

**AIR QUALITY DIVISION
CHAPTER 6, SECTION 3
OPERATING PERMIT**

**WYOMING DEPARTMENT OF
ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
122 West 25th Street
Cheyenne, Wyoming 82002**



PERMIT NO. 3-2-157-2

Issue Date: **February 28, 2014**
Expiration Date: **January 18, 2017**
Effective Date: **February 28, 2014**
Replaces Permit No.: **3-2-157-1**

In accordance with the provisions of W.S. §35-11-203 through W.S. §35-11-212 and Chapter 6, Section 3 of the Wyoming Air Quality Standards and Regulations,

**Burlington Resources, Incorporated
Lost Cabin Gas Plant
Section 11, Township 38 North, Range 90 West
Fremont County, Wyoming**

is authorized to operate a stationary source of air contaminants consisting of emission units described in this permit. The units described are subject to the terms and conditions specified in this permit. All terms and conditions of the permit are enforceable by the State of Wyoming. All terms and conditions of the permit, except those designated as not federally enforceable, are enforceable by EPA and citizens under the Act. A copy of this permit shall be kept on-site at the above named facility.

Steven A. Dietrich

Steven A. Dietrich, Administrator
Air Quality Division

2-28-14

Date

Todd Parfitt

Todd Parfitt, Director
Department of Environmental Quality

3-15-14

Date

WAQSR CHAPTER 6, SECTION 3 OPERATING PERMIT

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY AIR QUALITY DIVISION

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SOURCE EMISSION POINTS

(modified July 16, 2013)

This table may not include any or all insignificant activities at this facility.

SOURCE ID#	SOURCE DESCRIPTION	SIZE	CH. 6, SEC. 2 PERMITS
B-4301	Auxiliary Boiler	23 MMBtu/hr	MD-343 & CT-939
B-4301-3	Auxiliary Boiler	76.7 MMBtu/hr	CT-1946A
H-3302-1	Tail Gas Incinerator – Train 1	28.6 MMBtu/hr	MD-343 & CT-939
H-3302-2	Tail Gas Incinerator – Train 2	28.6 MMBtu/hr	CT-1362
H-3302-3	Tail Gas Incinerator – Train 3	61.4 MMBtu/hr	CT-1946A
S-2118-1	CO ₂ Product Vent #1	14.0 MMSCFD	MD-343 & CT-939
S-2118-2	CO ₂ Product Vent #2	14.0 MMSCFD	CT-1362
S-2118-3	CO ₂ Product Vent #3	32.3 MMSCFD	CT-1946A
H-5201	Flare – Pilot Flame	161.5 MMSCFD	CT-939
H-5201-3	Flare – Pilot Flame	485.7 MMSCFD	CT-1946A
G-4801-3	Centaur 40-T47008 Gas Turbine Emergency Generator	4714 hp	AP-0530
G-4810	Generac A7083 Propane Emergency Generator (4SRB)	90 hp	wv-9863 (Corrected)
G-4820	Office/Shop Emergency Diesel Generator Engine (CI)	102 hp	3/8/2001 letter
G-4801	Emergency Diesel Generator Engine (CI)	1232 hp	None
G-4801-2	Emergency Diesel Generator Engine (CI)	1252 hp	None
P-5303-2	Perkins PDFP-06YT Diesel Emergency Firewater Pump Engine (CI)	140 hp	wv-10485
None	Five Methanol Tanks	500 gallons – 1,480 gallons	wv-10486

TOTAL FACILITY ESTIMATED EMISSIONS

For informational purposes only. These emissions are not to be assumed as permit limits.

POLLUTANT	EMISSIONS (TPY)
CRITERIA POLLUTANT EMISSIONS	
Particulate Matter	7
PM ₁₀ Particulate Matter	7
Sulfur Dioxide (SO ₂)	2379
Nitrogen Oxides (NO _x)	141
Carbon Monoxide (CO)	2358
Volatile Organic Compounds (VOCs)	1
HAZARDOUS AIR POLLUTANT (HAP) EMISSIONS	2715
OTHER POLLUTANT EMISSIONS	
Hydrogen Sulfide (H ₂ S)	33

Facility estimated emissions include emission limits from AP-0530, CT-1946A, CT-1362, MD-343 & wv-9863 (**Corrected**) and information from the operating permit application. HAP emissions are mainly Carbonyl Sulfide (COS) from the CO₂ Product Vents. (**modified July 16, 2013**)

FACILITY-SPECIFIC PERMIT CONDITIONS

Facility-Wide Permit Conditions

- (F1) OPERATING PLAN [WAQSR Ch 6, Sec 2 Permit CT-1946A] (**modified July 16, 2013**)
The permittee shall follow the Operating Plan for minimizing SO₂ emissions for Trains 1, 2 and 3. The Operating Plan is provided in Appendix A of this permit. Revisions to this plan require Division approval prior to implementation.
- (F2) SULFUR DIOXIDE EMISSIONS INVENTORY [WAQSR Ch 14, Sec 3]
The permittee shall comply with the requirements of WAQSR Ch 14, Sec 3, including estimating SO₂ emissions in accordance with Ch 14 Sec 3(b), and adjusting estimates in accordance with Ch 14 Sec 3(c), if necessary.
- (F3) PERMIT SHIELD [WAQSR Ch 6, Sec 3(k)]
Compliance with the conditions of this permit shall be deemed compliance with any applicable requirements as of the date of permit issuance.

