS1GLYREG-S3	Condenser	Temp	40 °F (95% BTEX Control)	Rosemount	644 RTD
Cold Springs 1	MI	EUCS1GLYREG-S3	Thermal Oxidizer	Temp	Max 1400 °F	Omron	E5CK-AA1

4.1.2 System Design Considerations

The purpose of the CPMS is to ensure that across TransCanada's Pipelines, temperature data of air pollution control equipment in glycol dehydration systems are:

- Continuously monitored (or at a minimum, take temperature readings every 15 minutes and average hourly, not including periods of startup, shutdown or malfunction).

- Average the temperature data on a daily basis
- Average the temperature data on 12 month rolling basis.
- Ensure the air pollution control device(s) operating temperature is maintained within the established temperature range specified by manufacturer (for thermal oxidizers) and below the maximum operating temperature specified by manufacturer (for condensers).

4.1.3 Temperature Measurement Device Specifications

The following specifications apply to the temperature measurement device:

Thermal Oxidizer Control Device:

Parameter	Specification
Location	The temperature sensor shall be installed at a location representative of the combustion zone temperature.
Device Type	A temperature monitoring device equipped with a continuous recorder.
Tolerance	The monitoring device shall have a minimum accuracy of ±2 percent of the temperature being monitored in °C, or ±2.5 °C, whichever value is greater. [§63.1283(d)(3)(A)]

Condenser Control Device:

Parameter	Specification
Location	For a condenser, a temperature monitoring device equipped with a continuous recorder. The temperature monitoring device shall have a minimum accuracy of ±2 percent of the temperature being monitored in °C, or ±2.5 °C, whichever value is greater. The temperature sensor shall be installed at a location in the exhaust vent stream from the condenser that provides a representative measurement.
Device Type	A temperature monitoring device equipped with a continuous recorder.
Tolerance	The monitoring device shall have a minimum accuracy of ±2 percent of the temperature being monitored in °C, or ±2.5 °C, whichever value is greater. [§63.1283(d)(3)(E)]

4.1.4 Wiring

Conduit cable will be installed per the appropriate edition of the National Electric Code and TransCanada standards reflective of the time of installation.

4.1.5 Data Acquisition System

The Data Acquisition System (DAS, aka PLC) shall be in continuous operation and will provide the operator with the following local readouts: [§63.8(c) (2) (ii)]

- Instantaneous readings of control device exhaust gas temperature.
- 15-minute snapshot temperature readings.
- 1-hour average temperatures.
- Readout or other indication of operation must be readily accessible on site.

Data will be retained for at least five (5) years in the DAS for retrieval in the event of a failure reporting system. Additionally, the operator will have the capability of generating a screen print from the DAS in the event of a failure of the reporting system.

4.1.6 Reporting System

A PC with reporting software installed will be connected to the DAS for data retention and report generation. The software is used to collect the data from the DAS, collate into a report formatted for printing and for long term retention of the data.

4.2 Temperature Monitoring System Performance Evaluation & QA/QC

4.2.1 Periodicity

An initial verification of the CPMS was performed upon original equipment installation. [§63.8(c)(3)] Annual QA/QC evaluations of the CPMS shall be conducted as described below. [§63.1283(d)(1)]

4.2.2 Methodology

One of the following methods shall be used for performance evaluations:

RTD Replacement

The RTD shall be replaced with a factory calibrated unit meeting the design requirements listed above. The calibration certification sheets or other appropriate documentation shall be retained demonstrating factory calibration.

Concurrently, a calibrated RTD simulator shall be used to test the remaining elements of the CPMS system in accordance with manufacturer's recommendations and company policies and procedures. A written work plan or SAP work order documenting steps to be followed shall be used. [§63.8(d)(2) – (3)]

Calibration

The calibration of the RTD shall be checked in place in accordance with manufacturer's recommendations and company policies and procedures. The methods used shall address both the RTD and the DAS. A written work plan or SAP work order documenting steps to be followed shall be used. [§63.8(d)(2) – (3)]

4.2.3 Notification

Notification to MDEQ prior to conducting the performance evaluation or with results after testing is required.

4.2.4 Troubleshooting a Malfunctioning CPMS

Malfunctioning CPMS shall be evaluated and repaired in accordance with manufacturer's recommendations, company policy and procedures and good operating practices.

4.3 CPMS Operation and Maintenance

4.3.1 CPMS Operation

The CPMS will be in operation whenever the monitored control device (condenser or thermal oxidizer) is in service and exhaust gases are being vented to the atmosphere with the exception of monitoring malfunctions, associated repairs, and required quality assurance or control activities. Data will be collected as follows:

- Sample the control device exhaust gas temperature at least once every 15 minutes.
- Average the 15-minute samples on an hourly basis. Average the hourly average on a daily basis and the daily basis on a monthly and 12 month rolling basis.
- An hour is defined as a 60 minute period beginning at the o-clock (i.e. 1:00, 2:00 etc.).
- If the system starts midway through an hour, record 15-minute data points but begin averaging only if there are at least two data points for the first clock based 60 minute period. Each of the two data points should represent a 15-minute period.
- If a unit stops midway through an hour, the 15-minute data points will be monitored and recorded; however, the average for that last clock based 60 minute period should only be computed if at least two data points are available. Each of the two data points should represent a 15-minute period.
- Each daily average calculation will include all hourly averages starting with the hour of 9:00 a.m. Central US Time Zone and concluding 24 hours later (i.e., 8:59 p.m.).
- The CPMS shall alarm, at a minimum, when the control device exhaust gas temperature hourly average approaches 10% of the permitted limit.
- The CPMS shall divert exhaust gas flow to the secondary control device (i.e., condenser vent) and record temperature infraction from the lower limit (i.e., 1400 °F for Thermal Oxidizer and 135°F for the condenser).
- Alarms shall be disabled as follows:
    - Thermal Oxidizer Low Temperature: Never.
    - Condenser Exhaust High Temperature: Never

4.3.2 CPMS Maintenance

Preventive Maintenance

CPMS Maintenance will be conducted in accordance with company policy and procedures [§63.8(d)(2)(iii)]. Alternately, the RTDs may be replaced annually with a concurrent performance evaluation as described above. Additionally, station walk downs take place at least weekly (when the station is manned) to check on obvious signs of physical failure of the equipment.

Corrective Maintenance

Corrective maintenance will be conducted according to manufacturer's recommendations, company policy and procedures and good operating practices in a manner consistent with safety and good air pollution control practices for minimizing emissions in the event of a CPMS malfunction, impending malfunction, or out-of-control CPMS. In lieu of conducting immediate corrective maintenance, Operations may shutdown the dehy system until such time as corrective maintenance can be performed as per above.

Corrective Maintenance actions taken will be documented in SAP. To the extent practical, a written plan will be used when conducting corrective maintenance. [63.8(d)(2)(vi)]

4.4 Data Management

4.4.1 Valid Data

Valid data is defined as data not "recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities." [§63.6635] Specifically, valid data is comprised of:

- 15-minute readings not recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities.
- Hourly averages consisting of two (2) valid 15-minute readings.
- Daily averages consisting of a single (1) valid hourly average.
- Monthly averages consisting of at least one (1) valid daily averages.
- 12 Month rolling averages consisting of the current month and prior eleven (11) months.

4.4.2 Data Review

Operations shall review the CPMS data daily reports to: [§63.8(c)(6)]

- Confirm all required data was collected.
- Identify any data collected that was not valid data as defined above.
- Confirm that no exceedances of temperature limits occurred. Missing data may be recovered by:
    - Calling the Automation group to assist in recovering data from the DAS/PLC.
    - Generating a screen print from the HMI panel.

If missing data is unrecoverable (e.g., due to power failure), exceedances are identified, or non-valid data is identified, the Environment Department shall be notified immediately. Additionally, in the event of repeated instances of missing data, whether recoverable or unrecoverable, over a short duration of time, the Environment Department shall be notified such that an investigation as to the causes can be conducted.

5.0 DOCUMENTATION/REPORTING REQUIREMENTS

1. Closeout of the SAP work order shall be considered sufficient documentation provided field readings and/or other results as appropriate are included in the closeout comments or attached to the work order.
2. Logs documenting the malfunction of the CPMS, immediate actions and corrective actions shall be taken in accordance with Section 5.1.1 of this plan. Additionally the Environment Department shall be notified immediately of the malfunction. The Environment Department is responsible for reporting the malfunction in accordance with Section 5.1.2 of this plan.
3. The Environment Department shall review the data prior to filing Quarterly Deviation Reports, Semiannual Reports, or Annual Compliance Certifications as appropriate.
4. Revisions to this monitoring plan must be retained for 5 years from the date of the revision per §63.8(d) (2).

5.1 Recordkeeping

The following records collected by the CPMS are required to be retained for a period of five years. At minimum the most recent two year data shall be available on site. The other three years data may be stored off site but should be accessible within a reasonable time. [§63.10(b)(1) and §63.6660] These records can be retained either electronically, via hard copy or both and shall be easily accessible.

- 12-month rolling average. (COMET/File 1.5.5)
- Monthly average BTEX. (COMET/File 1.5.5)
- Each daily average. (COMET/File 1.5.5)
- Each hourly average used to calculate the daily average values. (COMET/File 1.5.5)
- Each 15-minute data point used to calculate hourly average values, as well as 15-minute data points during start-up and shutdowns. [§63.10(b)(2)(vii)] (COMET/File 1.5.5)
- The algorithm/calculation procedure used to reduce data. (this document)
- All readings taken during periods of CPMS breakdowns and out-of-control periods. (File 1.5.5) Additionally, the following records shall be created and retained by Operations regarding the CPMS:
- The date and time identifying each period during which the CPMS was inoperative except for zero (low-level) and high-level checks. (File 1.5.5)
- The date and time identifying each period during which the CMS was out of control. (File 1.5.5)
- The date and time of commencement and completion of each time period of where the CPMS 4-hour rolling temperature was out of the specified limits in this plan other than during periods other than startups, shutdowns, and malfunctions of the affected source. (File 1.5.5)
- The nature and cause of any malfunction (if known). (File 1.5.5)
- The corrective action taken or preventive measures adopted. (File 1.5.5)
- The nature of the repairs or adjustments to the CPMS that was inoperative or out of control. (File 1.5.5)
- The total process operating time during the reporting period. (File 1.5.5)
- Documentation of any QA/QC procedures performed for CPMS.

5.2 Compliance Reports

The Environment Department is responsible for compiling all compliance reports to be sent to regulatory agencies, including, but not limited to:

- Immediate notifications of non-compliance where required by state rules.
- Quarterly deviation reports where required by state rules.
- Semiannual Reports and Annual Compliance Reports.
- Notification of malfunctioning and out-of-control CPMS events.
- Notification of intent to conduct performance tests.
- Notification of Compliance Status at the completion of performance tests.

- Notification within 2 working days if an action taken during a startup, shutdown, or malfunction (including an action taken to correct a malfunction) is not consistent with this Procedure and the source exceeds any applicable emission limitation per §63.6(e)(3)(iv).

6.0 Definitions

Malfunction:	Any sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner which causes or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions. This definition is provided for information only. Operations should consult with the Environmental Coordinator to determine whether or not a malfunction has occurred due to any unit alarm or shutdown for purposes related to the MACT rules.
Out-of-Control:	A CPMS is out-of-control if the zero (low-level), mid-level (if applicable), or high-level calibration drift (CD) exceeds two times the applicable CD specification in the applicable performance specification or in the relevant standard; or The CPMS fails a performance test audit, relative accuracy audit, relative accuracy test audit, or linearity test audit.

7.0 Latest Revisions

Description:	Revision 01: Section 4.1.1 – Updated CPMS values
Rationale Statement:	Updated to account for the 95% BTEX control.
Impact Assessment Summary:	The update provided more precise limitations and control requirements for the station's Condenser.

Attachment A

Regulatory Cross Reference (40 CFR Part 63, Subpart HHH)

NESHAP From Natural Gas Transmission and Storage Facilities (40 CFR 63 Subpart HHH)	Description of Section	Plan Section
§ 63.1283(d)(ii)(A)	Performance and design criteria for monitoring system requirement	Sections 4.2 and 4.4
§63.1283(d)(ii)(B)	Sampling location	Section 4.1
§63.1283(d)(ii)(C)	Audit procedures	Sections 4.2.2(2) and 4.3.2(2)
§63.1283(d)(ii)(D)	Ongoing operational and maintenance procedures	Section 4.3.2(2)
§63.1283(d)(ii)(D)(i)	Operating CMS with good air pollution control practices	Section 4.3.2(2)
§63.1283(d)(ii)(E)	Ongoing reporting and recordkeeping procedures	Section 5.0
§63.1283(d)(ii)(E)(i)	Required CMS measurements	Section 5.1.1
§63.1283(d)(ii)(E)(ii)	Identifying inoperative periods for CMS	Section 5.1.1
§63.1283(d)(ii)(E)(iii)	Identifying each period when the CMS was out of control	Section 5.1.1
§63.1283(d)(ii)(E)(iv)	Specific identification	Section 4.1
§63.1283(d)(ii)(E)(vi)	Corrective actions and preventative measures	Section 4.3.1
§63.1283(d)(ii)(E)(vii)	Corrective actions and preventative measures	Section 4.3.1
§63.1283(d)(ii)(E)(viii)	Operating time during reporting period	Section 4.3.1
§63.1283(d)(ii)(E)(x)	Results of CMS performance evaluation	Section 4.2.2(2)
§63.1283(d)(ii)(E)(xi)	Duration of each malfunction	Section 4.2.4
§63.1283(d)(ii)(E)(xvi)	Measurements to comply with standards	Section 4.1.2(3)
§63.1283(d)(ii)(E)(xvii)	Results of performance tests and emission observations	Section 5.1.2(1)
§63.1283(d)(ii)(E)(xix)	CMS calibration checks	Section 4.2.2(2)
§63.1283(d)(ii)(E)(xx)	CMS maintenance	Section 4.3

NESHAP From Natural Gas Transmission and Storage Facilities (40 CFR 63 Subpart HHH)	Description of Section	Plan Section
§63.1283(d)(ii)(E)(xxii)	Notification of compliance status	Section 5.1.2(1)
§63.1283(d)(iii)	CPMS equipment performance check	Section 4.3
§63.1283(d)(iiv)	CPMS equipment performance check	Section 4.3

Appendix A

Area Maps and Process Flow Diagram:

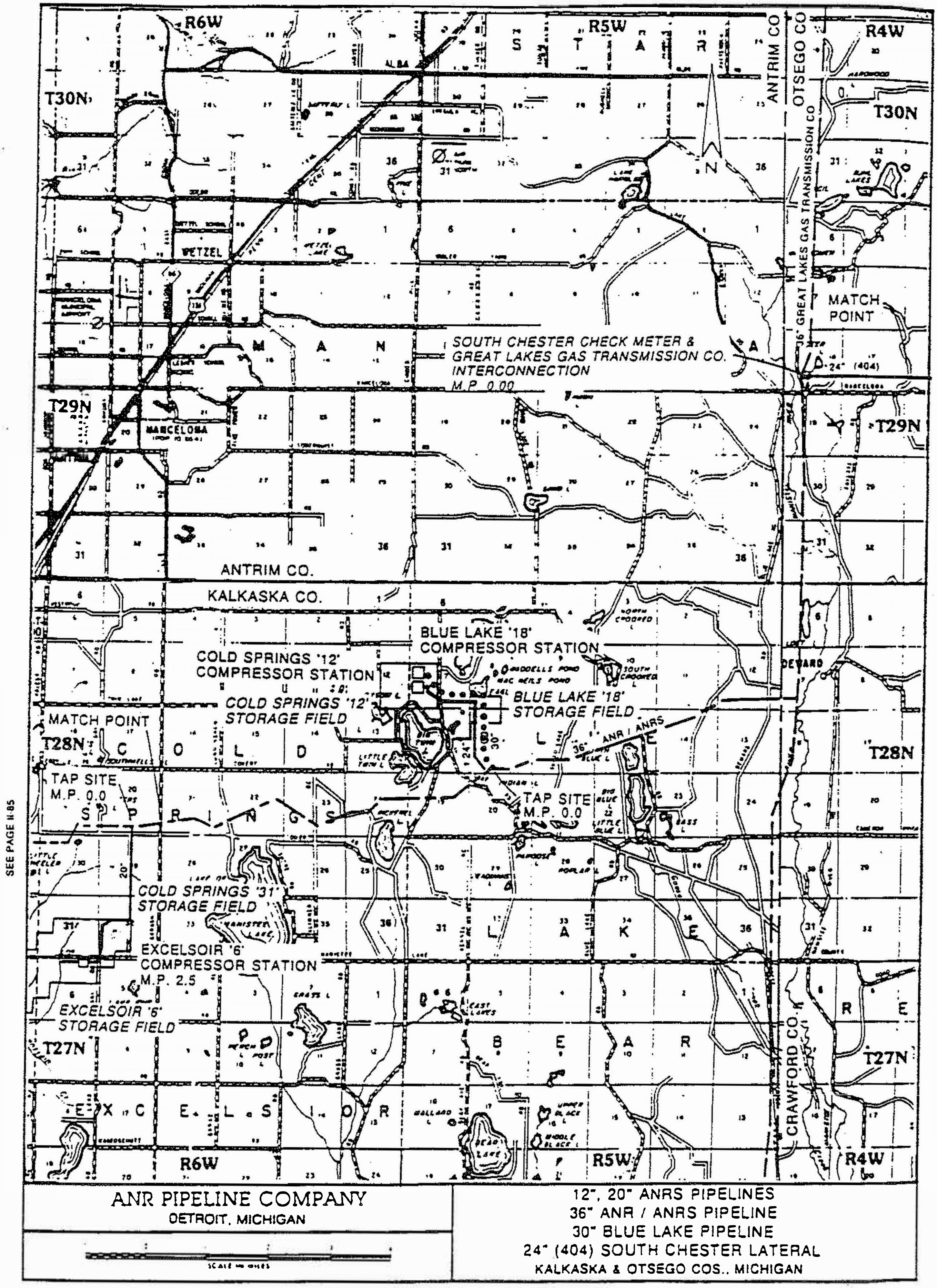

Figure A-1. Location Map of Existing Facilities Cold Springs 12 and Blue Lake

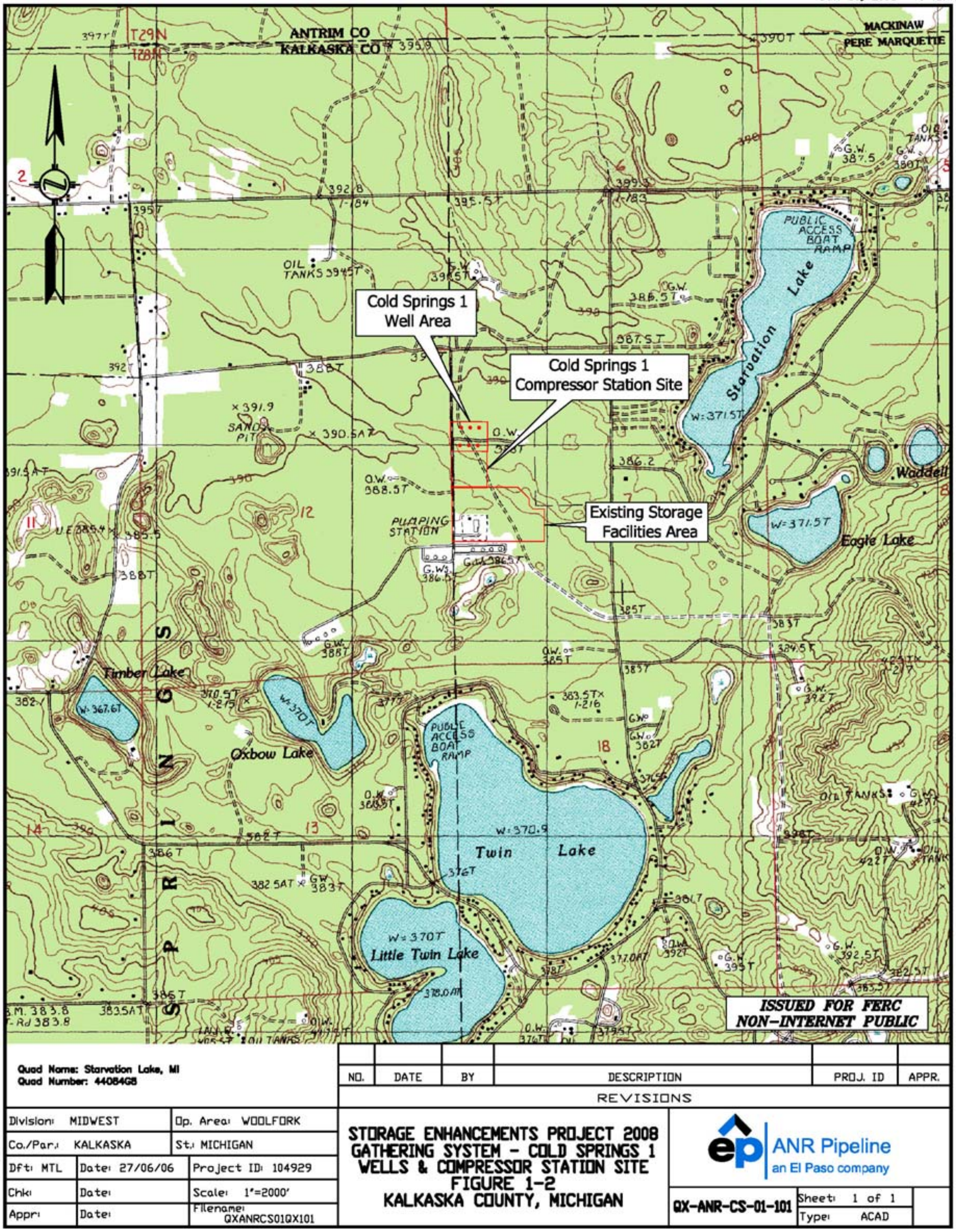

Figure A-2. Location Map of Existing Facilities and Proposed Cold Springs-1 Facility

COLD SPRINGS 12 COMPRESSOR STATION

FIGURE CS12-1

A – MCC BLDG.
B – BLOWDOWN SILENCER
C – COMPRESSOR BLDG.
D – PUMP BLDG.
E – VRC BLDG.
F – LIQUID METER BLDG.
G – AUXILIARY BLDG.
H – GENERATORS
I – LUBE OIL TANKS
J – AMBITROL TANK
K – GAS METER BLDG.

L – GENERATOR ENG. EXHAUST STACKS
M – GLYCOL TANKS (2)
N – REGEN. BLDG.
O – CONC. PAD
P – CONTRACTOR TOWERS
Q – MCC BLDG.
R – WITHDRAWAL COOLERS
S – WITHDRAWAL HEATERS
T – BRINE TANKS
U – WASTE OIL TANK
V – METHANOL TANK

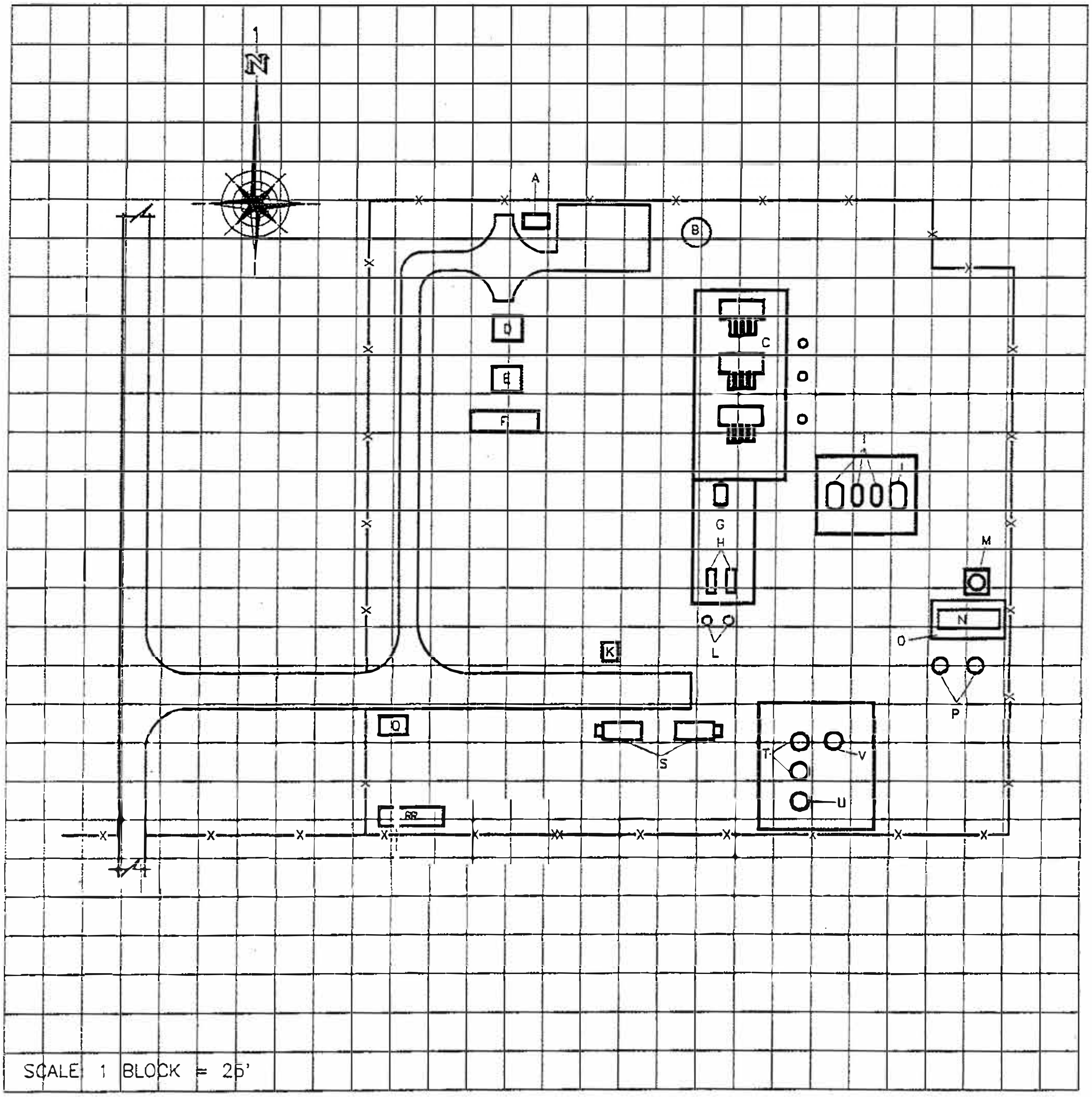

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Figure CS12-2
Gas Injection Process Flow Diagram
Cold Springs 12 Compressor Station
ANR Storage Company