Source-Specific Permit Conditions

- (F4) FUGITIVE EMISSIONS [WAQSR Ch 6, Sec 2 Permit CT-1946A]
 - (a) The access road shall be treated with a dust suppressant in addition to water to control fugitive dust emissions and shall be maintained continuously to the extent that such treatment remains a viable control measure. At a minimum, two (2) applications of dust suppressant shall be applied annually.
 - (b) The access road is defined as the unpaved road from where the pavement ends outside of Lysite to the plant entrance.
 - (c) The application frequency for the portion of the road that is maintained by the County may be changed without revision to this operating permit based on the County's requirements.
- (F5) VISIBLE EMISSIONS [WAQSR Ch 3, Sec 2] (**modified February 28, 2014**)
 - (a) Visible emissions from the diesel fired engine(s) shall not exceed 30 percent opacity except for periods not exceeding ten consecutive seconds.
 - (b) Visible emissions of any contaminant discharged into the atmosphere from any other single emission source shall not exhibit greater than 20 percent opacity except for one period or periods aggregating not more than six minutes in any one hour of not more than 40 percent opacity.
- (F6) EMISSIONS AND OPERATING HOURS LIMITS [WAQSR Ch 6, Sec 2 Permits CT-1946A, CT-1362 & MD-343 and Waivers AP-0530, **wv-9863 (Corrected) & wv-10485 (modified July 16, 2013)**]
 - (a) NO_x, CO, SO₂, H₂S and COS emissions shall not exceed the limits specified in Tables I, II & III.
 - (b) The Train 3 Auxiliary Boiler (source B-4301-3) shall be equipped with a fuel meter and a continuous recorder.
 - (c) The Centaur 40-T47008 Gas Turbine **Emergency** Generator Engine (source G-4801-3), the Generac A7083 **Propane** **Emergency** Generator (source G-4810) and the Perkins PFDP-06YT diesel fired emergency firewater pump engine shall each be limited to 100 hours of operation per year.
 - (d) Unless otherwise stated, the pound per hour (lb/hr) and pound per million Btu (lb/MMBtu) emission limits for sources H-3302-3, B-4301-3 & S-2118-3 are based on 1-hour averages.

TABLE I: NO _x Emission Limits				
Unit ID	Unit Description	lb/MMBtu	lb/hr	TPY
H-3302-1	Tail Gas Incinerator – Train 1		5.0	21.9
H-3302-2	Tail Gas Incinerator – Train 2		5.0	21.9
H-3302-3	Tail Gas Incinerator – Train 3		13.5	59.1
B-4301	Auxiliary Boiler		2.3	10.1
B-4301-3	Auxiliary Boiler	0.12	9.2	9.5

Unit ID	Unit Description	lb/MMBtu	lb/hr	TPY
H-3302-1	Tail Gas Incinerator – Train 1		100	438
H-3302-2	Tail Gas Incinerator – Train 2		100	438
H-3302-3	Tail Gas Incinerator – Train 3		330	1445
B-4301-3	Auxiliary Boiler	0.17	13.0	13.4

Unit ID	Unit Description	SO ₂ Limits		H ₂ S Limits		COS Limits	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
H-3302-1	Tail Gas Incinerator – Train 1	115 ¹	504	0.8	3.5		
H-3302-2	Tail Gas Incinerator – Train 2	115 ¹	504	0.8	3.5		
H-3302-3	Tail Gas Incinerator – Train 3	312 ¹	1367	2.2	9.5		
S-2118-1	CO ₂ Product Vent #1			0.5	2.2	130	569
S-2118-2	CO ₂ Product Vent #2			0.5	2.2	130	569
S-2118-3	CO ₂ Product Vent #3			2.2	9.6	360 ²	1577

¹ Based on a 3-hour average for excess emissions reporting.

² Based on a 12-hour rolling average calculated using the arithmetic average of the previous 1-hour averages as determined by the CEM monitoring system.

(F7) TEMPERATURE AND SULFUR RECOVERY EFFICIENCY

[WAQSR Ch 6, Sec 2 Permits CT-1946A, CT-1362 & CT-939] (modified July 16, 2013)

- (a) The sulfur recovery efficiency of Train 3 shall be at a minimum of 99.8 %, and the average temperature of the gas leaving the combustion zone of the tail gas incinerator (source H-3302-3) shall not be less than 1000 °F, based on a 12-hour rolling average using the arithmetic average of the previous 1-hour averages.
- (b) The average sulfur recovery efficiency from Train 1 and Train 2 shall be at a minimum of 99.8 %, and temperature of the gas leaving the combustion zone of the tail gas incinerators (sources H-3302-1 & H-3302-2) shall be at least 1000 °F, based on a 12-hour average.
- (c) The permittee shall use Ucarsol HS-103 or its equivalent as the SCOT amine solvent, to achieve maximum sulfur removal efficiency in **Train 1 and Train 2**.
- (d) The COS control efficiency of the SELEXOL Unit H₂S absorber (source S-2118-3) shall be at a minimum 24 % based on a 12 hour rolling average. The 12 hour rolling efficiency shall be calculated using the arithmetic average of the previous twelve 1-hour averages.

(F8) MAINTENANCE REQUIREMENTS

[WAQSR Ch 6, Sec 2 Permits CT-1946A, CT-1362 and Waiver AP-0530] (modified July 16, 2013)

- (a) The permittee shall operate and maintain the Centaur 40-T47008 Gas Turbine **Emergency Generator Engine** (source G-4801-3), the Generac A7083 **Propane Emergency Generator** (source G-4810), the Perkins PDFP-06YT emergency firewater pump engine, and the fuel meter and recorder on the **Train 3 Auxiliary Boiler** (source B-4301-3) in accordance with the manufacturers' or suppliers recommendations so that emissions from the units are minimized.
- (b) The permittee shall maintain all the plant gas fired equipment to manufacturer's specifications.

(F9) TEMPORARY ENGINE REPLACEMENT [WAQSR Ch 6, Sec 3(h)(i)(I)]

- (a) Should an engine break down or require an overhaul during the term of this permit, the permittee may bring on site and operate a temporary replacement engine until repairs are made. Permanent replacement of an engine must be evaluated by the Division under Ch 6, Sec 2 of WAQSR to determine appropriate permitting action and evaluate the need for additional requirements resulting from the permanent replacement.

- (b) The temporary replacement unit shall be identical or similar to the unit replaced with emission levels at or below those of the unit replaced.
- (c) The permittee shall notify the Division in writing of such replacement within five working days, provide the date of startup of the replacement engine, and provide a statement regarding the applicability of any New Source Performance Standards (NSPS) in 40 CFR, Part 60 and/or the applicability of any National Emission Standards for Hazardous Air Pollutants (NESHAPs) in 40 CFR, Part 63.

Testing Requirements

(F10) EMISSIONS TESTING [W.S. 35-11-110]

- (a) The Division reserves the right to require additional testing as provided under condition G1 of this permit. Should testing be required, test methods found at 40 CFR Part 60, Appendix A, shall be used as follows:
 - (i) For visible emissions, Method 9 shall be used.
 - (ii) For SO₂ emissions, Methods 1-4 and 6 or 6C shall be used.
 - (iii) For NO_x emissions, Methods 1-4 and 7 or 7E shall be used.
 - (iv) For CO emissions, Methods 1-4 and 10 shall be used.
 - (v) For COS and H₂S emissions, Methods 1-4 and 15 shall be used.
 - (vi) For alternative test methods, or methods used for other pollutants, the approval of the Administrator must be obtained prior to using the test method to measure emissions.
- (b) Unless otherwise specified, testing shall be conducted in accordance with WAQSR Ch 5, Sec 2(h).

Monitoring Requirements

(F11) OPERATIONS, FLARING, AND FUGITIVE CONTROL MONITORING

[WAQSR Ch 6, Sec 3(h)(i)(C)(I) and Ch 6, Sec 2 Permit CT-1946A and Waiver wv-10486]

- (a) The permittee shall monitor all incidences of acid and sour gas flaring to determine the following:
 - (i) The cause of flaring,
 - (ii) The amount of gas flared,
 - (iii) The H₂S content of the gas flared, and
 - (iv) The amount of SO₂ emitted.
- (b) The permittee shall monitor all incidences of abnormal operations to determine compliance with the Operating Plan, included in Appendix A of this permit.
- (c) The permittee shall monitor and record all fugitive dust emission control efforts as required by condition F4 of this permit.
- (d) The permittee shall monitor the annual throughput of the five methanol tanks.

(F12) VISIBLE EMISSIONS MONITORING [WAQSR Ch 6, Sec 3(h)(i)(C)(I)] (**modified July 16, 2013**)

- (a) Periodic monitoring for visible emissions from the Auxiliary Boilers (sources B-4301 & B-4301-3) and the Centaur 40-T47008 Gas Turbine **Emergency** Generator Engine (source G-4801-3) shall consist of monitoring the type of fuel used to ensure natural gas is the sole fuel source for these units.
- (b) The permittee shall conduct observations of visible emissions from the emergency diesel-fired engines during periodic availability assurance tests of these sources, at least semi-annually, to assess compliance with the opacity limit under condition F5 and to identify maintenance needs.
- (c) Periodic monitoring of visible emissions from the CO₂ Product Vent #1, CO₂ Product Vent #2, CO₂ Product Vent #3 and both flares, (sources S-2118-1, S-2118-2, S-2118-3, H-5201 & H-5201-3) shall consist of weekly observations to determine compliance with the opacity limits specified in condition F5 of this permit.
 - (i) The weekly observations shall be conducted by a person who is educated on the general procedures of determining the presence of visible emissions but not necessarily certified to perform Method 9 observations.
 - (ii) If any visible emissions are observed from a source during the weekly observations, a Method 9 analysis shall be performed within one hour of observing visible emissions.