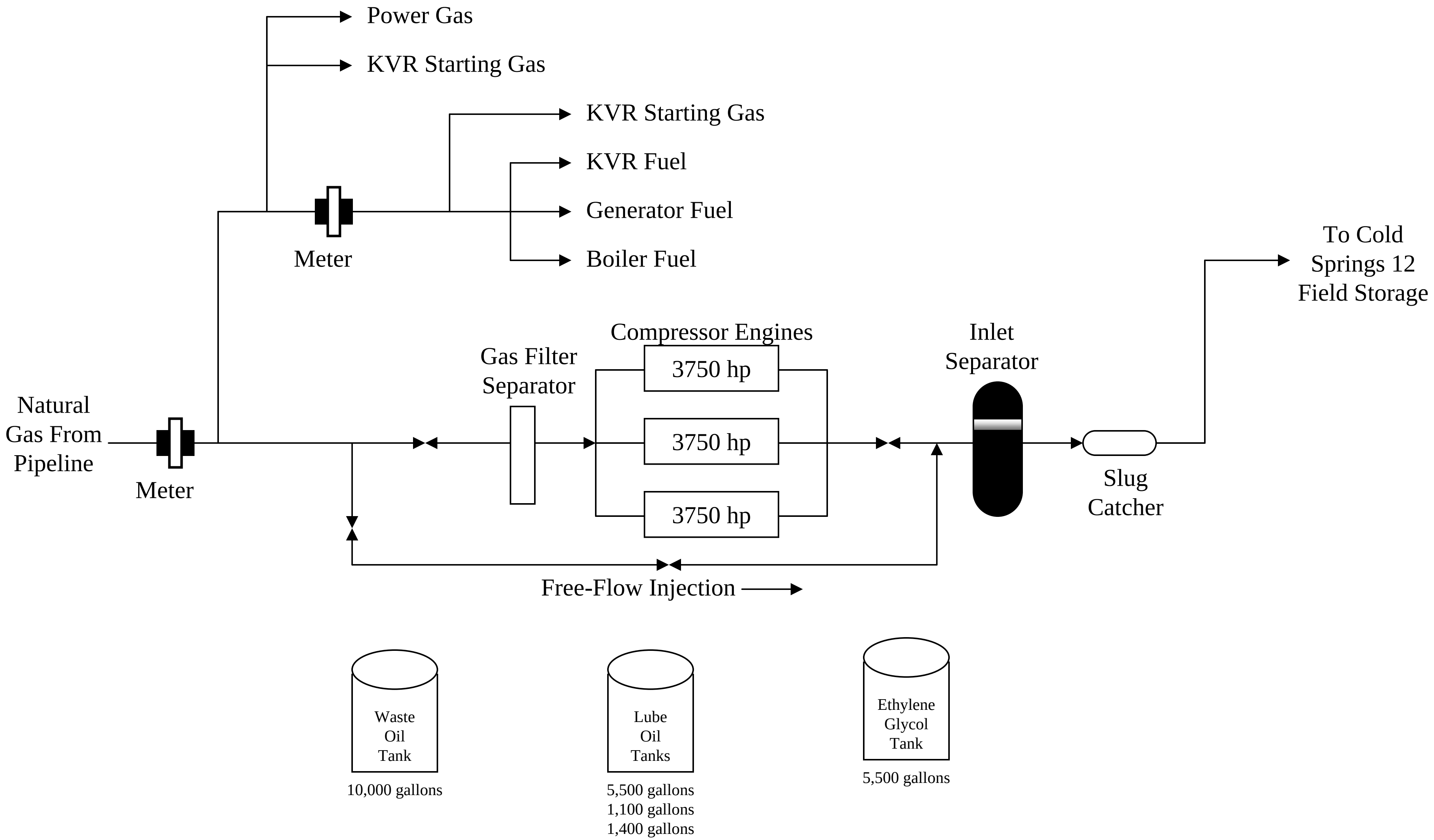
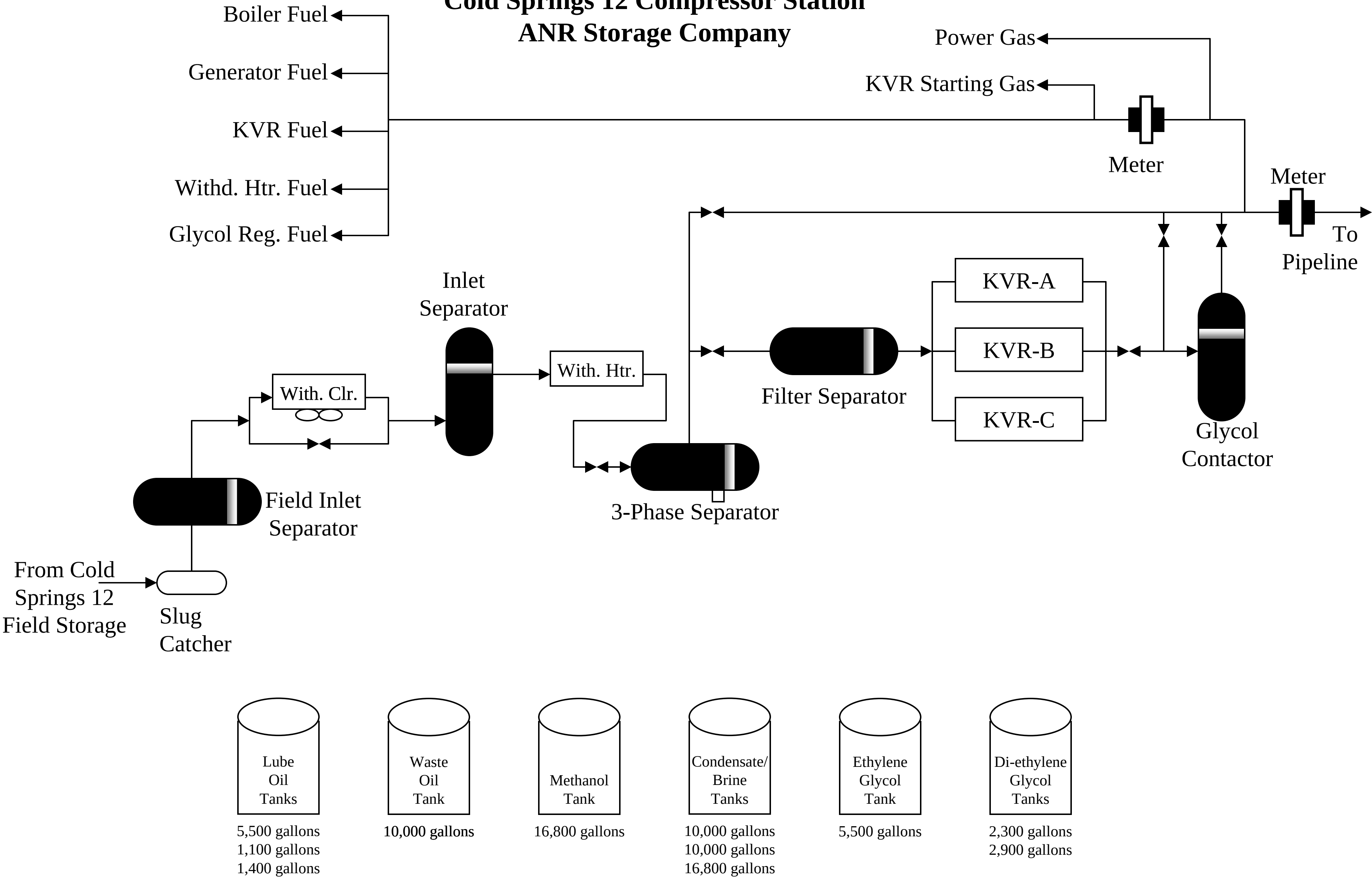


Figure CS12-3
Gas Withdrawal Process Flow Diagram
Cold Springs 12 Compressor Station
ANR Storage Company



BLUE LAKE 18A COMPRESSOR STATION

FIGURE BL–1

A – WAREHOUSE/OFFICE BLDG.
B – BLOWDOWN SILENCER
C – COOLERS
D – COMP. ENGINE STACK C
E – COMP. ENGINE STACK B
F – COMP. ENGINE STACK A
G – BOILER
H – GAS METER BLDG.
I – GENERATOR STACK C
J – GENERATOR STACK B
K – GENERATOR STACK A
L – LUBE OIL TANK
M – LUBE OIL TANK

N – COOLANT TANK
O – CYCLINDER OIL TANK
P – GENERAL LUBE TANK
Q – ENGINE COOLANT RECYCLE TANK
R – SEPARATORS
S – GAS WITHDRAWAL COOLER
T – PRIMARY SEPARATOR
U – GLYCOL REGENERATION BLDG.
V – WASTE OIL TANK
W – WITHDRAWAL GAS HEATER
X – INLET SCRUBBER
Y – GAS METER BLDG.
Z – PUMP/VRC BLDG.

V1 – 3502 BRINE TANK
V2 – 3401 BRINE TANK
V3 – 3402 BRINE TANK
V4 – 3403 BRINE TANK
V5 – 3304 BRINE TANK
V6 – 3303 ETHYLENE GLYCOL
GLYCOL RECYCLED

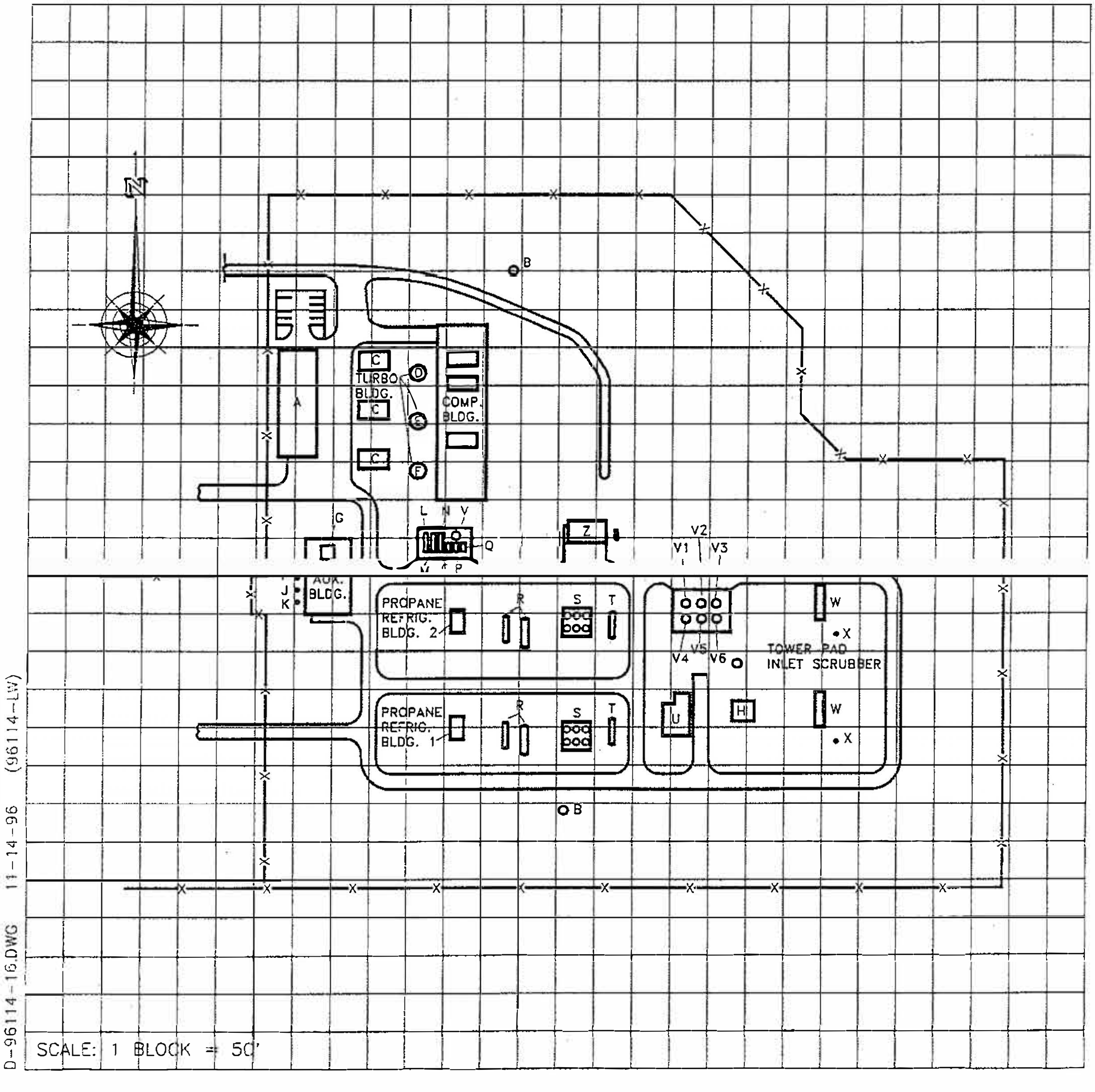


Figure BL-2
Gas Injection Process Flow Diagram
Blue Lake Compressor Station
ANR Storage Company

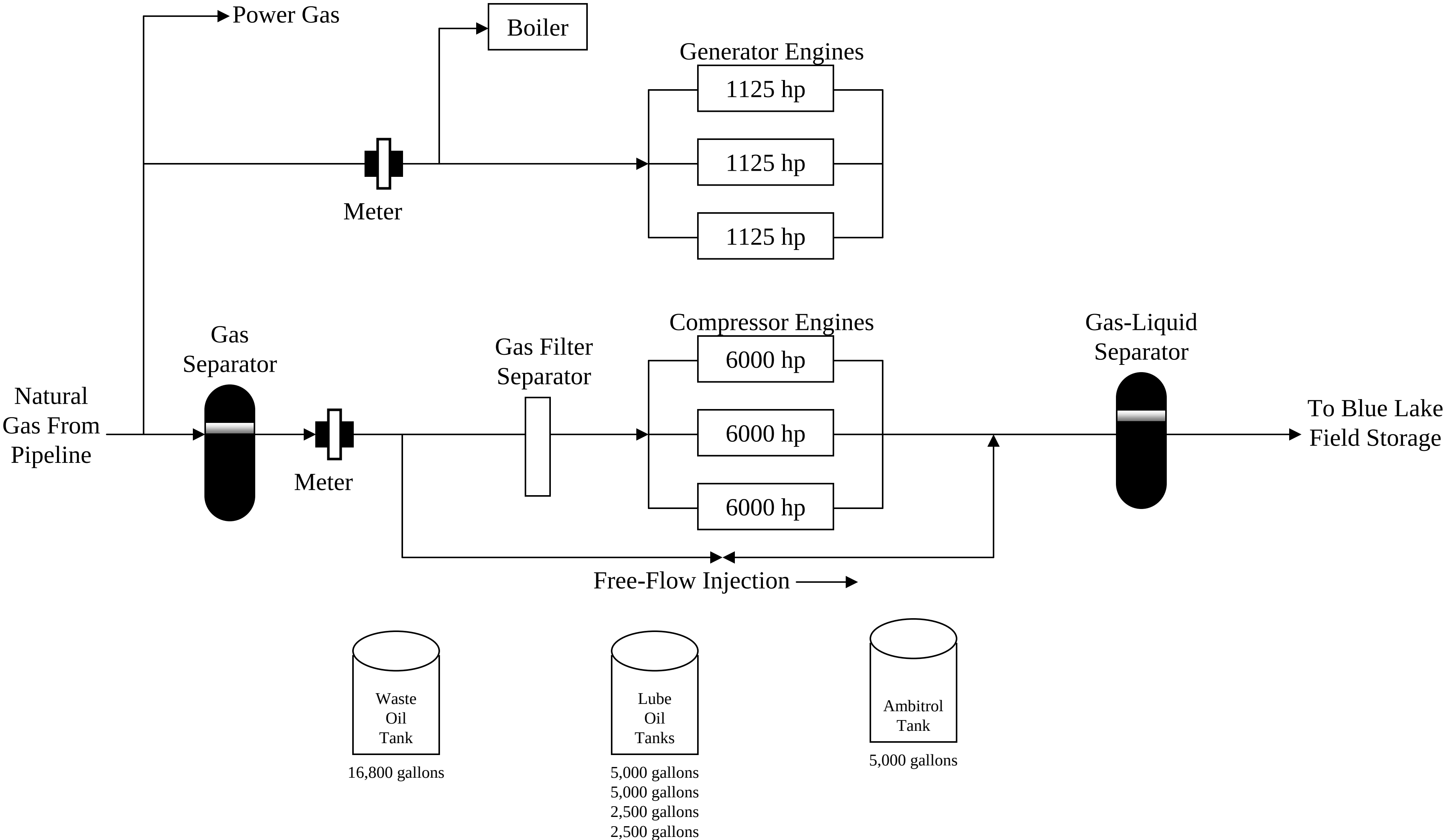
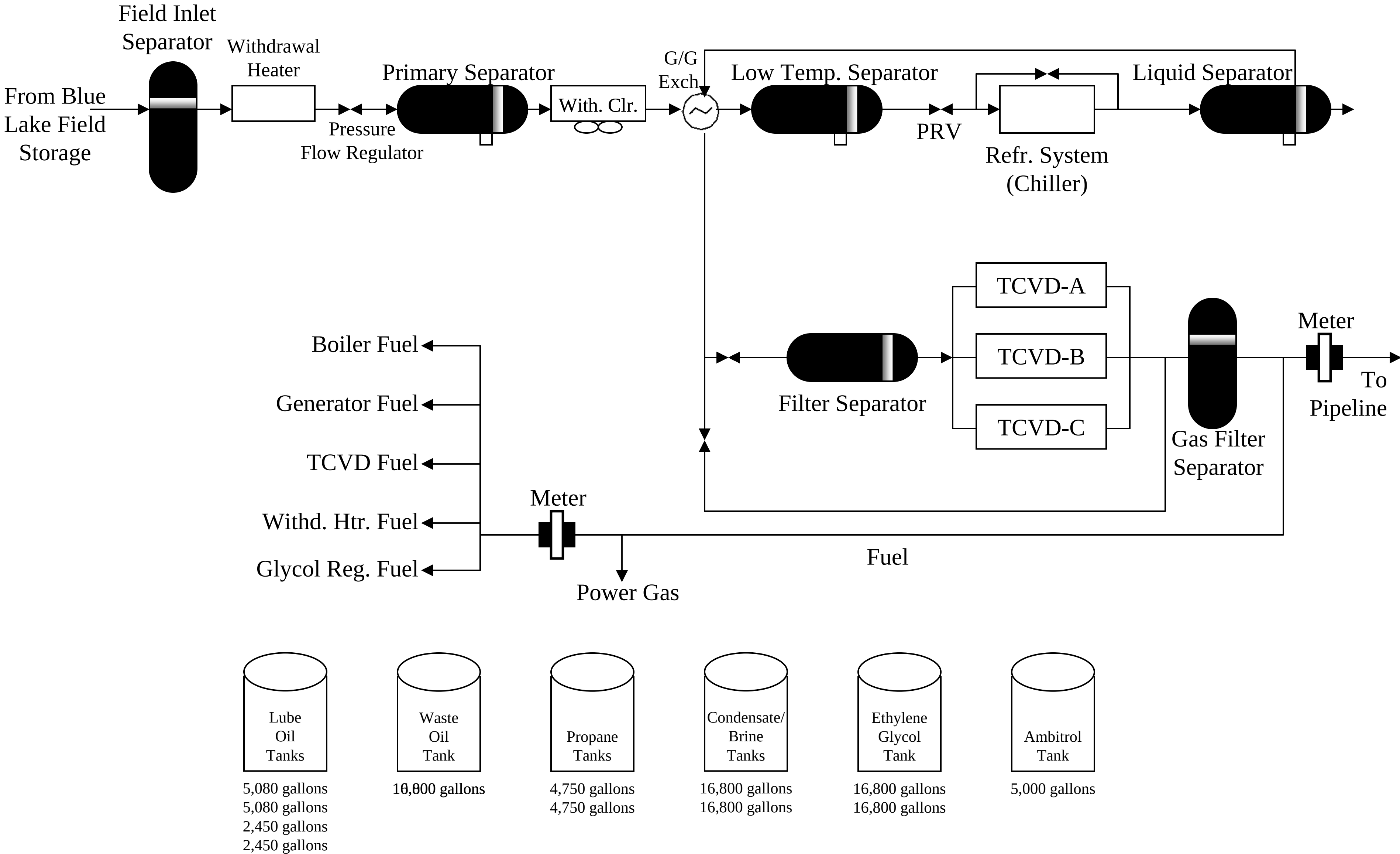


Figure BL-3
Gas Withdrawal Process Flow Diagram
Blue Lake Compressor Station
ANR Storage Company



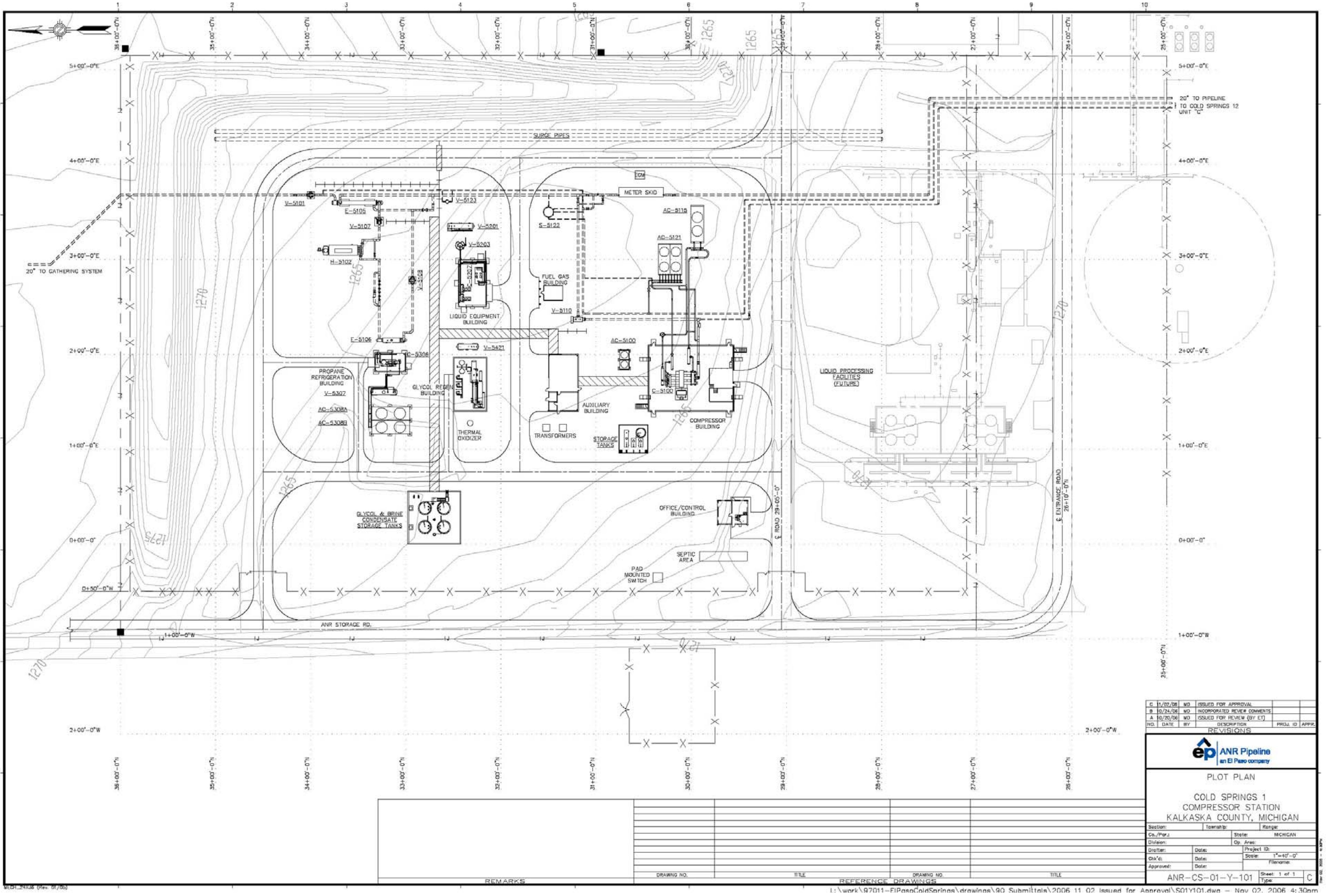


Figure CS1-1. Plot Plan of Cold Springs-1 Facility

Figure CS1-2
Glycol Dehydration System Process Flow Diagram
Cold Springs 1 Compressor Station
ANR Storage Company