- (F13) **NO_x AND CO EMISSIONS AND OPERATING HOURS MONITORING**
[WAQSR Ch 6, Sec 3 (h)(i)(C)(I) and WAQSR Ch 6, Sec 2 Permit CT-1946A] (modified July 16, 2013)
- (a) The permittee shall measure NO_x emissions from the Tail Gas Incinerator #1 and the Tail Gas Incinerator #2 (sources H-3302-1 & H-3302-2) once every 2 years to determine compliance with the emission limits stated in condition F6 of this permit.
 - (b) The permittee shall measure NO_x emissions from the Tail Gas Incinerator #3 (source H-3302-3) at least annually to determine compliance with the emission limit stated in condition F6 of this permit.
 - (c) The permittee shall measure CO emissions from the Tail Gas Incinerator #1, Tail Gas Incinerator #2 and Tail Gas Incinerator #3 (sources H-3302-1, H-3302-2 & H-3302-3) at least annually to determine compliance with the emission limits stated in condition F6 of this permit.
 - (d) The permittee shall measure NO_x and CO emissions as required in paragraphs (a), (b) and (c) of this condition using the Division's portable analyzer protocol or the EPA reference methods described in condition F10. The portable analyzer protocol is available from the Division upon request, or can be downloaded at <http://deq.state.wy.us/aqd/operating.asp>.
 - (e) The permittee shall monitor the hours of operation for the Generac A7083 Propane Emergency Generator (source G-4810); the Perkins PDFP-06YT diesel fired emergency firewater pump engine; and the Centaur 40-T47008 Gas Turbine Emergency Generator Engine (source G-4801-3).
 - (f) The permittee shall monitor NO_x and CO emissions from the Train 3 Auxiliary Boiler (source B-4301-3) as follows:
 - (i) Annual emissions shall be calculated based on the annual fuel consumption, average annual heat content of the fuel gas and the lb/MMBtu NO_x and CO emission factors as determined in paragraph (f)(ii) or (f)(iii) of this condition.
 - (ii) At least once every five years the permittee shall determine the actual lb/MMBtu NO_x and CO emission factors and lb/hr emission rates while the boiler is firing at an expected normal firing rate using a **portable analyzer following the Division's portable analyzer protocol or EPA reference methods described in condition F10 of this permit**. Notification of the test dates(s) shall be provided to the Division at least 15 days prior to testing.
 - (iii) During any calendar year that a test is not conducted, the permittee may utilize the allowable lb/MMBtu NO_x and CO emission rates as described in condition F6 of this permit.
 - (g) **The permittee shall measure NO_x emissions from the Train 1 Auxiliary Boiler (source B-4301) at least once every five years using the Division's portable analyzer protocol or the EPA reference methods described in condition F10 to determine compliance with the emission limits stated in condition F6 of this permit.**
- (F14) **SO₂ AND H₂S EMISSIONS, TEMPERATURE, AND SULFUR RECOVERY MONITORING**
[WAQSR Ch 6, Sec 2 Permits CT-1946A, CT-1362 & CT-939, Ch 7, Sec 3, and 40 CFR 60 Subpart LLL]
- (a) The permittee shall operate and maintain continuous in-stack monitoring systems (CMS), including a mass emission rate monitor, on the stacks for the Tail Gas Incinerator #1, Tail Gas Incinerator #2 and Tail Gas Incinerator #3 (sources H-3302-1, H-3302-2 & H-3302-3), for continually measuring SO₂ emissions and the temperature of the gas leaving the combustion zone of each incinerator. The monitoring systems shall comply with the requirements of WAQSR Chapter 5, Section 2(j).
 - (b) Each sulfur recovery unit (Trains 1, 2 & 3) shall be equipped with a switch to provide an alarm to the operator whenever the sulfur recovery unit (SRU) is bypassed.
 - (c) The permittee shall monitor the sulfur recovery efficiency of Trains 1, 2 & 3 as follows:
 - (i) Sulfur entering the system shall be determined by obtaining samples from the gas streams to each Claus sulfur recovery unit (Trains 1, 2 & 3), and from each SCOT recycle stream at least once during every 12 hour period. Each gas stream flowrate shall also be continuously measured.
 - (ii) The gas samples shall be analyzed for H₂S and COS by a gas chromatograph (or alternative method approved by the Division) to determine the inlet sulfur content.
 - (iii) The sulfur emissions shall be determined by conducting the continuous SO₂ emissions monitoring specified in Paragraph (a) of this condition.
 - (iv) The sulfur recovery efficiency shall be calculated continuously (at least four evenly spaced data points per hour) as indicated in the CAM plan attached as Appendix B of this permit. An excursion is defined as a Sulfur Recovery Efficiency (SRE) below 99.8 percent.
 - (d) The permittee shall follow any additional requirements of the approved CAM plan and conditions CAM-1 through CAM-4 of this permit.