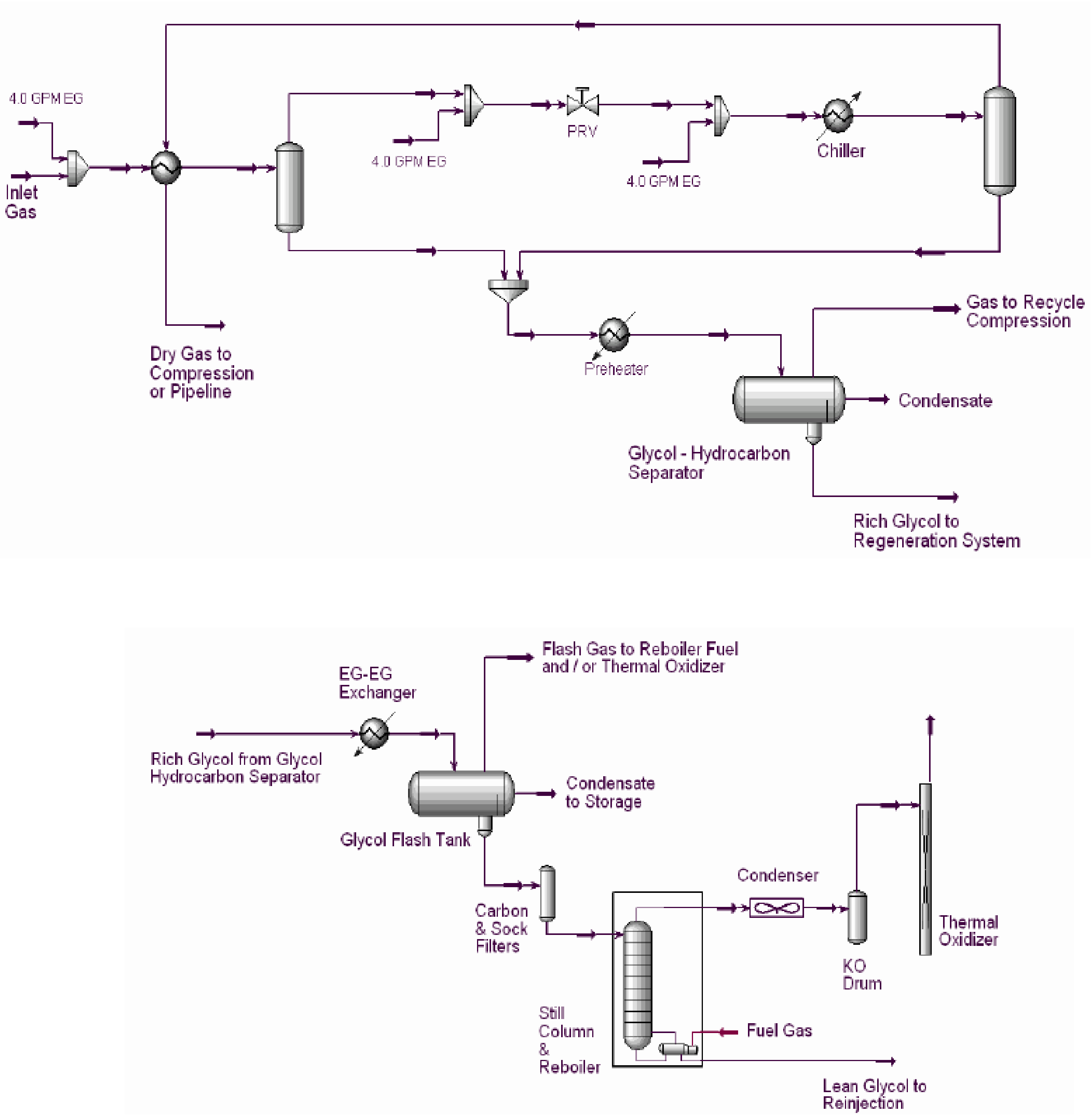
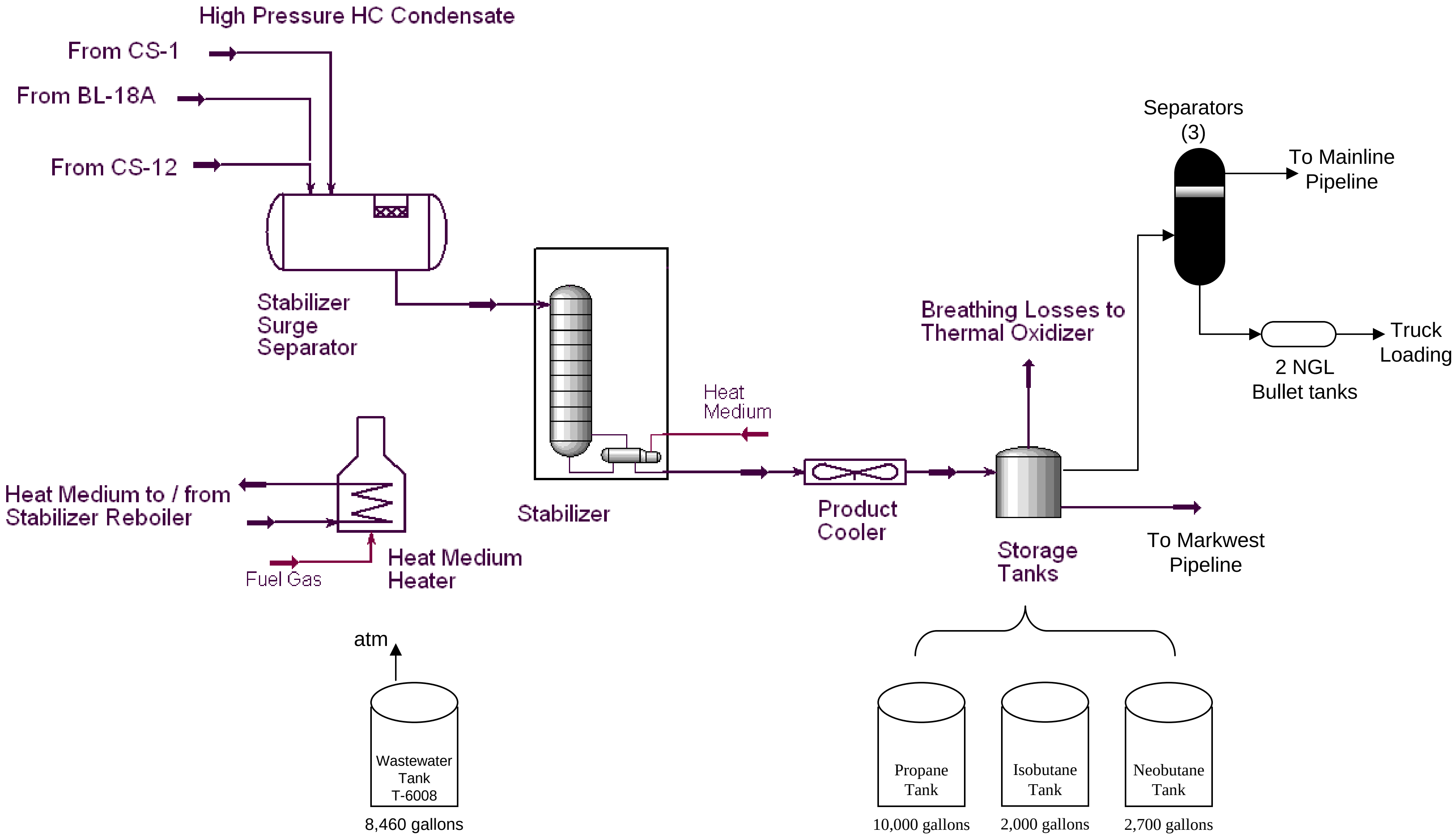


Figure CS1-3
Liquid Stabilization System Process Flow Diagram
Cold Springs 1 Compressor Station
ANR Storage Company



Appendix B

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

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GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Cold Springs 1, MI Theox
File Name: N:\Technical\5620-CPG\0032 - Cold Springs Blue Lake, MI
Reissuance\GLYCalc\CURRENT versions - 2014 data\TC - BL, MI Theox.ddf
     Date: October 23, 2018

 DESCRIPTION:

    Description: BL EG Cold Separators - Condenser + Thermal
                 Oxidizer EF using 3/16/2014 gas analysis.
                 700 MMSCFD rated. Cold Separation: -10 F;
                 850 psig. Flash Tank: 135 F; 45 psig.
                 Condenser: 80 F; 1 psig. TO: 95% contr.
                 Glycol recirculation: 60 gpm.

    Annual Hours of Operation:    8760.0 hours/yr



 EMISSIONS REPORTS:
 --------------------------------------------------------------------



 CONTROLLED REGENERATOR EMISSIONS
 --------------------------------------------------------------------
            Component              lbs/hr     lbs/day     tons/yr
 ------------------------------- ----------- ----------- -----------
                         Methane      0.1247       2.994      0.5464
                          Ethane      0.0250       0.600      0.1094
                         Propane      0.0056       0.134      0.0244
                       Isobutane      0.0012       0.028      0.0051
                        n-Butane      0.0021       0.051      0.0093

                      Isopentane      0.0021       0.050      0.0092
                       n-Pentane      0.0011       0.026      0.0047
                        n-Hexane      0.0023       0.055      0.0101
                     Cyclohexane      0.0077       0.186      0.0339
                   Other Hexanes      0.0035       0.084      0.0154

                        Heptanes      0.0032       0.077      0.0141
                         Benzene      0.0622       1.492      0.2722
                         Toluene      0.0648       1.555      0.2837
                         Xylenes      0.0155       0.372      0.0680
                     C8+ Heavies     <0.0001      <0.001     <0.0001
 ------------------------------- ----------- ----------- -----------
                 Total Emissions      0.3210       7.704      1.4059

     Total Hydrocarbon Emissions      0.3210       7.704      1.4059
             Total VOC Emissions      0.1713       4.110      0.7501
             Total HAP Emissions      0.1448       3.474      0.6340
            Total BTEX Emissions      0.1425       3.419      0.6239



 UNCONTROLLED REGENERATOR EMISSIONS
 --------------------------------------------------------------------
            Component              lbs/hr     lbs/day     tons/yr
 ------------------------------- ----------- ----------- -----------
                         Methane      2.4982      59.958     10.9423
                          Ethane      0.5014      12.034      2.1962
                         Propane      0.1129       2.710      0.4946
                       Isobutane      0.0240       0.575      0.1049
                        n-Butane      0.0442       1.060      0.1934

                      Isopentane      0.0475       1.139      0.2079
                       n-Pentane      0.0240       0.575      0.1049
                        n-Hexane      0.0668       1.604      0.2927
                     Cyclohexane      0.2474       5.938      1.0837
```

```
                  Other Hexanes      0.0893       2.143      0.3911

                       Heptanes      0.1459       3.501      0.6390
                        Benzene      2.6579      63.791     11.6418
                        Toluene      5.2875     126.900     23.1593
                        Xylenes      4.2973     103.135     18.8221
                    C8+ Heavies      0.0027       0.064      0.0116
------------------------------- ----------- ----------- -----------
                Total Emissions     16.0469     385.126     70.2855

    Total Hydrocarbon Emissions     16.0469     385.126     70.2855
            Total VOC Emissions     13.0473     313.134     57.1470
            Total HAP Emissions     12.3095     295.429     53.9158
           Total BTEX Emissions     12.2427     293.825     53.6232


FLASH GAS EMISSIONS
-------------------------------------------------------------------
           Component               lbs/hr     lbs/day     tons/yr
------------------------------- ----------- ----------- -----------
------------------------------- ----------- ----------- -----------




FLASH TANK OFF GAS
-------------------------------------------------------------------
           Component               lbs/hr     lbs/day     tons/yr
------------------------------- ----------- ----------- -----------
                        Methane     44.1778    1060.267    193.4987
                         Ethane      6.4877     155.705     28.4162
                        Propane      0.6164      14.793      2.6998
                      Isobutane      0.1437       3.449      0.6294
                       n-Butane      0.2038       4.890      0.8925

                     Isopentane      0.1886       4.526      0.8259
                      n-Pentane      0.0798       1.914      0.3494
                       n-Hexane      0.1649       3.957      0.7222
                    Cyclohexane      0.1336       3.208      0.5854
                  Other Hexanes      0.2893       6.944      1.2673

                       Heptanes      0.2762       6.628      1.2096
                        Benzene      0.3241       7.778      1.4194
                        Toluene      0.5209      12.501      2.2814
                        Xylenes      0.2690       6.457      1.1784
                    C8+ Heavies      0.0020       0.048      0.0088
------------------------------- ----------- ----------- -----------
                Total Emissions     53.8777    1293.065    235.9844

    Total Hydrocarbon Emissions     53.8777    1293.065    235.9844
            Total VOC Emissions      3.2122      77.093     14.0695
            Total HAP Emissions      1.2789      30.693      5.6014
           Total BTEX Emissions      1.1140      26.736      4.8793



EQUIPMENT REPORTS:
-------------------------------------------------------------------



CONDENSER AND COMBUSTION DEVICE
-------------------------------------------------------------------

          Condenser Outlet Temperature:     80.00 deg. F
                    Condenser Pressure:     15.50 psia
                        Condenser Duty: 3.66e-002 MM BTU/hr
                  Hydrocarbon Recovery:      0.75 bbls/day
```

```
                        Produced Water:     41.82 bbls/day
                   Ambient Temperature:     30.00 deg. F
                         Excess Oxygen:     20.00 %
                 Combustion Efficiency:     95.00 %
         Supplemental Fuel Requirement: 3.66e-002 MM BTU/hr

               Component             Emitted     Destroyed
    ------------------------------- ----------- -----------
                            Methane       4.99%      95.01%
                             Ethane       4.98%      95.02%
                            Propane       4.93%      95.07%
                          Isobutane       4.86%      95.14%
                           n-Butane       4.80%      95.20%

                         Isopentane       4.43%      95.57%
                          n-Pentane       4.50%      95.50%
                           n-Hexane       3.45%      96.55%
                        Cyclohexane       3.13%      96.87%
                      Other Hexanes       3.93%      96.07%

                           Heptanes       2.20%      97.80%
                            Benzene       2.34%      97.66%
                            Toluene       1.23%      98.77%
                            Xylenes       0.36%      99.64%
                        C8+ Heavies       0.01%      99.99%



COLD SEPARATOR
-------------------------------------------------------------------

            Cold Separator Temperature:     -10.0 deg. F
               Cold Separator Pressure:     850.0 psig
                     Dry Gas Flow Rate:  700.0000 MMSCF/day
          Calculated Dry Gas Dew Point:      0.73 lbs. H2O/MMSCF
            Glycol Losses with Dry Gas:    2.2823 lb/hr
                 Wet Gas Water Content: Saturated
      Calculated Wet Gas Water Content:     22.59 lbs. H2O/MMSCF
  Calculated Lean Glycol Recirc. Ratio:      5.65 gal/lb H2O
                       Produced Liquid: 1.72e+003 bbls/day
     Glycol Losses in Produced Liquids:    5.4596 lb/hr

                                     Remaining  Absorbed or
               Component             in Dry Gas  Condensed
    ------------------------------- ----------- -----------
                              Water       3.24%      96.76%
                     Carbon Dioxide      99.51%       0.49%
                           Nitrogen      99.95%       0.05%
                            Methane      99.90%       0.10%
                             Ethane      99.49%       0.51%

                            Propane      96.61%       3.39%
                          Isobutane      92.88%       7.12%
                           n-Butane      89.16%      10.84%
                         Isopentane      69.70%      30.30%
                          n-Pentane      40.45%      59.55%

                           n-Hexane      45.60%      54.40%
                        Cyclohexane      36.71%      63.29%
                      Other Hexanes      57.90%      42.10%
                           Heptanes      17.27%      82.73%
                            Benzene      34.35%      65.65%

                            Toluene       8.63%      91.37%
                            Xylenes       3.99%      96.01%
                        C8+ Heavies       4.18%      95.82%


FLASH TANK
```

```
------------------------------------------------------------------

                    Flash Control: Combustion device
         Flash Control Efficiency: 100.00 %
                Flash Temperature:     135.0 deg. F
                   Flash Pressure:      45.0 psig

                             Left in Oil  Removed in
         Component            and Glycol  Flash Gas
    ----------------------------- ----------- -----------
                        Water      99.98%       0.02%
               Carbon Dioxide      43.96%      56.04%
                     Nitrogen       3.83%      96.17%
                      Methane       5.35%      94.65%
                       Ethane       7.18%      92.82%

                      Propane      15.49%      84.51%
                    Isobutane      14.29%      85.71%
                     n-Butane      17.81%      82.19%
                   Isopentane      20.51%      79.49%
                    n-Pentane      23.48%      76.52%

                     n-Hexane      29.20%      70.80%
                  Cyclohexane      66.05%      33.95%
                Other Hexanes      24.35%      75.65%
                     Heptanes      34.89%      65.11%
                      Benzene      89.68%      10.32%

                      Toluene      91.74%       8.26%
                      Xylenes      94.87%       5.13%
                  C8+ Heavies      62.06%      37.94%


REGENERATOR
------------------------------------------------------------------

  No Stripping Gas used in regenerator.

                              Remaining   Distilled
         Component            in Glycol   Overhead
    ----------------------------- ----------- -----------
                        Water      94.08%       5.92%
               Carbon Dioxide       0.00%     100.00%
                     Nitrogen       0.00%     100.00%
                      Methane       0.00%     100.00%
                       Ethane       0.00%     100.00%

                      Propane       0.00%     100.00%
                    Isobutane       0.00%     100.00%
                     n-Butane       0.00%     100.00%
                   Isopentane       2.44%      97.56%
                    n-Pentane       2.13%      97.87%

                     n-Hexane       1.71%      98.29%
                  Cyclohexane       4.84%      95.16%
                Other Hexanes       4.11%      95.89%
                     Heptanes       1.43%      98.57%
                      Benzene       5.58%      94.42%

                      Toluene       8.61%      91.39%
                      Xylenes      13.60%      86.40%
                  C8+ Heavies      19.34%      80.66%


STREAM REPORTS:
------------------------------------------------------------------
```

```
WET GAS STREAM
-------------------------------------------------------------
    Temperature:     82.00 deg. F
    Pressure:      2100.70 psia
    Flow Rate:   2.93e+007 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 4.76e-002 6.62e+002
                     Carbon Dioxide 7.85e-001 2.67e+004
                           Nitrogen 8.50e-001 1.84e+004
                            Methane 9.54e+001 1.18e+006
                             Ethane 2.19e+000 5.08e+004

                            Propane 2.53e-001 8.61e+003
                          Isobutane 5.10e-002 2.29e+003
                           n-Butane 5.30e-002 2.38e+003
                         Isopentane 4.50e-002 2.50e+003
                          n-Pentane 2.40e-002 1.34e+003

                           n-Hexane 2.61e-002 1.74e+003
                        Cyclohexane 5.80e-003 3.77e+002
                      Other Hexanes 4.88e-002 3.24e+003
                           Heptanes 7.72e-002 5.97e+003
                            Benzene 4.60e-003 2.77e+002

                            Toluene 2.03e-002 1.44e+003
                            Xylenes 2.10e-002 1.72e+003
                        C8+ Heavies 5.52e-002 7.25e+003
    ------------------------------- --------- ---------
                   Total Components    100.00 1.32e+006


DRY GAS STREAM
-------------------------------------------------------------
    Temperature:    -10.00 deg. F
    Pressure:       864.70 psia
    Flow Rate:   2.92e+007 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 1.55e-003 2.14e+001
                     Carbon Dioxide 7.84e-001 2.65e+004
                           Nitrogen 8.53e-001 1.84e+004
                            Methane 9.57e+001 1.18e+006
                             Ethane 2.19e+000 5.06e+004

                            Propane 2.45e-001 8.32e+003
                          Isobutane 4.75e-002 2.12e+003
                           n-Butane 4.74e-002 2.12e+003
                         Isopentane 3.15e-002 1.75e+003
                          n-Pentane 9.74e-003 5.40e+002

                           n-Hexane 1.19e-002 7.91e+002
                        Cyclohexane 2.14e-003 1.38e+002
                      Other Hexanes 2.84e-002 1.88e+003
                           Heptanes 1.34e-002 1.03e+003
                            Benzene 1.59e-003 9.52e+001

                            Toluene 1.76e-003 1.25e+002
                            Xylenes 8.42e-004 6.87e+001
                        C8+ Heavies 2.32e-003 3.04e+002
    ------------------------------- --------- ---------
                   Total Components    100.00 1.30e+006
```

```
LEAN GLYCOL STREAM
-------------------------------------------------------------
    Temperature:     82.00 deg. F
    Flow Rate:   6.00e+001 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)     (ppm)
    ------------------------------ --------- --------- ---------
                                EG 7.00e+001 2.26e+004   699963.
                             Water 3.00e+001 9.69e+003   299996.
                    Carbon Dioxide 1.88e-011 6.06e-009        0.
                          Nitrogen 1.69e-013 5.48e-011        0.
                           Methane 4.85e-018 1.57e-015        0.

                            Ethane 1.02e-008 3.30e-006        0.
                           Propane 9.18e-011 2.97e-008        0.
                         Isobutane 1.56e-011 5.03e-009        0.
                          n-Butane 1.90e-011 6.15e-009        0.
                        Isopentane 3.67e-006 1.19e-003        0.

                         n-Pentane 1.61e-006 5.21e-004        0.
                          n-Hexane 3.60e-006 1.16e-003        0.
                       Cyclohexane 3.90e-005 1.26e-002        0.
                     Other Hexanes 1.18e-005 3.82e-003        0.
                          Heptanes 6.56e-006 2.12e-003        0.

                           Benzene 4.86e-004 1.57e-001        5.
                           Toluene 1.54e-003 4.98e-001       15.
                           Xylenes 2.09e-003 6.76e-001       21.
                       C8+ Heavies 1.97e-006 6.37e-004        0.
    ------------------------------ --------- --------- ---------
                  Total Components    100.00 3.23e+004  1000000.


RICH GLYCOL STREAM
-------------------------------------------------------------
    Temperature:    -10.00 deg. F
    Pressure:       864.70 psia
    Flow Rate:   6.15e+001 gpm
    NOTE: Stream has more than one phase.

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------ --------- ---------
                                EG 6.84e+001 2.26e+004
                             Water 3.12e+001 1.03e+004
                    Carbon Dioxide 1.83e-001 6.06e+001
                          Nitrogen 1.66e-003 5.48e-001
                           Methane 1.41e-001 4.67e+001

                            Ethane 2.11e-002 6.99e+000
                           Propane 2.21e-003 7.29e-001
                         Isobutane 5.07e-004 1.68e-001
                          n-Butane 7.50e-004 2.48e-001
                        Isopentane 7.18e-004 2.37e-001

                         n-Pentane 3.15e-004 1.04e-001
                          n-Hexane 7.04e-004 2.33e-001
                       Cyclohexane 1.19e-003 3.94e-001
                     Other Hexanes 1.16e-003 3.82e-001
                          Heptanes 1.28e-003 4.24e-001

                           Benzene 9.50e-003 3.14e+000
                           Toluene 1.91e-002 6.31e+000
                           Xylenes 1.59e-002 5.24e+000
                       C8+ Heavies 1.61e-005 5.31e-003
    ------------------------------ --------- ---------
```

```
                   Total Components    100.00 3.31e+004


COLD SEPARATOR OIL STREAM
-------------------------------------------------------------
    Temperature:    -10.00 deg. F
    Flow Rate:   5.03e+001 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------- --------- ---------
                                 EG 2.55e-002 5.46e+000
                              Water 1.32e-001 2.82e+001
                     Carbon Dioxide 3.21e-001 6.88e+001
                           Nitrogen 3.68e-002 7.87e+000
                            Methane 5.57e+000 1.19e+003

                             Ethane 1.19e+000 2.55e+002
                            Propane 1.36e+000 2.91e+002
                          Isobutane 7.60e-001 1.63e+002
                           n-Butane 1.20e+000 2.57e+002
                         Isopentane 3.55e+000 7.59e+002

                          n-Pentane 3.72e+000 7.95e+002
                           n-Hexane 4.41e+000 9.44e+002
                        Cyclohexane 1.11e+000 2.38e+002
                      Other Hexanes 6.38e+000 1.37e+003
                           Heptanes 2.31e+001 4.94e+003

                            Benzene 8.37e-001 1.79e+002
                            Toluene 6.14e+000 1.31e+003
                            Xylenes 7.70e+000 1.65e+003
                        C8+ Heavies 3.25e+001 6.95e+003
    ------------------------------- --------- ---------
                   Total Components    100.00 2.14e+004


FLASH TANK OFF GAS STREAM
-------------------------------------------------------------
    Temperature:    135.00 deg. F
    Pressure:        59.70 psia
    Flow Rate:   1.49e+003 scfh

                  Component           Conc.    Loading
                                     (vol%)    (lb/hr)
    ------------------------------- --------- ---------
                              Water 2.76e+000 1.95e+000
                     Carbon Dioxide 1.97e+001 3.40e+001
                           Nitrogen 4.80e-001 5.27e-001
                            Methane 7.04e+001 4.42e+001
                             Ethane 5.51e+000 6.49e+000

                            Propane 3.57e-001 6.16e-001
                          Isobutane 6.32e-002 1.44e-001
                           n-Butane 8.96e-002 2.04e-001
                         Isopentane 6.68e-002 1.89e-001
                          n-Pentane 2.82e-002 7.98e-002

                           n-Hexane 4.89e-002 1.65e-001
                        Cyclohexane 4.06e-002 1.34e-001
                      Other Hexanes 8.58e-002 2.89e-001
                           Heptanes 7.04e-002 2.76e-001
                            Benzene 1.06e-001 3.24e-001

                            Toluene 1.44e-001 5.21e-001
                            Xylenes 6.47e-002 2.69e-001
                        C8+ Heavies 3.02e-004 2.01e-003
    ------------------------------- --------- ---------
```

```
                   Total Components    100.00 9.03e+001


FLASH TANK OIL STREAM
-------------------------------------------------------------
    Temperature:    135.00 deg. F

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



FLASH TANK GLYCOL STREAM
-------------------------------------------------------------
    Temperature:    135.00 deg. F
    Flow Rate:   6.13e+001 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)      (ppm)
    ------------------------------- --------- --------- ---------
                                 EG 6.86e+001 2.26e+004   686029.
                              Water 3.13e+001 1.03e+004   312634.
                     Carbon Dioxide 8.08e-002 2.66e+001      808.
                           Nitrogen 6.36e-005 2.10e-002        1.
                            Methane 7.58e-003 2.50e+000       76.

                             Ethane 1.52e-003 5.01e-001       15.
                            Propane 3.43e-004 1.13e-001        3.
                          Isobutane 7.27e-005 2.40e-002        1.
                           n-Butane 1.34e-004 4.42e-002        1.
                         Isopentane 1.48e-004 4.87e-002        1.

                          n-Pentane 7.43e-005 2.45e-002        1.
                           n-Hexane 2.06e-004 6.80e-002        2.
                        Cyclohexane 7.89e-004 2.60e-001        8.
                      Other Hexanes 2.83e-004 9.31e-002        3.
                           Heptanes 4.49e-004 1.48e-001        4.

                            Benzene 8.54e-003 2.81e+000       85.
                            Toluene 1.76e-002 5.79e+000      176.
                            Xylenes 1.51e-002 4.97e+000      151.
                        C8+ Heavies 9.99e-006 3.29e-003        0.
    ------------------------------- --------- --------- ---------
                   Total Components    100.00 3.30e+004  1000000.



FLASH GAS EMISSIONS
-------------------------------------------------------------
    Flow Rate:   4.06e+003 scfh
    Control Method:   Combustion Device
    Control Efficiency:   100.00

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 6.07e+001 1.17e+002
                     Carbon Dioxide 3.92e+001 1.84e+002
                           Nitrogen 1.76e-001 5.27e-001
    ------------------------------- --------- ---------
                   Total Components    100.00 3.02e+002



REGENERATOR OVERHEADS STREAM
-------------------------------------------------------------
    Temperature:    212.00 deg. F
    Pressure:        14.70 psia
    Flow Rate:   1.32e+004 scfh
```

```
                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------ --------- ---------
                             Water 9.74e+001 6.10e+002
                    Carbon Dioxide 1.74e+000 2.66e+001
                          Nitrogen 2.15e-003 2.10e-002
                           Methane 4.48e-001 2.50e+000
                            Ethane 4.80e-002 5.01e-001

                           Propane 7.36e-003 1.13e-001
                         Isobutane 1.19e-003 2.40e-002
                          n-Butane 2.18e-003 4.42e-002
                        Isopentane 1.89e-003 4.75e-002
                         n-Pentane 9.55e-004 2.40e-002

                          n-Hexane 2.23e-003 6.68e-002
                       Cyclohexane 8.45e-003 2.47e-001
                     Other Hexanes 2.98e-003 8.93e-002
                          Heptanes 4.19e-003 1.46e-001
                           Benzene 9.79e-002 2.66e+000

                           Toluene 1.65e-001 5.29e+000
                           Xylenes 1.16e-001 4.30e+000
                       C8+ Heavies 4.49e-005 2.66e-003
    ------------------------------ --------- ---------
                  Total Components    100.00 6.52e+002


CONDENSER PRODUCED WATER STREAM
-------------------------------------------------------------
    Temperature:     80.00 deg. F
    Flow Rate:   1.22e+000 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)     (ppm)
    ------------------------------ --------- --------- ---------
                             Water 9.98e+001 6.09e+002   998340.
                    Carbon Dioxide 1.06e-001 6.48e-001     1063.
                          Nitrogen 1.70e-006 1.04e-005        0.
                           Methane 4.31e-004 2.63e-003        4.
                            Ethane 1.12e-004 6.85e-004        1.