(F15) COS EMISSIONS MONITORING

[WAQSR Ch 6, Sec 2 Permits CT-1946A, CT-1362, CT-939 and Ch 7, Sec 3] (modified July 16, 2013)

- (a) The permittee shall obtain samples, weekly at a minimum, from the Trains 1 and 2 CO₂ Product Vents (sources S-2118-1 & S-2118-2), and shall operate a stack gas flowrate monitor on each stack. The gas samples shall be analyzed by a gas chromatograph (GC), or alternative approved method, to determine the COS concentrations. The permittee shall calculate COS emissions using the COS concentrations along with the stack gas flow rates.
- (b) The permittee shall operate and maintain a continuous emissions monitor (CEM) for COS emissions and a flow rate monitor on the Train 3 CO₂ Product Vent stack (source S-2118-3).
- (i) The monitoring system for COS emissions must demonstrate linearity and shall be certified in terms of ppm_v and lb/hr.
- (ii) The continuous COS monitoring system shall meet the quality assurance requirements of 40 CFR Part 60, Appendix F. The annual Relative Accuracy Test Audit (RATA) shall be conducted in terms of ppm_v and lb/hr.
- (iii) The permittee shall follow the QA program approved by the Division for the COS monitoring system.
- (c) The permittee shall determine COS at the Train 3 inlet as follows:
- (i) Inlet COS mass rate shall be calculated using the ppm_v COS as determined from grab samples and gas chromatography analysis and the calculated inlet flowrate using a methane (CH₄) balance for the plant.
- (A) During normal operations the Plant inlet will be calculated as follows:

$$q_{in} = \frac{q_{out1}x_{out1} + q_{out2}x_{out2} + q_{out3}x_{out3} + q_{out4}x_{out4}}{x_{in}}$$

Where: q_{in} = volumetric flow to plant
x_{in} = percent CH₄ to plant
q_{out#} = volumetric flow rate for specific stream
x_{out#} = percent CH₄ for specific stream
Stream 1 = Sales Gas
Stream 2 = Fuel Gas
Stream 3 = SRU Feed Gas
Stream 4 = CO₂ Vent Stack Gas

- (B) Methodology used to calculate the inlet flow during abnormal operations shall be approved by the Division.
- (ii) The permittee shall obtain gas samples weekly at the common header upstream of the SELEXOL Unit inlet. If after six (6) months of operation, the results indicate that the COS concentration is relatively stable, sampling is only required monthly. As a guideline, ± 5% of the mean value will be considered stable.
- (iii) The permittee shall obtain gas samples weekly at the inlet and outlet streams identified in paragraph (c)(i)(A) of this condition and determine CH₄ concentration by GC analysis. If after six (6) months of operation, the results indicate the CH₄ concentration is relatively stable, sampling is only required monthly. As a guideline, ± 5% of the mean value will be considered stable.
- (iv) The flow rates of the identified streams (q_{out1}, q_{out2}, q_{out3} & q_{out4}) shall be measured and recorded on an hourly basis.
- (v) The gas chromatograph shall be calibrated prior to analyzing each sample run.
- (vi) The permittee shall follow the quality assurance/quality control (QA/QC) manual most recently approved by the Division, which consists of the Quality Assurance Project Plans and the related Standard of Quality Procedures, and which details the maintenance and calibration of the gas chromatograph.
- (d) The permittee shall calculate the COS control efficiency for the SELEXOL Unit H₂S absorber (source S-2118-3) using the data obtained in parts (b) and (c) of this condition. Efficiency shall be calculated at least once every 15 minutes, averaged every hour and then 12-hour rolling averages shall be calculated every hour. An excursion is defined as a COS recovery efficiency below 24 percent.

- (e) The permittee shall follow any additional requirements of the approved CAM plan, attached as Appendix B, and conditions CAM-1 thru CAM-4 of this permit.

Recordkeeping Requirements

- (F16) SULFUR DIOXIDE EMISSIONS INVENTORY RECORDS [WAQSR Ch 14, Sec 3(b)]
 - (a) The permittee shall maintain all records used in the calculation of SO₂ emissions for the inventory required by condition F23, including but not limited to the following:
 - (i) Amount of fuel consumed;
 - (ii) Percent sulfur content of fuel and how the content was determined;
 - (iii) Quantity of product produced;
 - (iv) Emissions monitoring data;
 - (v) Operating data; and
 - (vi) How the emissions are calculated, including monitoring/estimation methodology with a demonstration that the selected methodology is acceptable under Ch 14, Sec 3.
 - (b) The permittee shall maintain records of any physical changes to facility operations or equipment, or any other changes (e.g. raw material or feed) that may affect emissions projections of SO₂.
 - (c) The permittee shall retain all records and support information for compliance with this condition and with the reporting requirements of condition F23 at the facility, for a period of at least ten (10) years from the date of establishment, or if the record was the basis for an adjustment to the milestone, five years after the date of an implementation plan revision, whichever is longer.
- (F17) OPERATIONS, FLARING, AND FUGITIVE CONTROL RECORDS [WAQSR Ch 6, Sec 2 Permits CT-1946A & CT-1362; WAQSR Ch 6, Sec 2 Waiver wv-10486; and WAQSR Ch 6, Sec 3(h)(i)(C)(II)]
 - (a) The permittee shall record all acid and sour gas flaring incidents. The record shall include the following:
 - (i) Identification of the flare (sources H-5201 & H-5201-3),
 - (ii) The cause of flaring,
 - (iii) The amount of gas flared,
 - (iv) The H₂S content of the gas flared, and
 - (v) The amount of SO₂ emitted.
 - (b) The permittee shall record all incidents of abnormal operations. The record shall include the following:
 - (i) The date, time, duration and cause of the abnormal operations;
 - (ii) If the Operation Plan, attached as Appendix A, was followed, include a description of the activities performed under the plan.
 - (iii) An explanation for any deviation from the Operating Plan.
 - (c) The permittee shall record the type, concentration, quantity, and date of application of dust suppressant applied to the access road required by condition F4 of this permit.
 - (d) The permittee shall record the annual throughput of methanol through the five methanol storage tanks.
 - (e) The permittee shall retain on-site at the facility records of flaring, abnormal operations, dust suppressant applications and throughput of methanol as required by this condition for a period of at least five years from the date such records are generated.
- (F18) VISIBLE EMISSIONS MONITORING RECORDS [WAQSR Ch 6, Sec 3(h)(i)(C)(II)]
 - (a) For the weekly visible emission monitoring required by condition F12(c) of this permit, the permittee shall record as applicable, the following:
 - (i) The date, place and time of observation;
 - (ii) The company or entity that performed the observation;
 - (iii) The observation results;
 - (iv) The operating conditions as the existed at the time of observations; and
 - (v) Any corrective actions taken upon observing visible emissions or upon determining non-compliance with the stated opacity limit in condition F5(b).
 - (b) For any Method 9 observations required by the Division under condition F12(c)(ii), the permittee shall keep field records in accordance with Section 2.2 of Method 9.

- (c) For the visible emissions monitoring required by condition F12(b), the permittee shall record the source, date and time of visible emissions in non-compliance with the opacity limit on condition F5(a) and any corrective action taken.
 - (d) The permittee shall retain on-site at the facility records of observations and any corrective actions taken as required by this condition for a period of at least five years from the date such records are generated.
- (F19) EMISSIONS, OPERATING HOURS, AND TESTING RECORDS [WAQSR Ch 6, Sec 2 Permit CT-1946A and Waivers AP-0530, wv-9863 (**Corrected**) and wv-10485; and Ch 6, Sec 3 (h)(i)(C)(II)] (**modified July 16, 2013**)
- (a) For any testing or monitoring required under conditions F10 and F13, other than Method 9 observations, and for the gas sampling required under conditions F14(c) and F15(a) and (c), the permittee shall record, as applicable, the following:
 - (i) The date, place, and time of sampling or measurements;
 - (ii) The date(s) the analyses were performed;
 - (iii) The company or entity that performed the analyses;
 - (iv) The analytical techniques or methods used;
 - (v) The results of such analyses;
 - (vi) The operating conditions as they existed at the time of sampling or measurement; and
 - (vii) Any corrective actions taken.
 - (b) For any Method 9 observations required by the Division under condition F10, the permittee shall keep field records in accordance with Section 2.2 of Method 9.
 - (c) The permittee shall record the hours of operation for each calendar year of the Generac A7083 **Propane** Emergency Generator (source G-4810); the Perkins PDFP-06YT diesel fired emergency firewater pump engine; and the Centaur 40-T47008 Gas Turbine **Emergency** Generator Engine (source G-4801-3), including loaded and unloaded hours.
 - (d) For the annual NO_x and CO emission calculations required by condition F13(f), the permittee shall keep records of the average annual heat content and the quantity of the fuel consumed by the **Train 3** Auxiliary Boiler (source B-4301-3) during each calendar year. The permittee shall also keep records of the calculations used to determine the annual NO_x and CO emissions for the **Train 3** Auxiliary Boiler.
 - (e) The permittee shall retain on-site at the facility, the records of each test, measurement, observation, or fuel sampling and support information as required by this condition for a period of at least five years from the date of the test, measurement, observation or sampling.
- (F20) SO₂, H₂S, AND TEMPERATURE RECORDS [WAQSR Ch 6, Sec 2 Permits CT-1946A, CT-1362 & CT-939; Ch 5, Sec 2 (g)(ii) and (g)(v); and Ch 6, Sec 3 (h)(i)(C)(II)] (**modified July 16, 2013**)
- (a) For the CMS required by condition F14, the permittee shall maintain records of all measurements, including continuous monitoring system, monitoring device and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; recorded in a permanent form suitable for inspection.
 - (b) The permittee shall maintain records of the occurrence and duration of any startup, shutdown or malfunction in the operation of Trains 1, 2 & 3 sweetening units, sulfur recovery units or tail gas incinerators (H-3302-1, H-3302-2 & H-3302-3); the occurrence and duration of an SRU bypass, and any period during which any CMS or monitoring device required by condition F14 of this permit is inoperative.
 - (c) The permittee shall maintain records of the following:
 - (i) Each 12-hour average temperature of the gas leaving the combustion zone of Tail Gas Incinerators #1 and #2 (sources H-3302-1 & H-3302-2);
 - (ii) Each 12-hour rolling average temperature of the gas leaving the combustion zone of Tail Gas Incinerator #3 (source H-3302-3);
 - (iii) Each 3-hour average SO₂ emission rate in terms of lb/hr for each tail gas incinerator (sources H-3302-1, H-3302-2, H-3302-3);
 - (iv) For Trains 1 and 2, each sulfur recovery control efficiency calculation as described in condition F14(c), each 12-hour average sulfur recovery efficiency, and all associated data and calculations; and