                           Propane 1.77e-005 1.08e-004        0.
                         Isobutane 2.13e-006 1.30e-005        0.
                          n-Butane 5.41e-006 3.30e-005        0.
                        Isopentane 4.02e-006 2.46e-005        0.
                         n-Pentane 2.29e-006 1.39e-005        0.

                          n-Hexane 4.43e-006 2.70e-005        0.
                       Cyclohexane 9.63e-005 5.87e-004        1.
                     Other Hexanes 5.24e-006 3.20e-005        0.
                          Heptanes 3.63e-006 2.22e-005        0.
                           Benzene 2.70e-002 1.65e-001      270.

                           Toluene 2.50e-002 1.53e-001      250.
                           Xylenes 7.06e-003 4.31e-002       71.
                       C8+ Heavies 1.26e-010 7.67e-010        0.
    ------------------------------ --------- --------- ---------
                  Total Components    100.00 6.10e+002  1000000.


CONDENSER RECOVERED OIL STREAM
-------------------------------------------------------------
    Temperature:     80.00 deg. F
    Flow Rate:   2.19e-002 gpm

                  Component           Conc.    Loading
```

```
                                      (wt%)    (lb/hr)
    ------------------------------- --------- ---------
                              Water 4.60e-002 4.28e-003
                     Carbon Dioxide 3.46e-001 3.22e-002
                           Nitrogen 3.00e-004 2.79e-005
                            Methane 8.59e-003 7.98e-004
                             Ethane 1.03e-002 9.55e-004

                            Propane 1.51e-002 1.40e-003
                          Isobutane 6.93e-003 6.45e-004
                           n-Butane 1.83e-002 1.70e-003
                         Isopentane 5.83e-002 5.43e-003
                          n-Pentane 2.55e-002 2.37e-003

                           n-Hexane 2.22e-001 2.07e-002
                        Cyclohexane 9.90e-001 9.21e-002
                      Other Hexanes 2.05e-001 1.91e-002
                           Heptanes 8.78e-001 8.16e-002
                            Benzene 1.34e+001 1.25e+000

                            Toluene 4.13e+001 3.84e+000
                            Xylenes 4.24e+001 3.94e+000
                        C8+ Heavies 2.85e-002 2.65e-003
    ------------------------------- --------- ---------
                   Total Components    100.00 9.30e+000



CONDENSER VENT STREAM
-------------------------------------------------------------
    Temperature:     80.00 deg. F
    Pressure:        15.50 psia
    Flow Rate:   3.16e+002 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 3.33e+000 4.99e-001
                     Carbon Dioxide 7.09e+001 2.60e+001
                           Nitrogen 8.98e-002 2.09e-002
                            Methane 1.87e+001 2.49e+000
                             Ethane 2.00e+000 5.00e-001

                            Propane 3.04e-001 1.11e-001
                          Isobutane 4.82e-002 2.33e-002
                           n-Butane 8.78e-002 4.24e-002
                         Isopentane 7.00e-002 4.20e-002
                          n-Pentane 3.59e-002 2.16e-002

                           n-Hexane 6.44e-002 4.61e-002
                        Cyclohexane 2.21e-001 1.55e-001
                      Other Hexanes 9.79e-002 7.01e-002
                           Heptanes 7.71e-002 6.42e-002
                            Benzene 1.91e+000 1.24e+000

                            Toluene 1.69e+000 1.30e+000
                            Xylenes 3.51e-001 3.10e-001
                        C8+ Heavies 4.06e-006 5.76e-006
    ------------------------------- --------- ---------
                   Total Components    100.00 3.29e+001



COMBUSTION DEVICE OFF GAS STREAM
-------------------------------------------------------------
    Temperature:   1000.00 deg. F
    Pressure:        14.70 psia
    Flow Rate:   4.05e+000 scfh

                  Component           Conc.    Loading
```

```
                                  (vol%)   (lb/hr)
------------------------------- --------- ---------
                        Methane 7.29e+001 1.25e-001
                         Ethane 7.79e+000 2.50e-002
                        Propane 1.18e+000 5.57e-003
                      Isobutane 1.88e-001 1.16e-003
                       n-Butane 3.42e-001 2.12e-003

                     Isopentane 2.73e-001 2.10e-003
                      n-Pentane 1.40e-001 1.08e-003
                       n-Hexane 2.51e-001 2.31e-003
                    Cyclohexane 8.62e-001 7.74e-003
                 Other Hexanes 3.81e-001 3.51e-003

                       Heptanes 3.00e-001 3.21e-003
                        Benzene 7.46e+000 6.22e-002
                        Toluene 6.59e+000 6.48e-002
                        Xylenes 1.37e+000 1.55e-002
                    C8+ Heavies 1.58e-005 2.88e-007
------------------------------- --------- ---------
               Total Components    100.00 3.21e-001
```

```
GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Cold Springs 1, MI Theox
File Name: N:\Technical\5620-CPG\0032 - Cold Springs Blue Lake, MI
Reissuance\GLYCalc\CURRENT versions - 2014 data\TC - BL, MI Cond.ddf
     Date: October 23, 2018

 DESCRIPTION:

    Description: BL EG Cold Separators - Condenser EF using
                 3/16/2014 gas analysis. 700 MMSCFD rated.
                 Cold Separation: -10 F; 850 psig. Flash
                 Tank: 135 F; 45 psig. Condenser: 80 F; 1
                 psig. Glycol recirculation: 60 gpm.

    Annual Hours of Operation:    8760.0 hours/yr



 EMISSIONS REPORTS:
 -------------------------------------------------------------------



 CONTROLLED REGENERATOR EMISSIONS
 -------------------------------------------------------------------
            Component               lbs/hr     lbs/day     tons/yr
 ------------------------------- ----------- ----------- -----------
                         Methane      2.4948      59.876     10.9273
                          Ethane      0.4998      11.995      2.1890
                         Propane      0.1114       2.674      0.4880
                       Isobutane      0.0233       0.559      0.1020
                        n-Butane      0.0424       1.018      0.1858

                      Isopentane      0.0420       1.008      0.1840
                       n-Pentane      0.0216       0.518      0.0945
                        n-Hexane      0.0461       1.107      0.2021
                     Cyclohexane      0.1548       3.715      0.6779
                   Other Hexanes      0.0701       1.684      0.3073

                        Heptanes      0.0642       1.541      0.2813
                         Benzene      1.2431      29.834      5.4448
                         Toluene      1.2956      31.094      5.6747
                         Xylenes      0.3103       7.448      1.3593
                     C8+ Heavies     <0.0001      <0.001     <0.0001
 ------------------------------- ----------- ----------- -----------
                 Total Emissions      6.4196     154.071     28.1180

     Total Hydrocarbon Emissions      6.4196     154.071     28.1180
             Total VOC Emissions      3.4250      82.201     15.0016
             Total HAP Emissions      2.8952      69.484     12.6808
            Total BTEX Emissions      2.8490      68.377     12.4787


 UNCONTROLLED REGENERATOR EMISSIONS
 -------------------------------------------------------------------
            Component               lbs/hr     lbs/day     tons/yr
 ------------------------------- ----------- ----------- -----------
                         Methane      2.4982      59.958     10.9423
                          Ethane      0.5014      12.034      2.1962
                         Propane      0.1129       2.710      0.4946
                       Isobutane      0.0240       0.575      0.1049
                        n-Butane      0.0442       1.060      0.1934

                      Isopentane      0.0475       1.139      0.2079
                       n-Pentane      0.0240       0.575      0.1049
                        n-Hexane      0.0668       1.604      0.2927
                     Cyclohexane      0.2474       5.938      1.0837
                   Other Hexanes      0.0893       2.143      0.3911
```

```
                      Heptanes      0.1459       3.501      0.6390
                       Benzene      2.6579      63.791     11.6418
                       Toluene      5.2875     126.900     23.1593
                       Xylenes      4.2973     103.135     18.8221
                   C8+ Heavies      0.0027       0.064      0.0116
------------------------------ ----------- ----------- -----------
               Total Emissions     16.0469     385.126     70.2855

   Total Hydrocarbon Emissions     16.0469     385.126     70.2855
           Total VOC Emissions     13.0473     313.134     57.1470
           Total HAP Emissions     12.3095     295.429     53.9158
          Total BTEX Emissions     12.2427     293.825     53.6232


FLASH GAS EMISSIONS
------------------------------------------------------------------
           Component               lbs/hr     lbs/day     tons/yr
------------------------------ ----------- ----------- -----------
------------------------------ ----------- ----------- -----------



FLASH TANK OFF GAS
------------------------------------------------------------------
           Component               lbs/hr     lbs/day     tons/yr
------------------------------ ----------- ----------- -----------
                       Methane     44.1778    1060.267    193.4987
                        Ethane      6.4877     155.705     28.4162
                       Propane      0.6164      14.793      2.6998
                     Isobutane      0.1437       3.449      0.6294
                      n-Butane      0.2038       4.890      0.8925

                    Isopentane      0.1886       4.526      0.8259
                     n-Pentane      0.0798       1.914      0.3494
                      n-Hexane      0.1649       3.957      0.7222
                   Cyclohexane      0.1336       3.208      0.5854
                 Other Hexanes      0.2893       6.944      1.2673

                      Heptanes      0.2762       6.628      1.2096
                       Benzene      0.3241       7.778      1.4194
                       Toluene      0.5209      12.501      2.2814
                       Xylenes      0.2690       6.457      1.1784
                   C8+ Heavies      0.0020       0.048      0.0088
------------------------------ ----------- ----------- -----------
               Total Emissions     53.8777    1293.065    235.9844

   Total Hydrocarbon Emissions     53.8777    1293.065    235.9844
           Total VOC Emissions      3.2122      77.093     14.0695
           Total HAP Emissions      1.2789      30.693      5.6014
          Total BTEX Emissions      1.1140      26.736      4.8793



EQUIPMENT REPORTS:
------------------------------------------------------------------



CONDENSER
------------------------------------------------------------------
          Condenser Outlet Temperature:     80.00 deg. F
                    Condenser Pressure:     15.50 psia
                        Condenser Duty: 4.92e-001 MM BTU/hr
                  Hydrocarbon Recovery:      0.75 bbls/day
                        Produced Water:     41.82 bbls/day
                VOC Control Efficiency:     73.75 %
```

```
                HAP Control Efficiency:     76.48 %
               BTEX Control Efficiency:     76.73 %
       Dissolved Hydrocarbons in Water:    597.35 mg/L

               Component              Emitted    Condensed
    ------------------------------- ----------- -----------
                              Water       0.08%      99.92%
                     Carbon Dioxide      97.45%       2.55%
                           Nitrogen      99.82%       0.18%
                            Methane      99.86%       0.14%
                             Ethane      99.67%       0.33%

                            Propane      98.66%       1.34%
                          Isobutane      97.26%       2.74%
                           n-Butane      96.06%       3.94%
                         Isopentane      88.52%      11.48%
                          n-Pentane      90.05%       9.95%

                           n-Hexane      69.05%      30.95%
                        Cyclohexane      62.55%      37.45%
                      Other Hexanes      78.56%      21.44%
                           Heptanes      44.02%      55.98%
                            Benzene      46.77%      53.23%

                            Toluene      24.50%      75.50%
                            Xylenes       7.22%      92.78%
                        C8+ Heavies       0.22%      99.78%



COLD SEPARATOR
-------------------------------------------------------------------

            Cold Separator Temperature:     -10.0 deg. F
               Cold Separator Pressure:     850.0 psig
                     Dry Gas Flow Rate:  700.0000 MMSCF/day
          Calculated Dry Gas Dew Point:      0.73 lbs. H2O/MMSCF
            Glycol Losses with Dry Gas:    2.2823 lb/hr
                 Wet Gas Water Content: Saturated
     Calculated Wet Gas Water Content:     22.59 lbs. H2O/MMSCF
  Calculated Lean Glycol Recirc. Ratio:      5.65 gal/lb H2O
                       Produced Liquid: 1.72e+003 bbls/day
     Glycol Losses in Produced Liquids:    5.4596 lb/hr

                                     Remaining  Absorbed or
               Component             in Dry Gas  Condensed
    ------------------------------- ----------- -----------
                              Water       3.24%      96.76%
                     Carbon Dioxide      99.51%       0.49%
                           Nitrogen      99.95%       0.05%
                            Methane      99.90%       0.10%
                             Ethane      99.49%       0.51%

                            Propane      96.61%       3.39%
                          Isobutane      92.88%       7.12%
                           n-Butane      89.16%      10.84%
                         Isopentane      69.70%      30.30%
                          n-Pentane      40.45%      59.55%

                           n-Hexane      45.60%      54.40%
                        Cyclohexane      36.71%      63.29%
                      Other Hexanes      57.90%      42.10%
                           Heptanes      17.27%      82.73%
                            Benzene      34.35%      65.65%

                            Toluene       8.63%      91.37%
                            Xylenes       3.99%      96.01%
                        C8+ Heavies       4.18%      95.82%
```

```
FLASH TANK
-------------------------------------------------------------------

                          Flash Control: Combustion device
               Flash Control Efficiency: 100.00 %
                      Flash Temperature:     135.0 deg. F
                         Flash Pressure:      45.0 psig

                                    Left in Oil  Removed in
               Component             and Glycol  Flash Gas
    ------------------------------- ----------- -----------
                              Water      99.98%       0.02%
                     Carbon Dioxide      43.96%      56.04%
                           Nitrogen       3.83%      96.17%
                            Methane       5.35%      94.65%
                             Ethane       7.18%      92.82%

                            Propane      15.49%      84.51%
                          Isobutane      14.29%      85.71%
                           n-Butane      17.81%      82.19%
                         Isopentane      20.51%      79.49%
                          n-Pentane      23.48%      76.52%

                           n-Hexane      29.20%      70.80%
                        Cyclohexane      66.05%      33.95%
                      Other Hexanes      24.35%      75.65%
                           Heptanes      34.89%      65.11%
                            Benzene      89.68%      10.32%

                            Toluene      91.74%       8.26%
                            Xylenes      94.87%       5.13%
                        C8+ Heavies      62.06%      37.94%


REGENERATOR
-------------------------------------------------------------------

  No Stripping Gas used in regenerator.

                                     Remaining   Distilled
               Component             in Glycol   Overhead
    ------------------------------- ----------- -----------
                              Water      94.08%       5.92%
                     Carbon Dioxide       0.00%     100.00%
                           Nitrogen       0.00%     100.00%
                            Methane       0.00%     100.00%
                             Ethane       0.00%     100.00%

                            Propane       0.00%     100.00%
                          Isobutane       0.00%     100.00%
                           n-Butane       0.00%     100.00%
                         Isopentane       2.44%      97.56%
                          n-Pentane       2.13%      97.87%

                           n-Hexane       1.71%      98.29%
                        Cyclohexane       4.84%      95.16%
                      Other Hexanes       4.11%      95.89%
                           Heptanes       1.43%      98.57%
                            Benzene       5.58%      94.42%

                            Toluene       8.61%      91.39%
                            Xylenes      13.60%      86.40%
                        C8+ Heavies      19.34%      80.66%



STREAM REPORTS:
```

```
WET GAS STREAM
-------------------------------------------------------------
    Temperature:     82.00 deg. F
    Pressure:      2100.70 psia
    Flow Rate:   2.93e+007 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 4.76e-002 6.62e+002
                     Carbon Dioxide 7.85e-001 2.67e+004
                           Nitrogen 8.50e-001 1.84e+004
                            Methane 9.54e+001 1.18e+006
                             Ethane 2.19e+000 5.08e+004

                            Propane 2.53e-001 8.61e+003
                          Isobutane 5.10e-002 2.29e+003
                           n-Butane 5.30e-002 2.38e+003
                         Isopentane 4.50e-002 2.50e+003
                          n-Pentane 2.40e-002 1.34e+003

                           n-Hexane 2.61e-002 1.74e+003
                        Cyclohexane 5.80e-003 3.77e+002
                      Other Hexanes 4.88e-002 3.24e+003
                           Heptanes 7.72e-002 5.97e+003
                            Benzene 4.60e-003 2.77e+002

                            Toluene 2.03e-002 1.44e+003
                            Xylenes 2.10e-002 1.72e+003
                        C8+ Heavies 5.52e-002 7.25e+003
    ------------------------------- --------- ---------
                   Total Components    100.00 1.32e+006


DRY GAS STREAM
-------------------------------------------------------------
    Temperature:    -10.00 deg. F
    Pressure:       864.70 psia
    Flow Rate:   2.92e+007 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 1.55e-003 2.14e+001
                     Carbon Dioxide 7.84e-001 2.65e+004
                           Nitrogen 8.53e-001 1.84e+004
                            Methane 9.57e+001 1.18e+006
                             Ethane 2.19e+000 5.06e+004

                            Propane 2.45e-001 8.32e+003
                          Isobutane 4.75e-002 2.12e+003
                           n-Butane 4.74e-002 2.12e+003
                         Isopentane 3.15e-002 1.75e+003
                          n-Pentane 9.74e-003 5.40e+002

                           n-Hexane 1.19e-002 7.91e+002
                        Cyclohexane 2.14e-003 1.38e+002
                      Other Hexanes 2.84e-002 1.88e+003
                           Heptanes 1.34e-002 1.03e+003
                            Benzene 1.59e-003 9.52e+001

                            Toluene 1.76e-003 1.25e+002
                            Xylenes 8.42e-004 6.87e+001
                        C8+ Heavies 2.32e-003 3.04e+002
    ------------------------------- --------- ---------
```

```
                   Total Components    100.00 1.30e+006



LEAN GLYCOL STREAM
-------------------------------------------------------------
    Temperature:     82.00 deg. F
    Flow Rate:   6.00e+001 gpm

                 Component           Conc.    Loading
                                      (wt%)    (lb/hr)     (ppm)
    ------------------------------- --------- --------- ---------
                                 EG 7.00e+001 2.26e+004   699963.
                              Water 3.00e+001 9.69e+003   299996.
                     Carbon Dioxide 1.88e-011 6.06e-009        0.
                           Nitrogen 1.69e-013 5.48e-011        0.
                            Methane 4.85e-018 1.57e-015        0.

                             Ethane 1.02e-008 3.30e-006        0.
                            Propane 9.18e-011 2.97e-008        0.
                          Isobutane 1.56e-011 5.03e-009        0.
                           n-Butane 1.90e-011 6.15e-009        0.
                         Isopentane 3.67e-006 1.19e-003        0.

                          n-Pentane 1.61e-006 5.21e-004        0.
                           n-Hexane 3.60e-006 1.16e-003        0.
                        Cyclohexane 3.90e-005 1.26e-002        0.
                      Other Hexanes 1.18e-005 3.82e-003        0.
                           Heptanes 6.56e-006 2.12e-003        0.

                            Benzene 4.86e-004 1.57e-001        5.
                            Toluene 1.54e-003 4.98e-001       15.
                            Xylenes 2.09e-003 6.76e-001       21.
                        C8+ Heavies 1.97e-006 6.37e-004        0.
    ------------------------------- --------- --------- ---------
                   Total Components    100.00 3.23e+004  1000000.



RICH GLYCOL STREAM
-------------------------------------------------------------
    Temperature:    -10.00 deg. F
    Pressure:       864.70 psia
    Flow Rate:   6.15e+001 gpm
    NOTE: Stream has more than one phase.

                 Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------- --------- ---------
                                 EG 6.84e+001 2.26e+004
                              Water 3.12e+001 1.03e+004
                     Carbon Dioxide 1.83e-001 6.06e+001
                           Nitrogen 1.66e-003 5.48e-001
                            Methane 1.41e-001 4.67e+001

                             Ethane 2.11e-002 6.99e+000
                            Propane 2.21e-003 7.29e-001
                          Isobutane 5.07e-004 1.68e-001
                           n-Butane 7.50e-004 2.48e-001
                         Isopentane 7.18e-004 2.37e-001

                          n-Pentane 3.15e-004 1.04e-001
                           n-Hexane 7.04e-004 2.33e-001
                        Cyclohexane 1.19e-003 3.94e-001
                      Other Hexanes 1.16e-003 3.82e-001
                           Heptanes 1.28e-003 4.24e-001

                            Benzene 9.50e-003 3.14e+000
                            Toluene 1.91e-002 6.31e+000
                            Xylenes 1.59e-002 5.24e+000
```

```
                 C8+ Heavies 1.61e-005 5.31e-003
    ------------------------------ --------- ---------
            Total Components    100.00 3.31e+004



COLD SEPARATOR OIL STREAM
-------------------------------------------------------------
    Temperature:    -10.00 deg. F
    Flow Rate:   5.03e+001 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------ --------- ---------
                              EG 2.55e-002 5.46e+000
                           Water 1.32e-001 2.82e+001
                  Carbon Dioxide 3.21e-001 6.88e+001
                        Nitrogen 3.68e-002 7.87e+000
                         Methane 5.57e+000 1.19e+003

                          Ethane 1.19e+000 2.55e+002
                         Propane 1.36e+000 2.91e+002
                       Isobutane 7.60e-001 1.63e+002
                        n-Butane 1.20e+000 2.57e+002
                      Isopentane 3.55e+000 7.59e+002

                       n-Pentane 3.72e+000 7.95e+002
                        n-Hexane 4.41e+000 9.44e+002
                     Cyclohexane 1.11e+000 2.38e+002
                  Other Hexanes 6.38e+000 1.37e+003
                        Heptanes 2.31e+001 4.94e+003

                         Benzene 8.37e-001 1.79e+002
                         Toluene 6.14e+000 1.31e+003
                         Xylenes 7.70e+000 1.65e+003
                     C8+ Heavies 3.25e+001 6.95e+003
    ------------------------------ --------- ---------
            Total Components    100.00 2.14e+004



FLASH TANK OFF GAS STREAM
-------------------------------------------------------------
    Temperature:    135.00 deg. F
    Pressure:        59.70 psia
    Flow Rate:   1.49e+003 scfh

                  Component           Conc.    Loading
                                     (vol%)    (lb/hr)
    ------------------------------ --------- ---------
                           Water 2.76e+000 1.95e+000
                  Carbon Dioxide 1.97e+001 3.40e+001
                        Nitrogen 4.80e-001 5.27e-001
                         Methane 7.04e+001 4.42e+001
                          Ethane 5.51e+000 6.49e+000

                         Propane 3.57e-001 6.16e-001
                       Isobutane 6.32e-002 1.44e-001
                        n-Butane 8.96e-002 2.04e-001
                      Isopentane 6.68e-002 1.89e-001
                       n-Pentane 2.82e-002 7.98e-002

                        n-Hexane 4.89e-002 1.65e-001
                     Cyclohexane 4.06e-002 1.34e-001
                  Other Hexanes 8.58e-002 2.89e-001
                        Heptanes 7.04e-002 2.76e-001
                         Benzene 1.06e-001 3.24e-001

                         Toluene 1.44e-001 5.21e-001
                         Xylenes 6.47e-002 2.69e-001
```

```
                   C8+ Heavies 3.02e-004 2.01e-003
    ------------------------------- --------- ---------
              Total Components    100.00 9.03e+001



FLASH TANK OIL STREAM
-------------------------------------------------------------
    Temperature:    135.00 deg. F

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



FLASH TANK GLYCOL STREAM
-------------------------------------------------------------
    Temperature:    135.00 deg. F
    Flow Rate:   6.13e+001 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)     (ppm)
    ------------------------------- --------- --------- ---------
                               EG 6.86e+001 2.26e+004   686029.
                            Water 3.13e+001 1.03e+004   312634.
                   Carbon Dioxide 8.08e-002 2.66e+001      808.
                         Nitrogen 6.36e-005 2.10e-002        1.
                          Methane 7.58e-003 2.50e+000       76.

                           Ethane 1.52e-003 5.01e-001       15.
                          Propane 3.43e-004 1.13e-001        3.
                        Isobutane 7.27e-005 2.40e-002        1.
                         n-Butane 1.34e-004 4.42e-002        1.
                       Isopentane 1.48e-004 4.87e-002        1.

                        n-Pentane 7.43e-005 2.45e-002        1.
                         n-Hexane 2.06e-004 6.80e-002        2.
                      Cyclohexane 7.89e-004 2.60e-001        8.
                   Other Hexanes 2.83e-004 9.31e-002        3.
                         Heptanes 4.49e-004 1.48e-001        4.

                          Benzene 8.54e-003 2.81e+000       85.
                          Toluene 1.76e-002 5.79e+000      176.
                          Xylenes 1.51e-002 4.97e+000      151.
                      C8+ Heavies 9.99e-006 3.29e-003        0.
    ------------------------------- --------- --------- ---------
                 Total Components    100.00 3.30e+004  1000000.



FLASH GAS EMISSIONS
-------------------------------------------------------------
    Flow Rate:   4.06e+003 scfh
    Control Method:   Combustion Device
    Control Efficiency:   100.00

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                            Water 6.07e+001 1.17e+002
                   Carbon Dioxide 3.92e+001 1.84e+002
                         Nitrogen 1.76e-001 5.27e-001
    ------------------------------- --------- ---------
                 Total Components    100.00 3.02e+002



REGENERATOR OVERHEADS STREAM
-------------------------------------------------------------
    Temperature:    212.00 deg. F
```

```
    Pressure:        14.70 psia
    Flow Rate:   1.32e+004 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 9.74e+001 6.10e+002
                     Carbon Dioxide 1.74e+000 2.66e+001
                           Nitrogen 2.15e-003 2.10e-002
                            Methane 4.48e-001 2.50e+000
                             Ethane 4.80e-002 5.01e-001

                            Propane 7.36e-003 1.13e-001
                          Isobutane 1.19e-003 2.40e-002
                           n-Butane 2.18e-003 4.42e-002
                         Isopentane 1.89e-003 4.75e-002
                          n-Pentane 9.55e-004 2.40e-002

                           n-Hexane 2.23e-003 6.68e-002
                        Cyclohexane 8.45e-003 2.47e-001
                      Other Hexanes 2.98e-003 8.93e-002
                           Heptanes 4.19e-003 1.46e-001
                            Benzene 9.79e-002 2.66e+000

                            Toluene 1.65e-001 5.29e+000
                            Xylenes 1.16e-001 4.30e+000
                        C8+ Heavies 4.49e-005 2.66e-003
    ------------------------------- --------- ---------
                   Total Components    100.00 6.52e+002


CONDENSER VENT GAS STREAM
-------------------------------------------------------------
    Temperature:     80.00 deg. F
    Pressure:        15.50 psia
    Flow Rate:   3.16e+002 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 3.33e+000 4.99e-001
                     Carbon Dioxide 7.09e+001 2.60e+001
                           Nitrogen 8.98e-002 2.09e-002
                            Methane 1.87e+001 2.49e+000
                             Ethane 2.00e+000 5.00e-001

                            Propane 3.04e-001 1.11e-001
                          Isobutane 4.82e-002 2.33e-002
                           n-Butane 8.78e-002 4.24e-002
                         Isopentane 7.00e-002 4.20e-002
                          n-Pentane 3.59e-002 2.16e-002

                           n-Hexane 6.44e-002 4.61e-002
                        Cyclohexane 2.21e-001 1.55e-001
                      Other Hexanes 9.79e-002 7.01e-002
                           Heptanes 7.71e-002 6.42e-002
                            Benzene 1.91e+000 1.24e+000

                            Toluene 1.69e+000 1.30e+000
                            Xylenes 3.51e-001 3.10e-001
                        C8+ Heavies 4.06e-006 5.76e-006
    ------------------------------- --------- ---------
                   Total Components    100.00 3.29e+001


CONDENSER PRODUCED WATER STREAM
-------------------------------------------------------------
    Temperature:     80.00 deg. F
```

```
    Flow Rate:   1.22e+000 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)     (ppm)
    ------------------------------- --------- --------- ---------
                              Water 9.98e+001 6.09e+002   998340.
                     Carbon Dioxide 1.06e-001 6.48e-001     1063.
                           Nitrogen 1.70e-006 1.04e-005        0.
                            Methane 4.31e-004 2.63e-003        4.
                             Ethane 1.12e-004 6.85e-004        1.

                            Propane 1.77e-005 1.08e-004        0.
                          Isobutane 2.13e-006 1.30e-005        0.
                           n-Butane 5.41e-006 3.30e-005        0.
                         Isopentane 4.02e-006 2.46e-005        0.
                          n-Pentane 2.29e-006 1.39e-005        0.

                           n-Hexane 4.43e-006 2.70e-005        0.
                        Cyclohexane 9.63e-005 5.87e-004        1.
                      Other Hexanes 5.24e-006 3.20e-005        0.
                           Heptanes 3.63e-006 2.22e-005        0.
                            Benzene 2.70e-002 1.65e-001      270.

                            Toluene 2.50e-002 1.53e-001      250.
                            Xylenes 7.06e-003 4.31e-002       71.
                        C8+ Heavies 1.26e-010 7.67e-010        0.
    ------------------------------- --------- --------- ---------
                   Total Components    100.00 6.10e+002  1000000.


CONDENSER RECOVERED OIL STREAM
-------------------------------------------------------------
    Temperature:     80.00 deg. F
    Flow Rate:   2.19e-002 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------- --------- ---------
                              Water 4.60e-002 4.28e-003
                     Carbon Dioxide 3.46e-001 3.22e-002
                           Nitrogen 3.00e-004 2.79e-005
                            Methane 8.59e-003 7.98e-004
                             Ethane 1.03e-002 9.55e-004

                            Propane 1.51e-002 1.40e-003
                          Isobutane 6.93e-003 6.45e-004
                           n-Butane 1.83e-002 1.70e-003
                         Isopentane 5.83e-002 5.43e-003
                          n-Pentane 2.55e-002 2.37e-003

                           n-Hexane 2.22e-001 2.07e-002
                        Cyclohexane 9.90e-001 9.21e-002
                      Other Hexanes 2.05e-001 1.91e-002
                           Heptanes 8.78e-001 8.16e-002
                            Benzene 1.34e+001 1.25e+000

                            Toluene 4.13e+001 3.84e+000
                            Xylenes 4.24e+001 3.94e+000
                        C8+ Heavies 2.85e-002 2.65e-003
    ------------------------------- --------- ---------
                   Total Components    100.00 9.30e+000
```

```
GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Cold Springs 1, MI Theox
File Name: N:\Technical\5620-CPG\0032 - Cold Springs Blue Lake, MI
Reissuance\GLYCalc\CURRENT versions - 2014 data\TC - CS 12, MI Theox.ddf
     Date: October 23, 2018

 DESCRIPTION:

    Description: CS12 DEG Cold Separators (Absorption used
                 only during withdrawl) - Condenser + Thermal
                 Oxidizer EF using 3/16/2014 gas analysis.
                 300 MMSCFD. Cold Sep: 10 F; 850 psig. Flash:
                 80 F; 45 psig. Cond: 120 F; 1 psig. TO: 95%.
                 Glycol recirc: 6 gpm.

    Annual Hours of Operation:    8760.0 hours/yr



 EMISSIONS REPORTS:
 --------------------------------------------------------------------



 CONTROLLED REGENERATOR EMISSIONS
 --------------------------------------------------------------------
            Component                lbs/hr     lbs/day     tons/yr
 ------------------------------- ----------- ----------- -----------
                         Methane      0.0146       0.349      0.0638
                          Ethane      0.0031       0.075      0.0137
                         Propane      0.0006       0.015      0.0028
                       Isobutane      0.0001       0.003      0.0006
                        n-Butane      0.0003       0.006      0.0012

                      Isopentane      0.0003       0.008      0.0014
                       n-Pentane      0.0002       0.005      0.0009
                        n-Hexane      0.0004       0.011      0.0020
                     Cyclohexane      0.0013       0.031      0.0056
                   Other Hexanes      0.0006       0.014      0.0026

                        Heptanes      0.0011       0.026      0.0048
                         Benzene      0.0093       0.224      0.0409
                         Toluene      0.0227       0.544      0.0993
                         Xylenes      0.0082       0.196      0.0358
                     C8+ Heavies     <0.0001      <0.001     <0.0001
 ------------------------------- ----------- ----------- -----------
                 Total Emissions      0.0628       1.508      0.2752

     Total Hydrocarbon Emissions      0.0628       1.508      0.2752
             Total VOC Emissions      0.0451       1.083      0.1977
             Total HAP Emissions      0.0406       0.975      0.1780
            Total BTEX Emissions      0.0402       0.964      0.1760



 UNCONTROLLED REGENERATOR EMISSIONS
 --------------------------------------------------------------------
            Component                lbs/hr     lbs/day     tons/yr
 ------------------------------- ----------- ----------- -----------
                         Methane      0.2919       7.006      1.2787
                          Ethane      0.0628       1.508      0.2753
                         Propane      0.0129       0.310      0.0565
                       Isobutane      0.0028       0.067      0.0123
                        n-Butane      0.0053       0.128      0.0234

                      Isopentane      0.0066       0.158      0.0289
                       n-Pentane      0.0041       0.099      0.0180
                        n-Hexane      0.0098       0.235      0.0428
                     Cyclohexane      0.0287       0.689      0.1258
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                 Other Hexanes      0.0124       0.297      0.0543

                      Heptanes      0.0270       0.649      0.1184
                       Benzene      0.2633       6.319      1.1532
                       Toluene      0.7677      18.424      3.3624
                       Xylenes      0.4978      11.948      2.1806
                   C8+ Heavies      0.0004       0.009      0.0016
------------------------------ ----------- ----------- -----------
               Total Emissions      1.9936      47.847      8.7320

   Total Hydrocarbon Emissions      1.9936      47.847      8.7320
           Total VOC Emissions      1.6388      39.332      7.1781
           Total HAP Emissions      1.5386      36.926      6.7390
          Total BTEX Emissions      1.5288      36.691      6.6962



FLASH GAS EMISSIONS
-------------------------------------------------------------------
           Component               lbs/hr     lbs/day     tons/yr
------------------------------ ----------- ----------- -----------
------------------------------ ----------- ----------- -----------




FLASH TANK OFF GAS
-------------------------------------------------------------------
           Component               lbs/hr     lbs/day     tons/yr
------------------------------ ----------- ----------- -----------
                       Methane      4.7198     113.276     20.6729
                        Ethane      0.5166      12.399      2.2629
                       Propane      0.0567       1.360      0.2483
                     Isobutane      0.0127       0.305      0.0556
                      n-Butane      0.0174       0.418      0.0763

                    Isopentane      0.0170       0.408      0.0745
                     n-Pentane      0.0085       0.204      0.0372
                      n-Hexane      0.0133       0.320      0.0585
                   Cyclohexane      0.0071       0.169      0.0309
                 Other Hexanes      0.0232       0.558      0.1018

                      Heptanes      0.0256       0.615      0.1123
                       Benzene      0.0103       0.248      0.0452
                       Toluene      0.0218       0.523      0.0955
                       Xylenes      0.0077       0.185      0.0337
                   C8+ Heavies      0.0002       0.005      0.0009
------------------------------ ----------- ----------- -----------
               Total Emissions      5.4581     130.994     23.9064

   Total Hydrocarbon Emissions      5.4581     130.994     23.9064
           Total VOC Emissions      0.2216       5.319      0.9706
           Total HAP Emissions      0.0532       1.276      0.2329
          Total BTEX Emissions      0.0398       0.956      0.1744



EQUIPMENT REPORTS:
-------------------------------------------------------------------



CONDENSER AND COMBUSTION DEVICE
-------------------------------------------------------------------

          Condenser Outlet Temperature:    120.00 deg. F
                    Condenser Pressure:     15.50 psia
                        Condenser Duty: 6.78e-003 MM BTU/hr
                  Hydrocarbon Recovery:      0.05 bbls/day
```

```
                        Produced Water:     17.15 bbls/day
                   Ambient Temperature:     30.00 deg. F
                         Excess Oxygen:     30.00 %
                 Combustion Efficiency:     95.00 %
         Supplemental Fuel Requirement: 6.78e-003 MM BTU/hr

               Component             Emitted     Destroyed
    ------------------------------- ----------- -----------
                            Methane       4.99%      95.01%
                             Ethane       4.98%      95.02%
                            Propane       4.96%      95.04%
                          Isobutane       4.95%      95.05%
                           n-Butane       4.94%      95.06%

                         Isopentane       4.86%      95.14%
                          n-Pentane       4.78%      95.22%
                           n-Hexane       4.58%      95.42%
                        Cyclohexane       4.43%      95.57%
                      Other Hexanes       4.71%      95.29%

                           Heptanes       4.02%      95.98%
                            Benzene       3.55%      96.45%
                            Toluene       2.95%      97.05%
                            Xylenes       1.64%      98.36%
                        C8+ Heavies       0.05%      99.95%



COLD SEPARATOR
-------------------------------------------------------------------

            Cold Separator Temperature:      10.0 deg. F
               Cold Separator Pressure:     850.0 psig
                     Dry Gas Flow Rate:  300.0000 MMSCF/day
          Calculated Dry Gas Dew Point:      1.90 lbs. H2O/MMSCF
            Glycol Losses with Dry Gas:    1.4239 lb/hr
                 Wet Gas Water Content: Saturated
      Calculated Wet Gas Water Content:     22.59 lbs. H2O/MMSCF
  Calculated Lean Glycol Recirc. Ratio:      1.39 gal/lb H2O
                       Produced Liquid: 6.26e+002 bbls/day
     Glycol Losses in Produced Liquids:    2.4670 lb/hr

                                     Remaining  Absorbed or
               Component            in Dry Gas   Condensed
    ------------------------------- ----------- -----------
                              Water       8.38%      91.62%
                     Carbon Dioxide      99.77%       0.23%
                           Nitrogen      99.97%       0.03%
                            Methane      99.93%       0.07%
                             Ethane      99.61%       0.39%

                            Propane      97.78%       2.22%
                          Isobutane      95.39%       4.61%
                           n-Butane      93.14%       6.86%
                         Isopentane      83.25%      16.75%
                          n-Pentane      60.99%      39.01%

                           n-Hexane      60.68%      39.32%
                        Cyclohexane      51.44%      48.56%
                      Other Hexanes      70.46%      29.54%
                           Heptanes      31.25%      68.75%
                            Benzene      50.16%      49.84%

                            Toluene      20.12%      79.88%
                            Xylenes       7.96%      92.04%
                        C8+ Heavies       6.12%      93.88%


FLASH TANK
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-------------------------------------------------------------------

                          Flash Control: Combustion device
               Flash Control Efficiency: 100.00 %
                      Flash Temperature:      80.0 deg. F
                         Flash Pressure:      45.0 psig

                                    Left in Oil  Removed in
               Component             and Glycol  Flash Gas
    ------------------------------- -----------  ----------
                              Water     100.00%       0.00%
                     Carbon Dioxide      59.18%      40.82%
                           Nitrogen       3.83%      96.17%
                            Methane       5.83%      94.17%
                             Ethane      10.84%      89.16%

                            Propane      18.54%      81.46%
                          Isobutane      18.07%      81.93%
                           n-Butane      23.44%      76.56%
                         Isopentane      28.32%      71.68%
                          n-Pentane      33.00%      67.00%

                           n-Hexane      42.56%      57.44%
                        Cyclohexane      80.92%      19.08%
                      Other Hexanes      35.43%      64.57%
                           Heptanes      51.55%      48.45%
                            Benzene      96.42%       3.58%

                            Toluene      97.46%       2.54%
                            Xylenes      98.67%       1.33%
                        C8+ Heavies      67.14%      32.86%


REGENERATOR
-------------------------------------------------------------------

  No Stripping Gas used in regenerator.

                                     Remaining   Distilled
               Component             in Glycol   Overhead
    ------------------------------- ----------- -----------
                              Water      79.49%      20.51%
                     Carbon Dioxide       0.00%     100.00%
                           Nitrogen       0.00%     100.00%
                            Methane       0.00%     100.00%
                             Ethane       0.00%     100.00%

                            Propane       0.00%     100.00%
                          Isobutane       0.00%     100.00%
                           n-Butane       0.00%     100.00%
                         Isopentane       1.77%      98.23%
                          n-Pentane       1.52%      98.48%

                           n-Hexane       1.17%      98.83%
                        Cyclohexane       3.95%      96.05%
                      Other Hexanes       2.82%      97.18%
                           Heptanes       0.97%      99.03%
                            Benzene       5.19%      94.81%

                            Toluene       8.11%      91.89%
                            Xylenes      13.07%      86.93%
                        C8+ Heavies      17.87%      82.13%



STREAM REPORTS:
-------------------------------------------------------------------
```

```
WET GAS STREAM
-------------------------------------------------------------
    Temperature:     82.00 deg. F
    Pressure:      2100.70 psia
    Flow Rate:   1.25e+007 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 4.76e-002 2.83e+002
                     Carbon Dioxide 7.85e-001 1.14e+004
                           Nitrogen 8.50e-001 7.87e+003
                            Methane 9.54e+001 5.06e+005
                             Ethane 2.19e+000 2.18e+004

                            Propane 2.53e-001 3.69e+003
                          Isobutane 5.10e-002 9.79e+002
                           n-Butane 5.30e-002 1.02e+003
                         Isopentane 4.50e-002 1.07e+003
                          n-Pentane 2.40e-002 5.72e+002

                           n-Hexane 2.61e-002 7.43e+002
                        Cyclohexane 5.80e-003 1.61e+002
                      Other Hexanes 4.88e-002 1.39e+003
                           Heptanes 7.72e-002 2.56e+003
                            Benzene 4.60e-003 1.19e+002

                            Toluene 2.03e-002 6.18e+002
                            Xylenes 2.10e-002 7.37e+002
                        C8+ Heavies 5.52e-002 3.11e+003
    ------------------------------- --------- ---------
                   Total Components    100.00 5.64e+005


DRY GAS STREAM
-------------------------------------------------------------
    Temperature:     10.00 deg. F
    Pressure:       864.70 psia
    Flow Rate:   1.25e+007 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 4.00e-003 2.37e+001
                     Carbon Dioxide 7.85e-001 1.14e+004
                           Nitrogen 8.52e-001 7.86e+003
                            Methane 9.57e+001 5.06e+005
                             Ethane 2.19e+000 2.17e+004

                            Propane 2.48e-001 3.60e+003
                          Isobutane 4.88e-002 9.34e+002
                           n-Butane 4.95e-002 9.48e+002
                         Isopentane 3.76e-002 8.93e+002
                          n-Pentane 1.47e-002 3.49e+002

                           n-Hexane 1.59e-002 4.51e+002
                        Cyclohexane 2.99e-003 8.29e+001
                      Other Hexanes 3.45e-002 9.79e+002
                           Heptanes 2.42e-002 7.99e+002
                            Benzene 2.31e-003 5.95e+001

                            Toluene 4.10e-003 1.24e+002
                            Xylenes 1.68e-003 5.87e+001
                        C8+ Heavies 3.39e-003 1.90e+002
    ------------------------------- --------- ---------
                   Total Components    100.00 5.56e+005
```

```
LEAN GLYCOL STREAM
-------------------------------------------------------------
    Temperature:     82.00 deg. F
    Flow Rate:   6.00e+000 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)     (ppm)
    ------------------------------- --------- --------- ---------
                                 EG 7.00e+001 2.26e+003   699956.
                              Water 3.00e+001 9.69e+002   299995.
                     Carbon Dioxide 1.51e-011 4.88e-010        0.
                           Nitrogen 1.74e-013 5.62e-012        0.
                            Methane 5.21e-018 1.68e-016        0.

                             Ethane 8.46e-009 2.74e-007        0.
                            Propane 8.76e-011 2.83e-009        0.
                          Isobutane 1.44e-011 4.65e-010        0.
                           n-Butane 1.75e-011 5.64e-010        0.
                         Isopentane 3.67e-006 1.19e-004        0.

                          n-Pentane 1.96e-006 6.34e-005        0.
                           n-Hexane 3.59e-006 1.16e-004        0.
                        Cyclohexane 3.66e-005 1.18e-003        0.
                      Other Hexanes 1.11e-005 3.60e-004        0.
                           Heptanes 8.19e-006 2.65e-004        0.

                            Benzene 4.46e-004 1.44e-002        4.
                            Toluene 2.10e-003 6.77e-002       21.
                            Xylenes 2.32e-003 7.49e-002       23.
                        C8+ Heavies 2.45e-006 7.92e-005        0.
    ------------------------------- --------- --------- ---------
                   Total Components    100.00 3.23e+003  1000000.


RICH GLYCOL STREAM
-------------------------------------------------------------
    Temperature:     10.00 deg. F
    Pressure:       864.70 psia
    Flow Rate:   6.52e+000 gpm
    NOTE: Stream has more than one phase.

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------- --------- ---------
                                 EG 6.47e+001 2.26e+003
                              Water 3.49e+001 1.22e+003
                     Carbon Dioxide 1.40e-001 4.88e+000
                           Nitrogen 1.61e-003 5.62e-002
                            Methane 1.44e-001 5.01e+000

                             Ethane 1.66e-002 5.79e-001
                            Propane 1.99e-003 6.96e-002
                          Isobutane 4.44e-004 1.55e-002
                           n-Butane 6.52e-004 2.27e-002
                         Isopentane 6.80e-004 2.37e-002

                          n-Pentane 3.63e-004 1.27e-002
                           n-Hexane 6.66e-004 2.32e-002
                        Cyclohexane 1.06e-003 3.70e-002
                      Other Hexanes 1.03e-003 3.60e-002
                           Heptanes 1.52e-003 5.29e-002

                            Benzene 8.25e-003 2.88e-001
                            Toluene 2.46e-002 8.57e-001
                            Xylenes 1.66e-002 5.80e-001
                        C8+ Heavies 1.89e-005 6.60e-004
    ------------------------------- --------- ---------
```

```
                   Total Components    100.00 3.49e+003



COLD SEPARATOR OIL STREAM
-------------------------------------------------------------
    Temperature:     10.00 deg. F
    Flow Rate:   1.83e+001 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------- --------- ---------
                                 EG 3.17e-002 2.47e+000
                              Water 1.20e-001 9.33e+000
                     Carbon Dioxide 2.71e-001 2.10e+001
                           Nitrogen 3.31e-002 2.57e+000
                            Methane 4.79e+000 3.72e+002

                             Ethane 1.09e+000 8.51e+001
                            Propane 1.05e+000 8.16e+001
                          Isobutane 5.81e-001 4.52e+001
                           n-Butane 8.98e-001 6.98e+001
                         Isopentane 2.31e+000 1.80e+002

                          n-Pentane 2.87e+000 2.23e+002
                           n-Hexane 3.76e+000 2.92e+002
                        Cyclohexane 1.01e+000 7.83e+001
                      Other Hexanes 5.28e+000 4.10e+002
                           Heptanes 2.26e+001 1.76e+003

                            Benzene 7.57e-001 5.89e+001
                            Toluene 6.34e+000 4.93e+002
                            Xylenes 8.71e+000 6.77e+002
                        C8+ Heavies 3.75e+001 2.92e+003
    ------------------------------- --------- ---------
                   Total Components    100.00 7.77e+003



FLASH TANK OFF GAS STREAM
-------------------------------------------------------------
    Temperature:     80.00 deg. F
    Pressure:        59.70 psia
    Flow Rate:   1.38e+002 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 5.88e-001 3.85e-002
                     Carbon Dioxide 1.24e+001 1.99e+000
                           Nitrogen 5.30e-001 5.41e-002
                            Methane 8.08e+001 4.72e+000
                             Ethane 4.72e+000 5.17e-001

                            Propane 3.53e-001 5.67e-002
                          Isobutane 6.00e-002 1.27e-002
                           n-Butane 8.23e-002 1.74e-002
                         Isopentane 6.47e-002 1.70e-002
                          n-Pentane 3.23e-002 8.49e-003

                           n-Hexane 4.25e-002 1.33e-002
                        Cyclohexane 2.30e-002 7.05e-003
                      Other Hexanes 7.40e-002 2.32e-002
                           Heptanes 7.03e-002 2.56e-002
                            Benzene 3.63e-002 1.03e-002

                            Toluene 6.50e-002 2.18e-002
                            Xylenes 1.99e-002 7.70e-003
                        C8+ Heavies 3.49e-004 2.17e-004
    ------------------------------- --------- ---------
```

```
                Total Components    100.00 7.54e+000


FLASH TANK OIL STREAM
-------------------------------------------------------------
    Temperature:     80.00 deg. F

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



FLASH TANK GLYCOL STREAM
-------------------------------------------------------------
    Temperature:     80.00 deg. F
    Flow Rate:   6.50e+000 gpm

              Component           Conc.    Loading
                                  (wt%)    (lb/hr)     (ppm)
    ------------------------------- --------- --------- ---------
                                 EG 6.48e+001 2.26e+003   648354.
                              Water 3.50e+001 1.22e+003   350197.
                     Carbon Dioxide 8.30e-002 2.89e+000      830.
                           Nitrogen 6.18e-005 2.15e-003        1.
                            Methane 8.38e-003 2.92e-001       84.

                             Ethane 1.80e-003 6.28e-002       18.
                            Propane 3.70e-004 1.29e-002        4.
                          Isobutane 8.04e-005 2.80e-003        1.
                           n-Butane 1.53e-004 5.33e-003        2.
                         Isopentane 1.93e-004 6.72e-003        2.

                          n-Pentane 1.20e-004 4.18e-003        1.
                           n-Hexane 2.84e-004 9.89e-003        3.
                        Cyclohexane 8.59e-004 2.99e-002        9.
                      Other Hexanes 3.66e-004 1.27e-002        4.
                           Heptanes 7.83e-004 2.73e-002        8.

                            Benzene 7.97e-003 2.78e-001       80.
                            Toluene 2.40e-002 8.35e-001      240.
                            Xylenes 1.64e-002 5.73e-001      164.
                        C8+ Heavies 1.27e-005 4.43e-004        0.
    ------------------------------- --------- --------- ---------
                   Total Components    100.00 3.48e+003  1000000.



FLASH GAS EMISSIONS
-------------------------------------------------------------
    Flow Rate:   3.99e+002 scfh
    Control Method:   Combustion Device
    Control Efficiency:   100.00

              Component           Conc.    Loading
                                  (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 6.27e+001 1.19e+001
                     Carbon Dioxide 3.71e+001 1.71e+001
                           Nitrogen 1.84e-001 5.41e-002
    ------------------------------- --------- ---------
                   Total Components    100.00 2.91e+001



REGENERATOR OVERHEADS STREAM
-------------------------------------------------------------
    Temperature:    212.00 deg. F
    Pressure:        14.70 psia
    Flow Rate:   5.31e+003 scfh
```

```
                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 9.93e+001 2.50e+002
                     Carbon Dioxide 4.69e-001 2.89e+000
                           Nitrogen 5.49e-004 2.15e-003
                            Methane 1.30e-001 2.92e-001
                             Ethane 1.49e-002 6.28e-002

                            Propane 2.09e-003 1.29e-002
                          Isobutane 3.44e-004 2.80e-003
                           n-Butane 6.55e-004 5.33e-003
                         Isopentane 6.54e-004 6.60e-003
                          n-Pentane 4.08e-004 4.12e-003

                           n-Hexane 8.10e-004 9.77e-003
                        Cyclohexane 2.44e-003 2.87e-002
                      Other Hexanes 1.03e-003 1.24e-002
                           Heptanes 1.93e-003 2.70e-002
                            Benzene 2.41e-002 2.63e-001

                            Toluene 5.95e-002 7.68e-001
                            Xylenes 3.35e-002 4.98e-001
                        C8+ Heavies 1.53e-005 3.64e-004
    ------------------------------- --------- ---------
                   Total Components    100.00 2.55e+002


CONDENSER PRODUCED WATER STREAM
-------------------------------------------------------------
    Temperature:    120.00 deg. F
    Flow Rate:   5.00e-001 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)     (ppm)
    ------------------------------- --------- --------- ---------
                              Water 9.99e+001 2.50e+002   998840.
                     Carbon Dioxide 5.51e-002 1.38e-001      551.
                           Nitrogen 1.12e-006 2.81e-006        0.
                            Methane 2.93e-004 7.35e-004        3.
                             Ethane 7.20e-005 1.80e-004        1.

                            Propane 1.53e-005 3.82e-005        0.
                          Isobutane 1.80e-006 4.51e-006        0.
                           n-Butane 4.54e-006 1.14e-005        0.
                         Isopentane 3.91e-006 9.78e-006        0.
                          n-Pentane 2.58e-006 6.45e-006        0.

                           n-Hexane 4.86e-006 1.22e-005        0.
                        Cyclohexane 7.78e-005 1.95e-004        1.
                      Other Hexanes 5.11e-006 1.28e-005        0.
                           Heptanes 6.56e-006 1.64e-005        0.
                            Benzene 1.61e-002 4.02e-002      161.

                            Toluene 3.22e-002 8.05e-002      322.
                            Xylenes 1.21e-002 3.03e-002      121.
                        C8+ Heavies 6.50e-010 1.63e-009        0.
    ------------------------------- --------- --------- ---------
                   Total Components    100.00 2.50e+002  1000000.