- (v) For Train 3, each sulfur recovery control efficiency calculation as described in condition F14(c), each 12-hour rolling average sulfur recovery efficiency, and all associated data and calculations.
- (d) For the CAM required for sulfur recovery efficiency under condition F14 of this permit, the permittee shall also maintain records of corrective actions taken, any written Quality Improvement Plan (QIP) required pursuant to WAQSR Chapter 7, Section 3(h), and activities undertaken to implement a QIP, and any other supporting information required to be maintained under WAQSR Chapter 7, Section 3.
- (e) The permittee shall retain on-site at the facility all records required for this condition for a period of at least five years from the date such records are generated.

(F21) COS EMISSIONS RECORDS

[WAQSR Ch 6, Sec 2 Permit CT-1946A; Ch 5, Sec 2(g)(ii) and (g)(v); and Ch 6, Sec 3 (h)(i)(C)(II)]

- (a) For Trains 1 and 2, the permittee shall keep records of the following:
 - (i) The weekly gas sample analysis of the CO₂ Product Vents (sources S-2118-1 & S-2118-2) as required in condition F19(a);
 - (ii) The stack gas flowrate of the CO₂ Product Vent stacks (sources S-2118-1 & S-2118-2); and
 - (iii) The calculation of COS emissions in lb/hr required by condition F15(a), including all supporting data.
- (b) For the CMS required by condition F15(b), the permittee shall maintain records of all measurements, including continuous monitoring system, monitoring device, and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required under condition F15 of this permit, recorded in a permanent form suitable for inspection.
- (c) The permittee shall maintain records of the occurrence and duration of any startup or shutdown of Train 3 or any periods during which the continuous monitoring system required by condition F15(b) of this permit is inoperative.
- (d) For Train 3, the permittee shall keep records of the following:
 - (i) Each 12-hour rolling average COS emission rate in terms of lb/hr for the CO₂ Product Vent (source S-2118-3);
 - (ii) Inlet COS mass rate and associated calculations as described in condition F15(c);
 - (iii) Flowrates of the individual gas streams as described in condition F15(c)(iv);
 - (iv) All gas chromatograph calibrations required by condition F15(c)(v);
 - (v) All information required by the QA/QC manual described in condition F15(c)(vi); and
 - (vi) Each COS control efficiency calculation as described in condition F15(c), each 12-hour rolling average COS control efficiency, and all associated data and calculations.
- (e) For the CAM required for COS control efficiency under condition F15 of this permit, the permittee shall also maintain records of corrective actions taken, any written QIP required pursuant to WAQSR Chapter 7, Section 3(h), and activities undertaken to implement a QIP, and any other supporting information required to be maintained under WAQSR Chapter 7, Section 3.
- (f) The permittee shall retain on-site at the facility all records required for this condition for a period of at least five years from the date such records are generated.

(F22) MAINTENANCE RECORDS

[WAQSR Ch 6, Sec 3(h)(i)(C)(II); WAQSR Ch 6, Sec 2 Waivers AP-0530, wv-9863 (**Corrected**) and wv-10485] (**modified July 16, 2013**)

- (a) The permittee shall maintain records of maintenance activities for all gas fired equipment, the Generac A7083 **Propane** Emergency Generator (source G-4810), the Perkins PDFP-06YT emergency firewater pump engine, and the fuel meter and recorder on the Train 3 **Auxiliary Boiler** (source B-4301-3), including the following:
 - (i) The maintenance activity performed;
 - (ii) The date and place the activity was performed;
 - (iii) The company and individual(s) that performed the activity;
 - (iv) The purpose of the activity; and
 - (v) An explanation for any deviation from the manufacturer's or supplier's recommendations.
- (b) The permittee shall retain on-site at the facility all maintenance records required by this condition for a period of at least five years from the date of the maintenance activity.