CONDENSER RECOVERED OIL STREAM
-------------------------------------------------------------
    Temperature:    120.00 deg. F
    Flow Rate:   1.38e-003 gpm

                  Component           Conc.    Loading
```

```
                                 (wt%)    (lb/hr)
    ------------------------------ --------- ---------
                             Water 5.98e-002 3.51e-004
                    Carbon Dioxide 2.30e-001 1.35e-003
                          Nitrogen 1.99e-004 1.16e-006
                           Methane 6.50e-003 3.81e-005
                            Ethane 7.73e-003 4.53e-005

                           Propane 8.95e-003 5.25e-005
                         Isobutane 3.84e-003 2.25e-005
                          n-Butane 9.74e-003 5.71e-005
                        Isopentane 3.04e-002 1.79e-004
                         n-Pentane 2.94e-002 1.72e-004

                          n-Hexane 1.37e-001 8.05e-004
                       Cyclohexane 5.29e-001 3.10e-003
                     Other Hexanes 1.21e-001 7.08e-004
                          Heptanes 8.98e-001 5.27e-003
                           Benzene 6.17e+000 3.62e-002

                           Toluene 3.99e+001 2.34e-001
                           Xylenes 5.18e+001 3.04e-001
                       C8+ Heavies 6.14e-002 3.60e-004
    ------------------------------ --------- ---------
                  Total Components    100.00 5.87e-001



CONDENSER VENT STREAM
-------------------------------------------------------------
    Temperature:    120.00 deg. F
    Pressure:        15.50 psia
    Flow Rate:   3.97e+001 scfh

                  Component           Conc.    Loading
                                     (vol%)   (lb/hr)
    ------------------------------ --------- ---------
                             Water 1.10e+001 2.08e-001
                    Carbon Dioxide 5.98e+001 2.75e+000
                          Nitrogen 7.34e-002 2.15e-003
                           Methane 1.74e+001 2.91e-001
                            Ethane 1.99e+000 6.26e-002

                           Propane 2.78e-001 1.28e-002
                         Isobutane 4.56e-002 2.77e-003
                          n-Butane 8.66e-002 5.26e-003
                        Isopentane 8.50e-002 6.41e-003
                         n-Pentane 5.22e-002 3.94e-003

                          n-Hexane 9.94e-002 8.95e-003
                       Cyclohexane 2.89e-001 2.54e-002
                     Other Hexanes 1.30e-001 1.17e-002
                          Heptanes 2.08e-001 2.17e-002
                           Benzene 2.29e+000 1.87e-001

                           Toluene 4.71e+000 4.53e-001
                           Xylenes 1.47e+000 1.64e-001
                       C8+ Heavies 1.90e-005 3.39e-006
    ------------------------------ --------- ---------
                  Total Components    100.00 4.22e+000



COMBUSTION DEVICE OFF GAS STREAM
-------------------------------------------------------------
    Temperature:   1000.00 deg. F
    Pressure:        14.70 psia
    Flow Rate:   5.77e-001 scfh

                  Component           Conc.    Loading
```

```
                                  (vol%)   (lb/hr)
------------------------------ --------- ---------
                       Methane 5.97e+001 1.46e-002
                        Ethane 6.85e+000 3.13e-003
                       Propane 9.55e-001 6.40e-004
                     Isobutane 1.57e-001 1.39e-004
                      n-Butane 2.98e-001 2.63e-004

                    Isopentane 2.92e-001 3.21e-004
                     n-Pentane 1.80e-001 1.97e-004
                      n-Hexane 3.42e-001 4.48e-004
                   Cyclohexane 9.93e-001 1.27e-003
                 Other Hexanes 4.45e-001 5.83e-004

                      Heptanes 7.13e-001 1.09e-003
                       Benzene 7.86e+000 9.34e-003
                       Toluene 1.62e+001 2.27e-002
                       Xylenes 5.06e+000 8.18e-003
                   C8+ Heavies 6.54e-005 1.69e-007
------------------------------ --------- ---------
              Total Components    100.00 6.28e-002
```

```
GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Cold Springs 1, MI Theox
File Name: N:\Technical\5620-CPG\0032 - Cold Springs Blue Lake, MI
Reissuance\GLYCalc\CURRENT versions - 2014 data\TC - CS 12, MI Cond.ddf
     Date: October 23, 2018

 DESCRIPTION:

    Description: CS 12 DEG Cold Separators (Absorption used
                 only during withdrawl) - Condenser EF using
                 3/16/2014 gas analysis. 300 MMSCFD rated.
                 Cold Separation: 10 F; 850 psig. Flash Tank:
                 80 F; 45 psig. Condenser: 120 F; 1 psig.
                 Glycol recirc: 6 gpm.

    Annual Hours of Operation:    8760.0 hours/yr



 EMISSIONS REPORTS:
 -------------------------------------------------------------------



 CONTROLLED REGENERATOR EMISSIONS
 -------------------------------------------------------------------
            Component              lbs/hr     lbs/day     tons/yr
 ------------------------------ ----------- ----------- -----------
                        Methane      0.2912       6.988      1.2753
                         Ethane      0.0626       1.503      0.2743
                        Propane      0.0128       0.307      0.0561
                      Isobutane      0.0028       0.067      0.0121
                       n-Butane      0.0053       0.126      0.0231

                     Isopentane      0.0064       0.154      0.0281
                      n-Pentane      0.0039       0.095      0.0173
                       n-Hexane      0.0090       0.215      0.0392
                    Cyclohexane      0.0254       0.610      0.1114
                  Other Hexanes      0.0117       0.280      0.0511

                       Heptanes      0.0217       0.522      0.0952
                        Benzene      0.1869       4.485      0.8184
                        Toluene      0.4533      10.880      1.9855
                        Xylenes      0.1635       3.925      0.7163
                    C8+ Heavies     <0.0001      <0.001     <0.0001
 ------------------------------ ----------- ----------- -----------
                Total Emissions      1.2565      30.156      5.5035

    Total Hydrocarbon Emissions      1.2565      30.156      5.5035
            Total VOC Emissions      0.9027      21.665      3.9539
            Total HAP Emissions      0.8127      19.504      3.5595
           Total BTEX Emissions      0.8037      19.289      3.5203



 UNCONTROLLED REGENERATOR EMISSIONS
 -------------------------------------------------------------------
            Component              lbs/hr     lbs/day     tons/yr
 ------------------------------ ----------- ----------- -----------
                        Methane      0.2919       7.006      1.2787
                         Ethane      0.0628       1.508      0.2753
                        Propane      0.0129       0.310      0.0565
                      Isobutane      0.0028       0.067      0.0123
                       n-Butane      0.0053       0.128      0.0234

                     Isopentane      0.0066       0.158      0.0289
                      n-Pentane      0.0041       0.099      0.0180
                       n-Hexane      0.0098       0.235      0.0428
                    Cyclohexane      0.0287       0.689      0.1258
```

```
                 Other Hexanes      0.0124       0.297      0.0543

                      Heptanes      0.0270       0.649      0.1184
                       Benzene      0.2633       6.319      1.1532
                       Toluene      0.7677      18.424      3.3624
                       Xylenes      0.4978      11.948      2.1806
                   C8+ Heavies      0.0004       0.009      0.0016
------------------------------ ----------- ----------- -----------
               Total Emissions      1.9936      47.847      8.7320

   Total Hydrocarbon Emissions      1.9936      47.847      8.7320
           Total VOC Emissions      1.6388      39.332      7.1781
           Total HAP Emissions      1.5386      36.926      6.7390
          Total BTEX Emissions      1.5288      36.691      6.6962



FLASH GAS EMISSIONS
-----------------------------------------------------------------
           Component              lbs/hr     lbs/day     tons/yr
------------------------------ ----------- ----------- -----------
------------------------------ ----------- ----------- -----------




FLASH TANK OFF GAS
-----------------------------------------------------------------
           Component              lbs/hr     lbs/day     tons/yr
------------------------------ ----------- ----------- -----------
                       Methane      4.7198     113.276     20.6729
                        Ethane      0.5166      12.399      2.2629
                       Propane      0.0567       1.360      0.2483
                     Isobutane      0.0127       0.305      0.0556
                      n-Butane      0.0174       0.418      0.0763

                    Isopentane      0.0170       0.408      0.0745
                     n-Pentane      0.0085       0.204      0.0372
                      n-Hexane      0.0133       0.320      0.0585
                   Cyclohexane      0.0071       0.169      0.0309
                 Other Hexanes      0.0232       0.558      0.1018

                      Heptanes      0.0256       0.615      0.1123
                       Benzene      0.0103       0.248      0.0452
                       Toluene      0.0218       0.523      0.0955
                       Xylenes      0.0077       0.185      0.0337
                   C8+ Heavies      0.0002       0.005      0.0009
------------------------------ ----------- ----------- -----------
               Total Emissions      5.4581     130.994     23.9064

   Total Hydrocarbon Emissions      5.4581     130.994     23.9064
           Total VOC Emissions      0.2216       5.319      0.9706
           Total HAP Emissions      0.0532       1.276      0.2329
          Total BTEX Emissions      0.0398       0.956      0.1744



EQUIPMENT REPORTS:
-----------------------------------------------------------------



CONDENSER
-----------------------------------------------------------------
          Condenser Outlet Temperature:    120.00 deg. F
                    Condenser Pressure:     15.50 psia
                        Condenser Duty: 1.96e-001 MM BTU/hr
                 Hydrocarbon Recovery:       0.05 bbls/day
                        Produced Water:     17.15 bbls/day
```

```
                VOC Control Efficiency:     44.92 %
                HAP Control Efficiency:     47.18 %
               BTEX Control Efficiency:     47.43 %
       Dissolved Hydrocarbons in Water:    608.34 mg/L

               Component              Emitted   Condensed
    ------------------------------- ----------- -----------
                              Water       0.08%      99.92%
                     Carbon Dioxide      95.18%       4.82%
                           Nitrogen      99.82%       0.18%
                            Methane      99.74%       0.26%
                             Ethane      99.64%       0.36%

                            Propane      99.30%       0.70%
                          Isobutane      99.03%       0.97%
                           n-Butane      98.72%       1.28%
                         Isopentane      97.15%       2.85%
                          n-Pentane      95.66%       4.34%

                           n-Hexane      91.64%       8.36%
                        Cyclohexane      88.52%      11.48%
                      Other Hexanes      94.18%       5.82%
                           Heptanes      80.45%      19.55%
                            Benzene      70.97%      29.03%

                            Toluene      59.05%      40.95%
                            Xylenes      32.85%      67.15%
                        C8+ Heavies       0.93%      99.07%



COLD SEPARATOR
-------------------------------------------------------------------

            Cold Separator Temperature:      10.0 deg. F
               Cold Separator Pressure:     850.0 psig
                     Dry Gas Flow Rate:  300.0000 MMSCF/day
          Calculated Dry Gas Dew Point:      1.90 lbs. H2O/MMSCF
            Glycol Losses with Dry Gas:    1.4239 lb/hr
                 Wet Gas Water Content: Saturated
      Calculated Wet Gas Water Content:     22.59 lbs. H2O/MMSCF
  Calculated Lean Glycol Recirc. Ratio:      1.39 gal/lb H2O
                       Produced Liquid: 6.26e+002 bbls/day
     Glycol Losses in Produced Liquids:    2.4670 lb/hr

                                        Remaining  Absorbed or
               Component               in Dry Gas   Condensed
    ------------------------------- ----------- -----------
                              Water       8.38%      91.62%
                     Carbon Dioxide      99.77%       0.23%
                           Nitrogen      99.97%       0.03%
                            Methane      99.93%       0.07%
                             Ethane      99.61%       0.39%

                            Propane      97.78%       2.22%
                          Isobutane      95.39%       4.61%
                           n-Butane      93.14%       6.86%
                         Isopentane      83.25%      16.75%
                          n-Pentane      60.99%      39.01%

                           n-Hexane      60.68%      39.32%
                        Cyclohexane      51.44%      48.56%
                      Other Hexanes      70.46%      29.54%
                           Heptanes      31.25%      68.75%
                            Benzene      50.16%      49.84%

                            Toluene      20.12%      79.88%
                            Xylenes       7.96%      92.04%
                        C8+ Heavies       6.12%      93.88%
```

```
FLASH TANK
-------------------------------------------------------------------

                          Flash Control: Combustion device
               Flash Control Efficiency: 100.00 %
                      Flash Temperature:      80.0 deg. F
                         Flash Pressure:      45.0 psig

                                    Left in Oil  Removed in
               Component             and Glycol  Flash Gas
    ------------------------------- ----------- -----------
                              Water     100.00%       0.00%
                     Carbon Dioxide      59.18%      40.82%
                           Nitrogen       3.83%      96.17%
                            Methane       5.83%      94.17%
                             Ethane      10.84%      89.16%

                            Propane      18.54%      81.46%
                          Isobutane      18.07%      81.93%
                           n-Butane      23.44%      76.56%
                         Isopentane      28.32%      71.68%
                          n-Pentane      33.00%      67.00%

                           n-Hexane      42.56%      57.44%
                        Cyclohexane      80.92%      19.08%
                      Other Hexanes      35.43%      64.57%
                           Heptanes      51.55%      48.45%
                            Benzene      96.42%       3.58%

                            Toluene      97.46%       2.54%
                            Xylenes      98.67%       1.33%
                        C8+ Heavies      67.14%      32.86%


REGENERATOR
-------------------------------------------------------------------

  No Stripping Gas used in regenerator.

                                     Remaining   Distilled
               Component             in Glycol   Overhead
    ------------------------------- ----------- -----------
                              Water      79.49%      20.51%
                     Carbon Dioxide       0.00%     100.00%
                           Nitrogen       0.00%     100.00%
                            Methane       0.00%     100.00%
                             Ethane       0.00%     100.00%

                            Propane       0.00%     100.00%
                          Isobutane       0.00%     100.00%
                           n-Butane       0.00%     100.00%
                         Isopentane       1.77%      98.23%
                          n-Pentane       1.52%      98.48%

                           n-Hexane       1.17%      98.83%
                        Cyclohexane       3.95%      96.05%
                      Other Hexanes       2.82%      97.18%
                           Heptanes       0.97%      99.03%
                            Benzene       5.19%      94.81%

                            Toluene       8.11%      91.89%
                            Xylenes      13.07%      86.93%
                        C8+ Heavies      17.87%      82.13%
```

```
STREAM REPORTS:
------------------------------------------------------------------



WET GAS STREAM
------------------------------------------------------------
    Temperature:     82.00 deg. F
    Pressure:      2100.70 psia
    Flow Rate:   1.25e+007 scfh

                  Component           Conc.    Loading
                                     (vol%)    (lb/hr)
    -------------------------------- --------- ---------
                               Water 4.76e-002 2.83e+002
                      Carbon Dioxide 7.85e-001 1.14e+004
                            Nitrogen 8.50e-001 7.87e+003
                             Methane 9.54e+001 5.06e+005
                              Ethane 2.19e+000 2.18e+004

                             Propane 2.53e-001 3.69e+003
                           Isobutane 5.10e-002 9.79e+002
                            n-Butane 5.30e-002 1.02e+003
                          Isopentane 4.50e-002 1.07e+003
                           n-Pentane 2.40e-002 5.72e+002

                            n-Hexane 2.61e-002 7.43e+002
                         Cyclohexane 5.80e-003 1.61e+002
                       Other Hexanes 4.88e-002 1.39e+003
                            Heptanes 7.72e-002 2.56e+003
                             Benzene 4.60e-003 1.19e+002

                             Toluene 2.03e-002 6.18e+002
                             Xylenes 2.10e-002 7.37e+002
                         C8+ Heavies 5.52e-002 3.11e+003
    -------------------------------- --------- ---------
                    Total Components    100.00 5.64e+005



DRY GAS STREAM
------------------------------------------------------------
    Temperature:     10.00 deg. F
    Pressure:       864.70 psia
    Flow Rate:   1.25e+007 scfh

                  Component           Conc.    Loading
                                     (vol%)    (lb/hr)
    -------------------------------- --------- ---------
                               Water 4.00e-003 2.37e+001
                      Carbon Dioxide 7.85e-001 1.14e+004
                            Nitrogen 8.52e-001 7.86e+003
                             Methane 9.57e+001 5.06e+005
                              Ethane 2.19e+000 2.17e+004

                             Propane 2.48e-001 3.60e+003
                           Isobutane 4.88e-002 9.34e+002
                            n-Butane 4.95e-002 9.48e+002
                          Isopentane 3.76e-002 8.93e+002
                           n-Pentane 1.47e-002 3.49e+002

                            n-Hexane 1.59e-002 4.51e+002
                         Cyclohexane 2.99e-003 8.29e+001
                       Other Hexanes 3.45e-002 9.79e+002
                            Heptanes 2.42e-002 7.99e+002
                             Benzene 2.31e-003 5.95e+001

                             Toluene 4.10e-003 1.24e+002
                             Xylenes 1.68e-003 5.87e+001
                         C8+ Heavies 3.39e-003 1.90e+002
```

```
    ------------------------------ --------- ---------
                  Total Components    100.00 5.56e+005



LEAN GLYCOL STREAM
-------------------------------------------------------------
    Temperature:     82.00 deg. F
    Flow Rate:   6.00e+000 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)     (ppm)
    ------------------------------ --------- --------- ---------
                                EG 7.00e+001 2.26e+003   699956.
                             Water 3.00e+001 9.69e+002   299995.
                    Carbon Dioxide 1.51e-011 4.88e-010        0.
                          Nitrogen 1.74e-013 5.62e-012        0.
                           Methane 5.21e-018 1.68e-016        0.

                            Ethane 8.46e-009 2.74e-007        0.
                           Propane 8.76e-011 2.83e-009        0.
                         Isobutane 1.44e-011 4.65e-010        0.
                          n-Butane 1.75e-011 5.64e-010        0.
                        Isopentane 3.67e-006 1.19e-004        0.

                         n-Pentane 1.96e-006 6.34e-005        0.
                          n-Hexane 3.59e-006 1.16e-004        0.
                       Cyclohexane 3.66e-005 1.18e-003        0.
                     Other Hexanes 1.11e-005 3.60e-004        0.
                          Heptanes 8.19e-006 2.65e-004        0.

                           Benzene 4.46e-004 1.44e-002        4.
                           Toluene 2.10e-003 6.77e-002       21.
                           Xylenes 2.32e-003 7.49e-002       23.
                       C8+ Heavies 2.45e-006 7.92e-005        0.
    ------------------------------ --------- --------- ---------
                  Total Components    100.00 3.23e+003  1000000.



RICH GLYCOL STREAM
-------------------------------------------------------------
    Temperature:     10.00 deg. F
    Pressure:       864.70 psia
    Flow Rate:   6.52e+000 gpm
    NOTE: Stream has more than one phase.

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------ --------- ---------
                                EG 6.47e+001 2.26e+003
                             Water 3.49e+001 1.22e+003
                    Carbon Dioxide 1.40e-001 4.88e+000
                          Nitrogen 1.61e-003 5.62e-002
                           Methane 1.44e-001 5.01e+000

                            Ethane 1.66e-002 5.79e-001
                           Propane 1.99e-003 6.96e-002
                         Isobutane 4.44e-004 1.55e-002
                          n-Butane 6.52e-004 2.27e-002
                        Isopentane 6.80e-004 2.37e-002

                         n-Pentane 3.63e-004 1.27e-002
                          n-Hexane 6.66e-004 2.32e-002
                       Cyclohexane 1.06e-003 3.70e-002
                     Other Hexanes 1.03e-003 3.60e-002
                          Heptanes 1.52e-003 5.29e-002

                           Benzene 8.25e-003 2.88e-001
                           Toluene 2.46e-002 8.57e-001
```

```
                            Xylenes 1.66e-002 5.80e-001
                        C8+ Heavies 1.89e-005 6.60e-004
    ------------------------------- --------- ---------
                   Total Components    100.00 3.49e+003



COLD SEPARATOR OIL STREAM
-------------------------------------------------------------
    Temperature:     10.00 deg. F
    Flow Rate:   1.83e+001 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------- --------- ---------
                                 EG 3.17e-002 2.47e+000
                              Water 1.20e-001 9.33e+000
                     Carbon Dioxide 2.71e-001 2.10e+001
                           Nitrogen 3.31e-002 2.57e+000
                            Methane 4.79e+000 3.72e+002

                             Ethane 1.09e+000 8.51e+001
                            Propane 1.05e+000 8.16e+001
                          Isobutane 5.81e-001 4.52e+001
                           n-Butane 8.98e-001 6.98e+001
                         Isopentane 2.31e+000 1.80e+002

                          n-Pentane 2.87e+000 2.23e+002
                           n-Hexane 3.76e+000 2.92e+002
                        Cyclohexane 1.01e+000 7.83e+001
                      Other Hexanes 5.28e+000 4.10e+002
                           Heptanes 2.26e+001 1.76e+003

                            Benzene 7.57e-001 5.89e+001
                            Toluene 6.34e+000 4.93e+002
                            Xylenes 8.71e+000 6.77e+002
                        C8+ Heavies 3.75e+001 2.92e+003
    ------------------------------- --------- ---------
                   Total Components    100.00 7.77e+003



FLASH TANK OFF GAS STREAM
-------------------------------------------------------------
    Temperature:     80.00 deg. F
    Pressure:        59.70 psia
    Flow Rate:   1.38e+002 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 5.88e-001 3.85e-002
                     Carbon Dioxide 1.24e+001 1.99e+000
                           Nitrogen 5.30e-001 5.41e-002
                            Methane 8.08e+001 4.72e+000
                             Ethane 4.72e+000 5.17e-001

                            Propane 3.53e-001 5.67e-002
                          Isobutane 6.00e-002 1.27e-002
                           n-Butane 8.23e-002 1.74e-002
                         Isopentane 6.47e-002 1.70e-002
                          n-Pentane 3.23e-002 8.49e-003

                           n-Hexane 4.25e-002 1.33e-002
                        Cyclohexane 2.30e-002 7.05e-003
                      Other Hexanes 7.40e-002 2.32e-002
                           Heptanes 7.03e-002 2.56e-002
                            Benzene 3.63e-002 1.03e-002

                            Toluene 6.50e-002 2.18e-002
```

```
                            Xylenes 1.99e-002 7.70e-003
                        C8+ Heavies 3.49e-004 2.17e-004
    ------------------------------- --------- ---------
                   Total Components    100.00 7.54e+000



FLASH TANK OIL STREAM
-------------------------------------------------------------
    Temperature:     80.00 deg. F

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



FLASH TANK GLYCOL STREAM
-------------------------------------------------------------
    Temperature:     80.00 deg. F
    Flow Rate:   6.50e+000 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)      (ppm)
    ------------------------------- --------- --------- ---------
                                 EG 6.48e+001 2.26e+003   648354.
                              Water 3.50e+001 1.22e+003   350197.
                     Carbon Dioxide 8.30e-002 2.89e+000      830.
                           Nitrogen 6.18e-005 2.15e-003        1.
                            Methane 8.38e-003 2.92e-001       84.

                             Ethane 1.80e-003 6.28e-002       18.
                            Propane 3.70e-004 1.29e-002        4.
                          Isobutane 8.04e-005 2.80e-003        1.
                           n-Butane 1.53e-004 5.33e-003        2.
                         Isopentane 1.93e-004 6.72e-003        2.

                          n-Pentane 1.20e-004 4.18e-003        1.
                           n-Hexane 2.84e-004 9.89e-003        3.
                        Cyclohexane 8.59e-004 2.99e-002        9.
                      Other Hexanes 3.66e-004 1.27e-002        4.
                           Heptanes 7.83e-004 2.73e-002        8.

                            Benzene 7.97e-003 2.78e-001       80.
                            Toluene 2.40e-002 8.35e-001      240.
                            Xylenes 1.64e-002 5.73e-001      164.
                        C8+ Heavies 1.27e-005 4.43e-004        0.
    ------------------------------- --------- --------- ---------
                   Total Components    100.00 3.48e+003  1000000.



FLASH GAS EMISSIONS
-------------------------------------------------------------
    Flow Rate:   3.99e+002 scfh
    Control Method:   Combustion Device
    Control Efficiency:   100.00

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 6.27e+001 1.19e+001
                     Carbon Dioxide 3.71e+001 1.71e+001
                           Nitrogen 1.84e-001 5.41e-002
    ------------------------------- --------- ---------
                   Total Components    100.00 2.91e+001



REGENERATOR OVERHEADS STREAM
-------------------------------------------------------------
```

```
    Temperature:    212.00 deg. F
    Pressure:        14.70 psia
    Flow Rate:   5.31e+003 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 9.93e+001 2.50e+002
                     Carbon Dioxide 4.69e-001 2.89e+000
                           Nitrogen 5.49e-004 2.15e-003
                            Methane 1.30e-001 2.92e-001
                             Ethane 1.49e-002 6.28e-002

                            Propane 2.09e-003 1.29e-002
                          Isobutane 3.44e-004 2.80e-003
                           n-Butane 6.55e-004 5.33e-003
                         Isopentane 6.54e-004 6.60e-003
                          n-Pentane 4.08e-004 4.12e-003

                           n-Hexane 8.10e-004 9.77e-003
                        Cyclohexane 2.44e-003 2.87e-002
                      Other Hexanes 1.03e-003 1.24e-002
                           Heptanes 1.93e-003 2.70e-002
                            Benzene 2.41e-002 2.63e-001

                            Toluene 5.95e-002 7.68e-001
                            Xylenes 3.35e-002 4.98e-001
                        C8+ Heavies 1.53e-005 3.64e-004
    ------------------------------- --------- ---------
                   Total Components    100.00 2.55e+002


CONDENSER VENT GAS STREAM
-------------------------------------------------------------
    Temperature:    120.00 deg. F
    Pressure:        15.50 psia
    Flow Rate:   3.97e+001 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 1.10e+001 2.08e-001
                     Carbon Dioxide 5.98e+001 2.75e+000
                           Nitrogen 7.34e-002 2.15e-003
                            Methane 1.74e+001 2.91e-001
                             Ethane 1.99e+000 6.26e-002

                            Propane 2.78e-001 1.28e-002
                          Isobutane 4.56e-002 2.77e-003
                           n-Butane 8.66e-002 5.26e-003
                         Isopentane 8.50e-002 6.41e-003
                          n-Pentane 5.22e-002 3.94e-003

                           n-Hexane 9.94e-002 8.95e-003
                        Cyclohexane 2.89e-001 2.54e-002
                      Other Hexanes 1.30e-001 1.17e-002
                           Heptanes 2.08e-001 2.17e-002
                            Benzene 2.29e+000 1.87e-001

                            Toluene 4.71e+000 4.53e-001
                            Xylenes 1.47e+000 1.64e-001
                        C8+ Heavies 1.90e-005 3.39e-006
    ------------------------------- --------- ---------
                   Total Components    100.00 4.22e+000


CONDENSER PRODUCED WATER STREAM
-------------------------------------------------------------
```

```
    Temperature:    120.00 deg. F
    Flow Rate:   5.00e-001 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)     (ppm)
    ------------------------------- --------- --------- ---------
                              Water 9.99e+001 2.50e+002   998840.
                    Carbon Dioxide 5.51e-002 1.38e-001      551.
                           Nitrogen 1.12e-006 2.81e-006        0.
                            Methane 2.93e-004 7.35e-004        3.
                             Ethane 7.20e-005 1.80e-004        1.

                            Propane 1.53e-005 3.82e-005        0.
                          Isobutane 1.80e-006 4.51e-006        0.
                           n-Butane 4.54e-006 1.14e-005        0.
                         Isopentane 3.91e-006 9.78e-006        0.
                          n-Pentane 2.58e-006 6.45e-006        0.

                           n-Hexane 4.86e-006 1.22e-005        0.
                        Cyclohexane 7.78e-005 1.95e-004        1.
                      Other Hexanes 5.11e-006 1.28e-005        0.
                           Heptanes 6.56e-006 1.64e-005        0.
                            Benzene 1.61e-002 4.02e-002      161.

                            Toluene 3.22e-002 8.05e-002      322.
                            Xylenes 1.21e-002 3.03e-002      121.
                        C8+ Heavies 6.50e-010 1.63e-009        0.
    ------------------------------- --------- --------- ---------
                   Total Components    100.00 2.50e+002  1000000.


CONDENSER RECOVERED OIL STREAM
-------------------------------------------------------------
    Temperature:    120.00 deg. F
    Flow Rate:   1.38e-003 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------- --------- ---------
                              Water 5.98e-002 3.51e-004
                     Carbon Dioxide 2.30e-001 1.35e-003
                           Nitrogen 1.99e-004 1.16e-006
                            Methane 6.50e-003 3.81e-005
                             Ethane 7.73e-003 4.53e-005

                            Propane 8.95e-003 5.25e-005
                          Isobutane 3.84e-003 2.25e-005
                           n-Butane 9.74e-003 5.71e-005
                         Isopentane 3.04e-002 1.79e-004
                          n-Pentane 2.94e-002 1.72e-004

                           n-Hexane 1.37e-001 8.05e-004
                        Cyclohexane 5.29e-001 3.10e-003
                      Other Hexanes 1.21e-001 7.08e-004
                           Heptanes 8.98e-001 5.27e-003
                            Benzene 6.17e+000 3.62e-002

                            Toluene 3.99e+001 2.34e-001
                            Xylenes 5.18e+001 3.04e-001
                        C8+ Heavies 6.14e-002 3.60e-004
    ------------------------------- --------- ---------
                   Total Components    100.00 5.87e-001
```

```
GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Cold Springs 1, MI Theox
File Name: N:\Technical\5620-CPG\0032 - Cold Springs Blue Lake, MI
Reissuance\GLYCalc\CURRENT versions - 2014 data\TC - CS 1, MI Theox.ddf
     Date: November 09, 2018

 DESCRIPTION:

    Description: CS 1 EG Cold Separators - Condenser +
                 Thermal Oxidizer EF using 3/16/2014 gas
                 analysis. 200 MMSCFD rated. Cold Separation:
                 -10 F; 850 psig. Flash Tank: 120 F; 45 psig.
                 Condenser: 100 F; 1 psig. TO: 98%. Glycol
                 recirculation: 16 gpm.

    Annual Hours of Operation:    8760.0 hours/yr



 EMISSIONS REPORTS:
 --------------------------------------------------------------------



 CONTROLLED REGENERATOR EMISSIONS
 --------------------------------------------------------------------
            Component                lbs/hr     lbs/day     tons/yr
 ------------------------------- ----------- ----------- -----------
                         Methane      0.0134       0.321      0.0586
                          Ethane      0.0029       0.070      0.0128
                         Propane      0.0006       0.015      0.0027
                       Isobutane      0.0001       0.003      0.0006
                        n-Butane      0.0002       0.006      0.0011

                      Isopentane      0.0003       0.006      0.0012
                       n-Pentane      0.0001       0.003      0.0006
                        n-Hexane      0.0003       0.008      0.0015
                     Cyclohexane      0.0011       0.027      0.0049
                   Other Hexanes      0.0005       0.011      0.0021

                        Heptanes      0.0006       0.014      0.0025
                         Benzene      0.0097       0.232      0.0423
                         Toluene      0.0128       0.307      0.0561
                         Xylenes      0.0041       0.098      0.0179
                     C8+ Heavies     <0.0001      <0.001     <0.0001
 ------------------------------- ----------- ----------- -----------
                 Total Emissions      0.0468       1.123      0.2049

     Total Hydrocarbon Emissions      0.0468       1.123      0.2049
             Total VOC Emissions      0.0305       0.732      0.1335
             Total HAP Emissions      0.0269       0.646      0.1178
            Total BTEX Emissions      0.0266       0.637      0.1163



 UNCONTROLLED REGENERATOR EMISSIONS
 --------------------------------------------------------------------
            Component                lbs/hr     lbs/day     tons/yr
 ------------------------------- ----------- ----------- -----------
                         Methane      0.6696      16.071      2.9330
                          Ethane      0.1467       3.521      0.6427
                         Propane      0.0316       0.758      0.1384
                       Isobutane      0.0068       0.164      0.0299
                        n-Butane      0.0127       0.305      0.0557

                      Isopentane      0.0140       0.335      0.0611
                       n-Pentane      0.0071       0.170      0.0310
                        n-Hexane      0.0200       0.481      0.0877
                     Cyclohexane      0.0707       1.698      0.3099
```

```
                Other Hexanes      0.0268        0.644       0.1175

                     Heptanes      0.0442        1.061       0.1935
                      Benzene      0.7283       17.480       3.1902
                      Toluene      1.4433       34.639       6.3217
                      Xylenes      1.1641       27.939       5.0989
                  C8+ Heavies      0.0008        0.019       0.0035
------------------------------ ----------- ----------- -----------
              Total Emissions      4.3869      105.286      19.2147

   Total Hydrocarbon Emissions      4.3869      105.286      19.2147
           Total VOC Emissions      3.5706       85.693      15.6391
           Total HAP Emissions      3.3558       80.540      14.6985
          Total BTEX Emissions      3.3358       80.059      14.6107


FLASH GAS EMISSIONS
-------------------------------------------------------------------
           Component              lbs/hr     lbs/day     tons/yr
------------------------------ ----------- ----------- -----------
------------------------------ ----------- ----------- -----------



FLASH TANK OFF GAS
-------------------------------------------------------------------
           Component              lbs/hr     lbs/day     tons/yr
------------------------------ ----------- ----------- -----------
                      Methane     11.8228      283.748     51.7840
                       Ethane      1.7211       41.306      7.5383
                      Propane      0.1627        3.905      0.7127
                    Isobutane      0.0378        0.907      0.1656
                     n-Butane      0.0533        1.279      0.2334

                   Isopentane      0.0488        1.172      0.2139
                    n-Pentane      0.0205        0.492      0.0898
                     n-Hexane      0.0415        0.997      0.1819
                  Cyclohexane      0.0306        0.733      0.1338
                Other Hexanes      0.0738        1.771      0.3233

                     Heptanes      0.0678        1.628      0.2971
                      Benzene      0.0665        1.595      0.2912
                      Toluene      0.1029        2.469      0.4505
                      Xylenes      0.0504        1.209      0.2206
                  C8+ Heavies      0.0004        0.010      0.0019
------------------------------ ----------- ----------- -----------
              Total Emissions     14.3009      343.222     62.6380

   Total Hydrocarbon Emissions     14.3009      343.222     62.6380
           Total VOC Emissions      0.7570       18.168      3.3157
           Total HAP Emissions      0.2612        6.270      1.1442
          Total BTEX Emissions      0.2197        5.273      0.9623



EQUIPMENT REPORTS:
-------------------------------------------------------------------



CONDENSER AND COMBUSTION DEVICE
-------------------------------------------------------------------

          Condenser Outlet Temperature:    100.00 deg. F
                    Condenser Pressure:     15.50 psia
                        Condenser Duty: 1.16e-002 MM BTU/hr
                Hydrocarbon Recovery:      0.16 bbls/day
```

```
                        Produced Water:     11.95 bbls/day
                   Ambient Temperature:     30.00 deg. F
                         Excess Oxygen:      5.00 %
                 Combustion Efficiency:     98.00 %
         Supplemental Fuel Requirement: 1.16e-002 MM BTU/hr

               Component             Emitted     Destroyed
    ------------------------------- ----------- -----------
                            Methane       2.00%      98.00%
                             Ethane       2.00%      98.00%
                            Propane       1.98%      98.02%
                          Isobutane       1.97%      98.03%
                           n-Butane       1.96%      98.04%

                         Isopentane       1.89%      98.11%
                          n-Pentane       1.87%      98.13%
                           n-Hexane       1.68%      98.32%
                        Cyclohexane       1.59%      98.41%
                      Other Hexanes       1.78%      98.22%

                           Heptanes       1.31%      98.69%
                            Benzene       1.33%      98.67%
                            Toluene       0.89%      99.11%
                            Xylenes       0.35%      99.65%
                        C8+ Heavies       0.01%      99.99%



COLD SEPARATOR
-------------------------------------------------------------------

            Cold Separator Temperature:     -10.0 deg. F
               Cold Separator Pressure:     850.0 psig
                     Dry Gas Flow Rate:  200.0000 MMSCF/day
          Calculated Dry Gas Dew Point:      0.74 lbs. H2O/MMSCF
            Glycol Losses with Dry Gas:    0.6503 lb/hr
                 Wet Gas Water Content: Saturated
      Calculated Wet Gas Water Content:     22.59 lbs. H2O/MMSCF
  Calculated Lean Glycol Recirc. Ratio:      5.27 gal/lb H2O
                       Produced Liquid: 4.93e+002 bbls/day
     Glycol Losses in Produced Liquids:    1.5561 lb/hr

                                     Remaining  Absorbed or
               Component             in Dry Gas  Condensed
    ------------------------------- ----------- -----------
                              Water       3.24%      96.76%
                     Carbon Dioxide      99.53%       0.47%
                           Nitrogen      99.95%       0.05%
                            Methane      99.90%       0.10%
                             Ethane      99.49%       0.51%

                            Propane      96.61%       3.39%
                          Isobutane      92.88%       7.12%
                           n-Butane      89.16%      10.84%
                         Isopentane      69.70%      30.30%
                          n-Pentane      40.45%      59.55%

                           n-Hexane      45.60%      54.40%
                        Cyclohexane      36.71%      63.29%
                      Other Hexanes      57.89%      42.11%
                           Heptanes      17.27%      82.73%
                            Benzene      34.37%      65.63%

                            Toluene       8.63%      91.37%
                            Xylenes       3.99%      96.01%
                        C8+ Heavies       4.18%      95.82%


FLASH TANK
```

```
-------------------------------------------------------------------

                          Flash Control: Combustion device
               Flash Control Efficiency: 100.00 %
                      Flash Temperature:     120.0 deg. F
                         Flash Pressure:      45.0 psig

                                    Left in Oil  Removed in
               Component             and Glycol  Flash Gas
    ------------------------------- ----------- -----------
                              Water      99.99%       0.01%
                     Carbon Dioxide      47.38%      52.62%
                           Nitrogen       3.78%      96.22%
                            Methane       5.36%      94.64%
                             Ethane       7.86%      92.14%

                            Propane      16.26%      83.74%
                          Isobutane      15.30%      84.70%
                           n-Butane      19.28%      80.72%
                         Isopentane      22.61%      77.39%
                          n-Pentane      26.04%      73.96%

                           n-Hexane      32.87%      67.13%
                        Cyclohexane      70.81%      29.19%
                      Other Hexanes      27.39%      72.61%
                           Heptanes      39.75%      60.25%
                            Benzene      92.06%       7.94%

                            Toluene      93.87%       6.13%
                            Xylenes      96.39%       3.61%
                        C8+ Heavies      69.56%      30.44%


REGENERATOR
-------------------------------------------------------------------

  No Stripping Gas used in regenerator.

                                     Remaining   Distilled
               Component             in Glycol   Overhead
    ------------------------------- ----------- -----------
                              Water      93.68%       6.32%
                     Carbon Dioxide       0.00%     100.00%
                           Nitrogen       0.00%     100.00%
                            Methane       0.00%     100.00%
                             Ethane       0.00%     100.00%

                            Propane       0.00%     100.00%
                          Isobutane       0.00%     100.00%
                           n-Butane       0.00%     100.00%
                         Isopentane       2.21%      97.79%
                          n-Pentane       1.92%      98.08%

                           n-Hexane       1.52%      98.48%
                        Cyclohexane       4.52%      95.48%
                      Other Hexanes       3.65%      96.35%
                           Heptanes       1.26%      98.74%
                            Benzene       5.43%      94.57%

                            Toluene       8.42%      91.58%
                            Xylenes      13.38%      86.62%
                        C8+ Heavies      17.25%      82.75%


STREAM REPORTS:
-------------------------------------------------------------------
```

```
WET GAS STREAM
-------------------------------------------------------------
    Temperature:     82.00 deg. F
    Pressure:      2100.70 psia
    Flow Rate:   8.37e+006 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    -------------------------------- --------- ---------
                               Water 4.76e-002 1.89e+002
                      Carbon Dioxide 7.85e-001 7.61e+003
                            Nitrogen 8.50e-001 5.25e+003
                             Methane 9.54e+001 3.38e+005
                              Ethane 2.19e+000 1.45e+004

                             Propane 2.53e-001 2.46e+003
                           Isobutane 5.10e-002 6.53e+002
                            n-Butane 5.30e-002 6.79e+002
                          Isopentane 4.50e-002 7.16e+002
                           n-Pentane 2.40e-002 3.82e+002

                            n-Hexane 2.61e-002 4.96e+002
                         Cyclohexane 5.80e-003 1.08e+002
                       Other Hexanes 4.88e-002 9.27e+002
                            Heptanes 7.72e-002 1.71e+003
                             Benzene 4.60e-003 7.92e+001

                             Toluene 2.03e-002 4.12e+002
                             Xylenes 2.10e-002 4.91e+002
                         C8+ Heavies 5.52e-002 2.07e+003
    -------------------------------- --------- ---------
                    Total Components    100.00 3.76e+005


DRY GAS STREAM
-------------------------------------------------------------
    Temperature:    -10.00 deg. F
    Pressure:       864.70 psia
    Flow Rate:   8.33e+006 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    -------------------------------- --------- ---------
                               Water 1.55e-003 6.13e+000
                      Carbon Dioxide 7.84e-001 7.58e+003
                            Nitrogen 8.53e-001 5.25e+003
                             Methane 9.57e+001 3.37e+005
                              Ethane 2.19e+000 1.44e+004

                             Propane 2.45e-001 2.38e+003
                           Isobutane 4.75e-002 6.07e+002
                            n-Butane 4.74e-002 6.05e+002
                          Isopentane 3.15e-002 4.99e+002
                           n-Pentane 9.74e-003 1.54e+002

                            n-Hexane 1.19e-002 2.26e+002
                         Cyclohexane 2.14e-003 3.95e+001
                       Other Hexanes 2.84e-002 5.37e+002
                            Heptanes 1.34e-002 2.94e+002
                             Benzene 1.59e-003 2.72e+001

                             Toluene 1.76e-003 3.56e+001
                             Xylenes 8.42e-004 1.96e+001
                         C8+ Heavies 2.32e-003 8.67e+001
    -------------------------------- --------- ---------
                    Total Components    100.00 3.70e+005
```

```
LEAN GLYCOL STREAM
------------------------------------------------------------
    Temperature:     82.00 deg. F
    Flow Rate:   1.60e+001 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)     (ppm)
    ------------------------------ --------- --------- ---------
                                EG 7.00e+001 6.03e+003   699963.
                             Water 3.00e+001 2.59e+003   299996.
                    Carbon Dioxide 1.88e-011 1.62e-009        0.
                          Nitrogen 1.70e-013 1.46e-011        0.
                           Methane 4.87e-018 4.20e-016        0.

                            Ethane 1.02e-008 8.82e-007        0.
                           Propane 9.18e-011 7.91e-009        0.
                         Isobutane 1.55e-011 1.34e-009        0.
                          n-Butane 1.90e-011 1.64e-009        0.
                        Isopentane 3.66e-006 3.15e-004        0.

                         n-Pentane 1.61e-006 1.39e-004        0.
                          n-Hexane 3.59e-006 3.09e-004        0.
                       Cyclohexane 3.89e-005 3.35e-003        0.
                     Other Hexanes 1.18e-005 1.02e-003        0.
                          Heptanes 6.53e-006 5.63e-004        0.

                           Benzene 4.85e-004 4.18e-002        5.
                           Toluene 1.54e-003 1.33e-001       15.
                           Xylenes 2.09e-003 1.80e-001       21.
                       C8+ Heavies 1.96e-006 1.69e-004        0.
    ------------------------------ --------- --------- ---------
                  Total Components    100.00 8.62e+003  1000000.


RICH GLYCOL STREAM
------------------------------------------------------------
    Temperature:    -10.00 deg. F
    Pressure:       864.70 psia
    Flow Rate:   1.64e+001 gpm
    NOTE: Stream has more than one phase.

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------ --------- ---------
                                EG 6.83e+001 6.03e+003
                             Water 3.13e+001 2.76e+003
                    Carbon Dioxide 1.84e-001 1.62e+001
                          Nitrogen 1.66e-003 1.46e-001
                           Methane 1.42e-001 1.25e+001

                            Ethane 2.12e-002 1.87e+000
                           Propane 2.20e-003 1.94e-001
                         Isobutane 5.06e-004 4.46e-002
                          n-Butane 7.48e-004 6.60e-002
                        Isopentane 7.15e-004 6.31e-002

                         n-Pentane 3.14e-004 2.77e-002
                          n-Hexane 7.01e-004 6.19e-002
                       Cyclohexane 1.19e-003 1.05e-001
                     Other Hexanes 1.15e-003 1.02e-001
                          Heptanes 1.28e-003 1.13e-001

                           Benzene 9.48e-003 8.37e-001
                           Toluene 1.90e-002 1.68e+000
                           Xylenes 1.58e-002 1.39e+000
                       C8+ Heavies 1.59e-005 1.41e-003
    ------------------------------ --------- ---------
```

```
                   Total Components    100.00 8.83e+003


COLD SEPARATOR OIL STREAM
-------------------------------------------------------------
    Temperature:    -10.00 deg. F
    Flow Rate:   1.44e+001 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------- --------- ---------
                                 EG 2.55e-002 1.56e+000
                              Water 1.32e-001 8.07e+000
                     Carbon Dioxide 3.21e-001 1.97e+001
                           Nitrogen 3.68e-002 2.25e+000
                            Methane 5.57e+000 3.41e+002

                             Ethane 1.19e+000 7.28e+001
                            Propane 1.36e+000 8.31e+001
                          Isobutane 7.60e-001 4.65e+001
                           n-Butane 1.20e+000 7.35e+001
                         Isopentane 3.55e+000 2.17e+002

                          n-Pentane 3.72e+000 2.27e+002
                           n-Hexane 4.41e+000 2.70e+002
                        Cyclohexane 1.11e+000 6.80e+001
                      Other Hexanes 6.38e+000 3.90e+002
                           Heptanes 2.31e+001 1.41e+003

                            Benzene 8.37e-001 5.12e+001
                            Toluene 6.14e+000 3.75e+002
                            Xylenes 7.70e+000 4.71e+002
                        C8+ Heavies 3.25e+001 1.99e+003
    ------------------------------- --------- ---------
                   Total Components    100.00 6.11e+003


FLASH TANK OFF GAS STREAM
-------------------------------------------------------------
    Temperature:    120.00 deg. F
    Pressure:         59.70 psia
    Flow Rate:   3.88e+002 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 1.85e+000 3.40e-001
                     Carbon Dioxide 1.89e+001 8.52e+000
                           Nitrogen 4.92e-001 1.41e-001
                            Methane 7.21e+001 1.18e+001
                             Ethane 5.59e+000 1.72e+000

                            Propane 3.61e-001 1.63e-001
                          Isobutane 6.36e-002 3.78e-002
                           n-Butane 8.96e-002 5.33e-002
                         Isopentane 6.62e-002 4.88e-002
                          n-Pentane 2.78e-002 2.05e-002

                           n-Hexane 4.71e-002 4.15e-002
                        Cyclohexane 3.55e-002 3.06e-002
                      Other Hexanes 8.37e-002 7.38e-002
                           Heptanes 6.62e-002 6.78e-002
                            Benzene 8.32e-002 6.65e-002

                            Toluene 1.09e-001 1.03e-001
                            Xylenes 4.64e-002 5.04e-002
                        C8+ Heavies 2.45e-004 4.28e-004
    ------------------------------- --------- ---------
```

```
                   Total Components    100.00 2.33e+001


FLASH TANK OIL STREAM
-------------------------------------------------------------
    Temperature:    120.00 deg. F

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



FLASH TANK GLYCOL STREAM
-------------------------------------------------------------
    Temperature:    120.00 deg. F
    Flow Rate:   1.64e+001 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)      (ppm)
    ------------------------------- --------- --------- ---------
                                 EG 6.85e+001 6.03e+003   685051.
                              Water 3.14e+001 2.76e+003   313537.
                     Carbon Dioxide 8.72e-002 7.68e+000      872.
                           Nitrogen 6.28e-005 5.53e-003        1.
                            Methane 7.61e-003 6.70e-001       76.

                             Ethane 1.67e-003 1.47e-001       17.
                            Propane 3.59e-004 3.16e-002        4.
                          Isobutane 7.76e-005 6.83e-003        1.
                           n-Butane 1.45e-004 1.27e-002        1.
                         Isopentane 1.62e-004 1.43e-002        2.

                          n-Pentane 8.20e-005 7.22e-003        1.
                           n-Hexane 2.31e-004 2.03e-002        2.
                        Cyclohexane 8.42e-004 7.41e-002        8.
                      Other Hexanes 3.16e-004 2.78e-002        3.
                           Heptanes 5.08e-004 4.48e-002        5.

                            Benzene 8.75e-003 7.70e-001       88.
                            Toluene 1.79e-002 1.58e+000      179.
                            Xylenes 1.53e-002 1.34e+000      153.
                        C8+ Heavies 1.11e-005 9.77e-004        0.
    ------------------------------- --------- --------- ---------
                   Total Components    100.00 8.80e+003  1000000.



FLASH GAS EMISSIONS
-------------------------------------------------------------
    Flow Rate:   1.07e+003 scfh
    Control Method:   Combustion Device
    Control Efficiency:   100.00

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 6.09e+001 3.10e+001
                     Carbon Dioxide 3.89e+001 4.84e+001
                           Nitrogen 1.78e-001 1.41e-001
    ------------------------------- --------- ---------
                   Total Components    100.00 7.95e+001



REGENERATOR OVERHEADS STREAM
-------------------------------------------------------------
    Temperature:    212.00 deg. F
    Pressure:        14.70 psia
    Flow Rate:   3.77e+003 scfh
```

```
                   Component           Conc.    Loading
                                       (vol%)   (lb/hr)
    ------------------------------ --------- ---------
                             Water 9.74e+001 1.74e+002
                    Carbon Dioxide 1.75e+000 7.68e+000
                          Nitrogen 1.98e-003 5.53e-003
                           Methane 4.20e-001 6.70e-001
                            Ethane 4.91e-002 1.47e-001

                           Propane 7.20e-003 3.16e-002
                         Isobutane 1.18e-003 6.83e-003
                          n-Butane 2.20e-003 1.27e-002
                        Isopentane 1.94e-003 1.40e-002
                         n-Pentane 9.87e-004 7.08e-003

                          n-Hexane 2.34e-003 2.00e-002
                       Cyclohexane 8.45e-003 7.07e-002
                     Other Hexanes 3.13e-003 2.68e-002
                          Heptanes 4.43e-003 4.42e-002
                           Benzene 9.38e-002 7.28e-001

                           Toluene 1.58e-001 1.44e+000
                           Xylenes 1.10e-001 1.16e+000
                       C8+ Heavies 4.77e-005 8.09e-004
    ------------------------------ --------- ---------
                  Total Components    100.00 1.86e+002


CONDENSER PRODUCED WATER STREAM
-------------------------------------------------------------
    Temperature:    100.00 deg. F
    Flow Rate:   3.49e-001 gpm

                   Component           Conc.    Loading
                                       (wt%)    (lb/hr)     (ppm)
    ------------------------------ --------- --------- ---------
                             Water 9.99e+001 1.74e+002   998602.
                    Carbon Dioxide 7.83e-002 1.37e-001      783.
                          Nitrogen 1.31e-006 2.28e-006        0.
                           Methane 3.20e-004 5.59e-004        3.
                            Ethane 8.47e-005 1.48e-004        1.

                           Propane 1.59e-005 2.78e-005        0.
                         Isobutane 1.91e-006 3.33e-006        0.
                          n-Butane 4.81e-006 8.40e-006        0.
                        Isopentane 3.72e-006 6.48e-006        0.
                         n-Pentane 2.03e-006 3.54e-006        0.

                          n-Hexane 4.45e-006 7.77e-006        0.
                       Cyclohexane 8.97e-005 1.56e-004        1.
                     Other Hexanes 5.02e-006 8.75e-006        0.
                          Heptanes 4.37e-006 7.62e-006        0.
                           Benzene 2.41e-002 4.20e-002      241.

                           Toluene 2.73e-002 4.76e-002      273.
                           Xylenes 9.65e-003 1.68e-002       96.
                       C8+ Heavies 2.88e-010 5.02e-010        0.
    ------------------------------ --------- --------- ---------
                  Total Components    100.00 1.74e+002  1000000.


CONDENSER RECOVERED OIL STREAM
-------------------------------------------------------------
    Temperature:    100.00 deg. F
    Flow Rate:   4.58e-003 gpm

                   Component           Conc.    Loading
```

```
                                      (wt%)    (lb/hr)
    ------------------------------- --------- ---------
                              Water 5.23e-002 1.02e-003
                     Carbon Dioxide 2.90e-001 5.65e-003
                           Nitrogen 2.35e-004 4.58e-006
                            Methane 6.90e-003 1.34e-004
                             Ethane 8.56e-003 1.67e-004

                            Propane 1.12e-002 2.17e-004
                          Isobutane 4.99e-003 9.71e-005
                           n-Butane 1.28e-002 2.49e-004
                         Isopentane 3.74e-002 7.29e-004
                          n-Pentane 2.30e-002 4.47e-004

                           n-Hexane 1.65e-001 3.22e-003
                        Cyclohexane 7.42e-001 1.44e-002
                      Other Hexanes 1.51e-001 2.94e-003
                           Heptanes 7.86e-001 1.53e-002
                            Benzene 1.04e+001 2.03e-001

                            Toluene 3.88e+001 7.55e-001
                            Xylenes 4.84e+001 9.43e-001
                        C8+ Heavies 4.14e-002 8.05e-004
    ------------------------------- --------- ---------
                   Total Components    100.00 1.95e+000


CONDENSER VENT STREAM
-------------------------------------------------------------
    Temperature:    100.00 deg. F
    Pressure:        15.50 psia
    Flow Rate:   9.54e+001 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 6.21e+000 2.81e-001
                     Carbon Dioxide 6.81e+001 7.53e+000
                           Nitrogen 7.84e-002 5.52e-003
                            Methane 1.66e+001 6.69e-001
                             Ethane 1.94e+000 1.46e-001

                            Propane 2.83e-001 3.13e-002
                          Isobutane 4.61e-002 6.73e-003
                           n-Butane 8.53e-002 1.25e-002
                         Isopentane 7.29e-002 1.32e-002
                          n-Pentane 3.66e-002 6.63e-003

                           n-Hexane 7.76e-002 1.68e-002
                        Cyclohexane 2.65e-001 5.61e-002
                      Other Hexanes 1.10e-001 2.39e-002
                           Heptanes 1.15e-001 2.89e-002
                            Benzene 2.46e+000 4.83e-001

                            Toluene 2.77e+000 6.40e-001
                            Xylenes 7.67e-001 2.05e-001
                        C8+ Heavies 7.88e-006 3.38e-006
    ------------------------------- --------- ---------
                   Total Components    100.00 1.02e+001


COMBUSTION DEVICE OFF GAS STREAM
-------------------------------------------------------------
    Temperature:   1000.00 deg. F
    Pressure:        14.70 psia
    Flow Rate:   4.89e-001 scfh

                  Component           Conc.    Loading
```

```
                                  (vol%)   (lb/hr)
------------------------------- --------- ---------
                        Methane 6.48e+001 1.34e-002
                         Ethane 7.56e+000 2.93e-003
                        Propane 1.10e+000 6.27e-004
                      Isobutane 1.80e-001 1.35e-004
                       n-Butane 3.33e-001 2.49e-004

                     Isopentane 2.85e-001 2.64e-004
                      n-Pentane 1.43e-001 1.33e-004
                       n-Hexane 3.03e-001 3.36e-004
                    Cyclohexane 1.04e+000 1.12e-003
                  Other Hexanes 4.30e-001 4.78e-004

                       Heptanes 4.48e-001 5.78e-004
                        Benzene 9.60e+000 9.66e-003
                        Toluene 1.08e+001 1.28e-002
                        Xylenes 2.99e+000 4.09e-003
                    C8+ Heavies 3.08e-005 6.75e-008
------------------------------- --------- ---------
               Total Components    100.00 4.68e-002
```

```
GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Cold Springs 1, MI Cond
File Name: N:\Technical\5620-CPG\0032 - Cold Springs Blue Lake, MI
Reissuance\GLYCalc\CURRENT versions - 2014 data\TC - CS 1, MI Cond.ddf
     Date: November 09, 2018

 DESCRIPTION:

    Description: CS 1 EG Cold Separators - Condenser EF using
                 3/16/2014 gas analysis. 200 MMSCFD rated.
                 Cold Separation: -10 F; 850 psig. Flash
                 Tank: 120 F; 45 psig. Condenser: 100 F; 1
                 psig. Glycol recirculation: 16 gpm.

    Annual Hours of Operation:    8760.0 hours/yr



 EMISSIONS REPORTS:
 -------------------------------------------------------------------



 CONTROLLED REGENERATOR EMISSIONS
 -------------------------------------------------------------------
            Component              lbs/hr     lbs/day     tons/yr
 ------------------------------- ----------- ----------- -----------
                         Methane      0.6689      16.055      2.9300
                          Ethane      0.1464       3.514      0.6413
                         Propane      0.0313       0.752      0.1373
                       Isobutane      0.0067       0.162      0.0295
                        n-Butane      0.0125       0.299      0.0546

                      Isopentane      0.0132       0.317      0.0579
                       n-Pentane      0.0066       0.159      0.0290
                        n-Hexane      0.0168       0.403      0.0736
                     Cyclohexane      0.0561       1.347      0.2459
                   Other Hexanes      0.0239       0.573      0.1046

                        Heptanes      0.0289       0.693      0.1265
                         Benzene      0.4830      11.591      2.1154
                         Toluene      0.6405      15.371      2.8052
                         Xylenes      0.2046       4.911      0.8962
                     C8+ Heavies     <0.0001      <0.001     <0.0001
 ------------------------------- ----------- ----------- -----------
                 Total Emissions      2.3395      56.148     10.2470

     Total Hydrocarbon Emissions      2.3395      56.148     10.2470
             Total VOC Emissions      1.5241      36.579      6.6757
             Total HAP Emissions      1.3448      32.276      5.8904
            Total BTEX Emissions      1.3280      31.873      5.8168


 UNCONTROLLED REGENERATOR EMISSIONS
 -------------------------------------------------------------------
            Component              lbs/hr     lbs/day     tons/yr
 ------------------------------- ----------- ----------- -----------
                         Methane      0.6696      16.071      2.9330
                          Ethane      0.1467       3.521      0.6427
                         Propane      0.0316       0.758      0.1384
                       Isobutane      0.0068       0.164      0.0299
                        n-Butane      0.0127       0.305      0.0557

                      Isopentane      0.0140       0.335      0.0611
                       n-Pentane      0.0071       0.170      0.0310
                        n-Hexane      0.0200       0.481      0.0877
                     Cyclohexane      0.0707       1.698      0.3099
                   Other Hexanes      0.0268       0.644      0.1175
```

```
                      Heptanes      0.0442       1.061      0.1935
                       Benzene      0.7283      17.480      3.1902
                       Toluene      1.4433      34.639      6.3217
                       Xylenes      1.1641      27.939      5.0989
                   C8+ Heavies      0.0008       0.019      0.0035
------------------------------ ----------- ----------- -----------
               Total Emissions      4.3869     105.286     19.2147

   Total Hydrocarbon Emissions      4.3869     105.286     19.2147
           Total VOC Emissions      3.5706      85.693     15.6391
           Total HAP Emissions      3.3558      80.540     14.6985
          Total BTEX Emissions      3.3358      80.059     14.6107


FLASH GAS EMISSIONS
------------------------------------------------------------------
           Component               lbs/hr     lbs/day     tons/yr
------------------------------ ----------- ----------- -----------
------------------------------ ----------- ----------- -----------



FLASH TANK OFF GAS
------------------------------------------------------------------
           Component               lbs/hr     lbs/day     tons/yr
------------------------------ ----------- ----------- -----------
                       Methane     11.8228     283.748     51.7840
                        Ethane      1.7211      41.306      7.5383
                       Propane      0.1627       3.905      0.7127
                     Isobutane      0.0378       0.907      0.1656
                      n-Butane      0.0533       1.279      0.2334

                    Isopentane      0.0488       1.172      0.2139
                     n-Pentane      0.0205       0.492      0.0898
                      n-Hexane      0.0415       0.997      0.1819
                   Cyclohexane      0.0306       0.733      0.1338
                 Other Hexanes      0.0738       1.771      0.3233

                      Heptanes      0.0678       1.628      0.2971
                       Benzene      0.0665       1.595      0.2912
                       Toluene      0.1029       2.469      0.4505
                       Xylenes      0.0504       1.209      0.2206
                   C8+ Heavies      0.0004       0.010      0.0019
------------------------------ ----------- ----------- -----------
               Total Emissions     14.3009     343.222     62.6380

   Total Hydrocarbon Emissions     14.3009     343.222     62.6380
           Total VOC Emissions      0.7570      18.168      3.3157
           Total HAP Emissions      0.2612       6.270      1.1442
          Total BTEX Emissions      0.2197       5.273      0.9623


EQUIPMENT REPORTS:
------------------------------------------------------------------


CONDENSER
------------------------------------------------------------------
          Condenser Outlet Temperature:    100.00 deg. F
                    Condenser Pressure:     15.50 psia
                        Condenser Duty: 1.41e-001 MM BTU/hr
                  Hydrocarbon Recovery:      0.16 bbls/day
                        Produced Water:     11.95 bbls/day
                VOC Control Efficiency:     57.31 %
```

```
                HAP Control Efficiency:     59.92 %
               BTEX Control Efficiency:     60.19 %
       Dissolved Hydrocarbons in Water:    615.48 mg/L

               Component              Emitted    Condensed
    ------------------------------- ----------- -----------
                              Water       0.16%      99.84%
                     Carbon Dioxide      98.15%       1.85%
                           Nitrogen      99.88%       0.12%
                            Methane      99.90%       0.10%
                             Ethane      99.79%       0.21%

                            Propane      99.23%       0.77%
                          Isobutane      98.53%       1.47%
                           n-Butane      97.97%       2.03%
                         Isopentane      94.73%       5.27%
                          n-Pentane      93.64%       6.36%

                           n-Hexane      83.90%      16.10%
                        Cyclohexane      79.36%      20.64%
                      Other Hexanes      89.01%      10.99%
                           Heptanes      65.36%      34.64%
                            Benzene      66.31%      33.69%

                            Toluene      44.37%      55.63%
                            Xylenes      17.58%      82.42%
                        C8+ Heavies       0.42%      99.58%



COLD SEPARATOR
-------------------------------------------------------------------

            Cold Separator Temperature:     -10.0 deg. F
               Cold Separator Pressure:     850.0 psig
                     Dry Gas Flow Rate:  200.0000 MMSCF/day
          Calculated Dry Gas Dew Point:      0.74 lbs. H2O/MMSCF
            Glycol Losses with Dry Gas:    0.6503 lb/hr
                 Wet Gas Water Content: Saturated
      Calculated Wet Gas Water Content:     22.59 lbs. H2O/MMSCF
  Calculated Lean Glycol Recirc. Ratio:      5.27 gal/lb H2O
                       Produced Liquid: 4.93e+002 bbls/day
     Glycol Losses in Produced Liquids:    1.5561 lb/hr

                                     Remaining  Absorbed or
               Component             in Dry Gas  Condensed
    ------------------------------- ----------- -----------
                              Water       3.24%      96.76%
                     Carbon Dioxide      99.53%       0.47%
                           Nitrogen      99.95%       0.05%
                            Methane      99.90%       0.10%
                             Ethane      99.49%       0.51%

                            Propane      96.61%       3.39%
                          Isobutane      92.88%       7.12%
                           n-Butane      89.16%      10.84%
                         Isopentane      69.70%      30.30%
                          n-Pentane      40.45%      59.55%

                           n-Hexane      45.60%      54.40%
                        Cyclohexane      36.71%      63.29%
                      Other Hexanes      57.89%      42.11%
                           Heptanes      17.27%      82.73%
                            Benzene      34.37%      65.63%

                            Toluene       8.63%      91.37%
                            Xylenes       3.99%      96.01%
                        C8+ Heavies       4.18%      95.82%
```

```
FLASH TANK
-------------------------------------------------------------------

                          Flash Control: Combustion device
               Flash Control Efficiency: 100.00 %
                      Flash Temperature:     120.0 deg. F
                         Flash Pressure:      45.0 psig

                                    Left in Oil  Removed in
               Component             and Glycol  Flash Gas
    ------------------------------- ----------- -----------
                              Water      99.99%       0.01%
                     Carbon Dioxide      47.38%      52.62%
                           Nitrogen       3.78%      96.22%
                            Methane       5.36%      94.64%
                             Ethane       7.86%      92.14%

                            Propane      16.26%      83.74%
                          Isobutane      15.30%      84.70%
                           n-Butane      19.28%      80.72%
                         Isopentane      22.61%      77.39%
                          n-Pentane      26.04%      73.96%

                           n-Hexane      32.87%      67.13%
                        Cyclohexane      70.81%      29.19%
                      Other Hexanes      27.39%      72.61%
                           Heptanes      39.75%      60.25%
                            Benzene      92.06%       7.94%

                            Toluene      93.87%       6.13%
                            Xylenes      96.39%       3.61%
                        C8+ Heavies      69.56%      30.44%


REGENERATOR
-------------------------------------------------------------------

  No Stripping Gas used in regenerator.

                                     Remaining   Distilled
               Component             in Glycol   Overhead
    ------------------------------- ----------- -----------
                              Water      93.68%       6.32%
                     Carbon Dioxide       0.00%     100.00%
                           Nitrogen       0.00%     100.00%
                            Methane       0.00%     100.00%
                             Ethane       0.00%     100.00%

                            Propane       0.00%     100.00%
                          Isobutane       0.00%     100.00%
                           n-Butane       0.00%     100.00%
                         Isopentane       2.21%      97.79%
                          n-Pentane       1.92%      98.08%

                           n-Hexane       1.52%      98.48%
                        Cyclohexane       4.52%      95.48%
                      Other Hexanes       3.65%      96.35%
                           Heptanes       1.26%      98.74%
                            Benzene       5.43%      94.57%

                            Toluene       8.42%      91.58%
                            Xylenes      13.38%      86.62%
                        C8+ Heavies      17.25%      82.75%



STREAM REPORTS:
```

```
------------------------------------------------------------------



WET GAS STREAM
------------------------------------------------------------
    Temperature:     82.00 deg. F
    Pressure:      2100.70 psia
    Flow Rate:   8.37e+006 scfh

                  Component           Conc.    Loading
                                     (vol%)    (lb/hr)
    ------------------------------ --------- ---------
                             Water 4.76e-002 1.89e+002
                    Carbon Dioxide 7.85e-001 7.61e+003
                          Nitrogen 8.50e-001 5.25e+003
                           Methane 9.54e+001 3.38e+005
                            Ethane 2.19e+000 1.45e+004

                           Propane 2.53e-001 2.46e+003
                         Isobutane 5.10e-002 6.53e+002
                          n-Butane 5.30e-002 6.79e+002
                        Isopentane 4.50e-002 7.16e+002
                         n-Pentane 2.40e-002 3.82e+002

                          n-Hexane 2.61e-002 4.96e+002
                       Cyclohexane 5.80e-003 1.08e+002
                     Other Hexanes 4.88e-002 9.27e+002
                          Heptanes 7.72e-002 1.71e+003
                           Benzene 4.60e-003 7.92e+001

                           Toluene 2.03e-002 4.12e+002
                           Xylenes 2.10e-002 4.91e+002
                       C8+ Heavies 5.52e-002 2.07e+003
    ------------------------------ --------- ---------
                  Total Components    100.00 3.76e+005



DRY GAS STREAM
------------------------------------------------------------
    Temperature:    -10.00 deg. F
    Pressure:       864.70 psia
    Flow Rate:   8.33e+006 scfh

                  Component           Conc.    Loading
                                     (vol%)    (lb/hr)
    ------------------------------ --------- ---------
                             Water 1.55e-003 6.13e+000
                    Carbon Dioxide 7.84e-001 7.58e+003
                          Nitrogen 8.53e-001 5.25e+003
                           Methane 9.57e+001 3.37e+005
                            Ethane 2.19e+000 1.44e+004

                           Propane 2.45e-001 2.38e+003
                         Isobutane 4.75e-002 6.07e+002
                          n-Butane 4.74e-002 6.05e+002
                        Isopentane 3.15e-002 4.99e+002
                         n-Pentane 9.74e-003 1.54e+002

                          n-Hexane 1.19e-002 2.26e+002
                       Cyclohexane 2.14e-003 3.95e+001
                     Other Hexanes 2.84e-002 5.37e+002
                          Heptanes 1.34e-002 2.94e+002
                           Benzene 1.59e-003 2.72e+001

                           Toluene 1.76e-003 3.56e+001
                           Xylenes 8.42e-004 1.96e+001
                       C8+ Heavies 2.32e-003 8.67e+001
    ------------------------------ --------- ---------
```

```
                 Total Components    100.00 3.70e+005


LEAN GLYCOL STREAM
------------------------------------------------------------
    Temperature:     82.00 deg. F
    Flow Rate:   1.60e+001 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)     (ppm)
    ------------------------------ --------- --------- ---------
                                EG 7.00e+001 6.03e+003   699963.
                             Water 3.00e+001 2.59e+003   299996.
                    Carbon Dioxide 1.88e-011 1.62e-009        0.
                          Nitrogen 1.70e-013 1.46e-011        0.
                           Methane 4.87e-018 4.20e-016        0.

                            Ethane 1.02e-008 8.82e-007        0.
                           Propane 9.18e-011 7.91e-009        0.
                         Isobutane 1.55e-011 1.34e-009        0.
                          n-Butane 1.90e-011 1.64e-009        0.
                        Isopentane 3.66e-006 3.15e-004        0.

                         n-Pentane 1.61e-006 1.39e-004        0.
                          n-Hexane 3.59e-006 3.09e-004        0.
                       Cyclohexane 3.89e-005 3.35e-003        0.
                     Other Hexanes 1.18e-005 1.02e-003        0.
                          Heptanes 6.53e-006 5.63e-004        0.

                           Benzene 4.85e-004 4.18e-002        5.
                           Toluene 1.54e-003 1.33e-001       15.
                           Xylenes 2.09e-003 1.80e-001       21.
                       C8+ Heavies 1.96e-006 1.69e-004        0.
    ------------------------------ --------- --------- ---------
                  Total Components    100.00 8.62e+003  1000000.


RICH GLYCOL STREAM
------------------------------------------------------------
    Temperature:    -10.00 deg. F
    Pressure:       864.70 psia
    Flow Rate:   1.64e+001 gpm
    NOTE: Stream has more than one phase.

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------ --------- ---------
                                EG 6.83e+001 6.03e+003
                             Water 3.13e+001 2.76e+003
                    Carbon Dioxide 1.84e-001 1.62e+001
                          Nitrogen 1.66e-003 1.46e-001
                           Methane 1.42e-001 1.25e+001

                            Ethane 2.12e-002 1.87e+000
                           Propane 2.20e-003 1.94e-001
                         Isobutane 5.06e-004 4.46e-002
                          n-Butane 7.48e-004 6.60e-002
                        Isopentane 7.15e-004 6.31e-002

                         n-Pentane 3.14e-004 2.77e-002
                          n-Hexane 7.01e-004 6.19e-002
                       Cyclohexane 1.19e-003 1.05e-001
                     Other Hexanes 1.15e-003 1.02e-001
                          Heptanes 1.28e-003 1.13e-001

                           Benzene 9.48e-003 8.37e-001
                           Toluene 1.90e-002 1.68e+000
                           Xylenes 1.58e-002 1.39e+000
```

```
                        C8+ Heavies 1.59e-005 1.41e-003
    ------------------------------- --------- ---------
                   Total Components    100.00 8.83e+003



COLD SEPARATOR OIL STREAM
-------------------------------------------------------------
    Temperature:    -10.00 deg. F
    Flow Rate:   1.44e+001 gpm

                  Component             Conc.    Loading
                                        (wt%)    (lb/hr)
    ------------------------------- --------- ---------
                                 EG 2.55e-002 1.56e+000
                              Water 1.32e-001 8.07e+000
                     Carbon Dioxide 3.21e-001 1.97e+001
                           Nitrogen 3.68e-002 2.25e+000
                            Methane 5.57e+000 3.41e+002

                             Ethane 1.19e+000 7.28e+001
                            Propane 1.36e+000 8.31e+001
                          Isobutane 7.60e-001 4.65e+001
                           n-Butane 1.20e+000 7.35e+001
                         Isopentane 3.55e+000 2.17e+002

                          n-Pentane 3.72e+000 2.27e+002
                           n-Hexane 4.41e+000 2.70e+002
                        Cyclohexane 1.11e+000 6.80e+001
                      Other Hexanes 6.38e+000 3.90e+002
                           Heptanes 2.31e+001 1.41e+003

                            Benzene 8.37e-001 5.12e+001
                            Toluene 6.14e+000 3.75e+002
                            Xylenes 7.70e+000 4.71e+002
                        C8+ Heavies 3.25e+001 1.99e+003
    ------------------------------- --------- ---------
                   Total Components    100.00 6.11e+003



FLASH TANK OFF GAS STREAM
-------------------------------------------------------------
    Temperature:    120.00 deg. F
    Pressure:        59.70 psia
    Flow Rate:   3.88e+002 scfh

                  Component             Conc.    Loading
                                       (vol%)    (lb/hr)
    ------------------------------- --------- ---------
                              Water 1.85e+000 3.40e-001
                     Carbon Dioxide 1.89e+001 8.52e+000
                           Nitrogen 4.92e-001 1.41e-001
                            Methane 7.21e+001 1.18e+001
                             Ethane 5.59e+000 1.72e+000

                            Propane 3.61e-001 1.63e-001
                          Isobutane 6.36e-002 3.78e-002
                           n-Butane 8.96e-002 5.33e-002
                         Isopentane 6.62e-002 4.88e-002
                          n-Pentane 2.78e-002 2.05e-002

                           n-Hexane 4.71e-002 4.15e-002
                        Cyclohexane 3.55e-002 3.06e-002
                      Other Hexanes 8.37e-002 7.38e-002
                           Heptanes 6.62e-002 6.78e-002
                            Benzene 8.32e-002 6.65e-002

                            Toluene 1.09e-001 1.03e-001
                            Xylenes 4.64e-002 5.04e-002
```

```
                        C8+ Heavies 2.45e-004 4.28e-004
    ------------------------------- --------- ---------
                   Total Components    100.00 2.33e+001



FLASH TANK OIL STREAM
-------------------------------------------------------------
    Temperature:    120.00 deg. F

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



FLASH TANK GLYCOL STREAM
-------------------------------------------------------------
    Temperature:    120.00 deg. F
    Flow Rate:   1.64e+001 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)     (ppm)
    ------------------------------- --------- --------- ---------
                                 EG 6.85e+001 6.03e+003   685051.
                              Water 3.14e+001 2.76e+003   313537.
                     Carbon Dioxide 8.72e-002 7.68e+000      872.
                           Nitrogen 6.28e-005 5.53e-003        1.
                            Methane 7.61e-003 6.70e-001       76.

                             Ethane 1.67e-003 1.47e-001       17.
                            Propane 3.59e-004 3.16e-002        4.
                          Isobutane 7.76e-005 6.83e-003        1.
                           n-Butane 1.45e-004 1.27e-002        1.
                         Isopentane 1.62e-004 1.43e-002        2.

                          n-Pentane 8.20e-005 7.22e-003        1.
                           n-Hexane 2.31e-004 2.03e-002        2.
                        Cyclohexane 8.42e-004 7.41e-002        8.
                      Other Hexanes 3.16e-004 2.78e-002        3.
                           Heptanes 5.08e-004 4.48e-002        5.

                            Benzene 8.75e-003 7.70e-001       88.
                            Toluene 1.79e-002 1.58e+000      179.
                            Xylenes 1.53e-002 1.34e+000      153.
                        C8+ Heavies 1.11e-005 9.77e-004        0.
    ------------------------------- --------- --------- ---------
                   Total Components    100.00 8.80e+003  1000000.



FLASH GAS EMISSIONS
-------------------------------------------------------------
    Flow Rate:   1.07e+003 scfh
    Control Method:   Combustion Device
    Control Efficiency:   100.00

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                              Water 6.09e+001 3.10e+001
                     Carbon Dioxide 3.89e+001 4.84e+001
                           Nitrogen 1.78e-001 1.41e-001
    ------------------------------- --------- ---------
                   Total Components    100.00 7.95e+001



REGENERATOR OVERHEADS STREAM
-------------------------------------------------------------
    Temperature:    212.00 deg. F
```

```
    Pressure:        14.70 psia
    Flow Rate:   3.77e+003 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                               Water 9.74e+001 1.74e+002
                      Carbon Dioxide 1.75e+000 7.68e+000
                            Nitrogen 1.98e-003 5.53e-003
                             Methane 4.20e-001 6.70e-001
                              Ethane 4.91e-002 1.47e-001

                             Propane 7.20e-003 3.16e-002
                           Isobutane 1.18e-003 6.83e-003
                            n-Butane 2.20e-003 1.27e-002
                          Isopentane 1.94e-003 1.40e-002
                           n-Pentane 9.87e-004 7.08e-003

                            n-Hexane 2.34e-003 2.00e-002
                         Cyclohexane 8.45e-003 7.07e-002
                       Other Hexanes 3.13e-003 2.68e-002
                            Heptanes 4.43e-003 4.42e-002
                             Benzene 9.38e-002 7.28e-001

                             Toluene 1.58e-001 1.44e+000
                             Xylenes 1.10e-001 1.16e+000
                         C8+ Heavies 4.77e-005 8.09e-004
    ------------------------------- --------- ---------
                    Total Components    100.00 1.86e+002


CONDENSER VENT GAS STREAM
-------------------------------------------------------------
    Temperature:    100.00 deg. F
    Pressure:        15.50 psia
    Flow Rate:   9.54e+001 scfh

                  Component           Conc.    Loading
                                      (vol%)   (lb/hr)
    ------------------------------- --------- ---------
                               Water 6.21e+000 2.81e-001
                      Carbon Dioxide 6.81e+001 7.53e+000
                            Nitrogen 7.84e-002 5.52e-003
                             Methane 1.66e+001 6.69e-001
                              Ethane 1.94e+000 1.46e-001

                             Propane 2.83e-001 3.13e-002
                           Isobutane 4.61e-002 6.73e-003
                            n-Butane 8.53e-002 1.25e-002
                          Isopentane 7.29e-002 1.32e-002
                           n-Pentane 3.66e-002 6.63e-003

                            n-Hexane 7.76e-002 1.68e-002
                         Cyclohexane 2.65e-001 5.61e-002
                       Other Hexanes 1.10e-001 2.39e-002
                            Heptanes 1.15e-001 2.89e-002
                             Benzene 2.46e+000 4.83e-001

                             Toluene 2.77e+000 6.40e-001
                             Xylenes 7.67e-001 2.05e-001
                         C8+ Heavies 7.88e-006 3.38e-006
    ------------------------------- --------- ---------
                    Total Components    100.00 1.02e+001


CONDENSER PRODUCED WATER STREAM
-------------------------------------------------------------
    Temperature:    100.00 deg. F
```

```
    Flow Rate:   3.49e-001 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)     (ppm)
    ------------------------------- --------- --------- ---------
                              Water 9.99e+001 1.74e+002   998602.
                     Carbon Dioxide 7.83e-002 1.37e-001      783.
                           Nitrogen 1.31e-006 2.28e-006        0.
                            Methane 3.20e-004 5.59e-004        3.
                             Ethane 8.47e-005 1.48e-004        1.

                            Propane 1.59e-005 2.78e-005        0.
                          Isobutane 1.91e-006 3.33e-006        0.
                           n-Butane 4.81e-006 8.40e-006        0.
                         Isopentane 3.72e-006 6.48e-006        0.
                          n-Pentane 2.03e-006 3.54e-006        0.

                           n-Hexane 4.45e-006 7.77e-006        0.
                        Cyclohexane 8.97e-005 1.56e-004        1.
                      Other Hexanes 5.02e-006 8.75e-006        0.
                           Heptanes 4.37e-006 7.62e-006        0.
                            Benzene 2.41e-002 4.20e-002      241.

                            Toluene 2.73e-002 4.76e-002      273.
                            Xylenes 9.65e-003 1.68e-002       96.
                        C8+ Heavies 2.88e-010 5.02e-010        0.
    ------------------------------- --------- --------- ---------
                   Total Components    100.00 1.74e+002  1000000.


CONDENSER RECOVERED OIL STREAM
-------------------------------------------------------------
    Temperature:    100.00 deg. F
    Flow Rate:   4.58e-003 gpm

                  Component           Conc.    Loading
                                      (wt%)    (lb/hr)
    ------------------------------- --------- ---------
                              Water 5.23e-002 1.02e-003
                     Carbon Dioxide 2.90e-001 5.65e-003
                           Nitrogen 2.35e-004 4.58e-006
                            Methane 6.90e-003 1.34e-004
                             Ethane 8.56e-003 1.67e-004

                            Propane 1.12e-002 2.17e-004
                          Isobutane 4.99e-003 9.71e-005
                           n-Butane 1.28e-002 2.49e-004
                         Isopentane 3.74e-002 7.29e-004
                          n-Pentane 2.30e-002 4.47e-004

                           n-Hexane 1.65e-001 3.22e-003
                        Cyclohexane 7.42e-001 1.44e-002
                      Other Hexanes 1.51e-001 2.94e-003
                           Heptanes 7.86e-001 1.53e-002
                            Benzene 1.04e+001 2.03e-001

                            Toluene 3.88e+001 7.55e-001
                            Xylenes 4.84e+001 9.43e-001
                        C8+ Heavies 4.14e-002 8.05e-004
    ------------------------------- --------- ---------
                   Total Components    100.00 1.95e+000
```