Reporting Requirements

- (F23) SULFUR DIOXIDE EMISSIONS INVENTORY REPORTS
[WAQSR Ch 14, Sec 3(b) and (c)] *(modified February 28, 2014)*
- (a) The permittee shall report calendar year SO₂ emissions by April 15th of the following year. The inventory shall be submitted in the format specified by the Division.
 - (b) Emissions from startup, shutdown, and upset conditions shall be included in the inventory.
 - (c) If the permittee uses a different emission monitoring or calculation method than was used to report SO₂ emissions in **2006**, the permittee shall adjust reported SO₂ emissions to be comparable to the emission monitoring or calculation method that was used in **2006**. The calculations that are used to make this adjustment shall be included with the annual emission report.
 - (d) The annual reports shall be submitted in accordance with condition G4 of this permit.
- (F24) OPERATIONS, FLARING, AND FUGITIVE CONTROL REPORTS
[WAQSR Ch 6, Sec 2 Permits CT-1946A, CT-1362 & CT-939]
- (a) The permittee shall report to the Division with the quarterly excess emissions reports required under condition F27 of this permit, all acid and sour gas flaring incidents and abnormal operations during the reporting period, including the information recorded under conditions F17(a) and F17(b).
 - (b) All instances of deviation from conditions F1 and F11 of this permit must be clearly identified in each report.
 - (c) The quarterly reports shall refer to this permit condition (F24) and be submitted in accordance with condition G4 of this permit.
- (F25) VISIBLE EMISSION REPORTING [WAQSR Ch 6, Sec 3(h)(i)(C)(II)] *(modified July 16, 2013)*
- (a) The following shall be submitted to the Division by January 31 and July 31 each year:
 - (i) Documentation the Auxiliary Boilers and the Centaur 40-T47008 Gas Turbine **Emergency Generator Engine** (sources B-4301, B-4301-3& G-4801-3) are firing natural gas as specified in condition F12(a).
 - (ii) (A) A summary of the weekly visible emission monitoring of the CO₂ Product Vent #1, CO₂ Product Vent #2, CO₂ Product Vent #3 and both flares (sources S-2118-1, S-2118-2, S-2118-3, H-5201 & H-5201-3) required under condition F12(c) of this permit. Only monitoring during which visible emissions are observed shall be included in the report. If no visible emissions were observed, this shall be stated in the report.
 - (B) The results of any Method 9 measurements required under condition F12(c)(ii) of this permit. Each opacity measurement and any corrective actions taken shall be included in the report.
 - (b) All instances of deviation from conditions F5 and F12 of this permit must be clearly identified in each report.
 - (c) The semiannual reports refer to this permit condition (F25) and shall be submitted in accordance with condition G4.
- (F26) TESTING AND OPERATING HOURS REPORTS
[WAQSR Ch 6, Sec 3 (h)(i)(C)(I) and WAQSR Ch 6, Sec 2 Permit CT-1946A] *(modified July 16, 2013)*
- (a) The permittee shall submit the following to the Division by January 31 each year:
 - (i) The hours of operation of the Generac A7083 **Propane** Emergency Generator (source G-4810), the Perkins PDFP-06YT diesel fired emergency firewater pump engine and the Centaur 40-T47008 Gas Turbine **Emergency Generator Engine** (source G-4801-3) during the previous calendar year.
 - (ii) The results of the NO_x and CO monitoring from the **Train 3** Auxiliary Boiler (source B-4301-3) required under condition F13(f) of this permit, including documentation of how they were calculated.
 - (b) The permittee shall report the results of the emissions monitoring required under condition F13, and any additional testing required by the Division under condition F10, within 30 days of conducting the tests. The reports shall include the information specified under condition F19(a) of this permit.
 - (c) All instances of deviation from the NO_x and CO emission limitations and monitoring conditions, and the operating time limitations in condition F6(c) of this permit, must be clearly identified in each report.

- (d) The annual reports shall refer to this permit condition (F26) and be submitted in accordance with condition G4 of this permit.

(F27) QUARTERLY COS AND EXCESS EMISSIONS REPORTS

[WAQSR Ch 6, Sec 2 Permits CT-1946A, CT-1362 & CT-939; and WAQSR Ch 5, Sec 2(g)]

The permittee shall submit a quarterly COS and excess emissions report. All reports shall be postmarked by the 30th day following the end of each calendar quarter and shall include the following:

- (a) A summary report for COS emissions with each calculated weekly average COS emission rate, in lb/hr, from the CO₂ Product Vent #1 (source S-2118-1) and CO₂ Product Vent #2 (source S-2118-2).
- (b) The actual SO₂ emissions in pounds per day from each tail gas incinerator (sources H-3302-1, H-3302-2, and H-3302-3) based on CMS data.
- (c) An excess emissions and monitoring systems performance report (excess emissions are defined in paragraph (c)(vi) of this condition). Written reports shall comply with the requirements of WAQSR Chapter 5, Section 2(g), be in a format approved by the Division, and shall include the following information:
 - (i) The magnitude of excess emissions computed in accordance with WAQSR Chapter 5, Section 2(j)(viii), any conversion factor(s) used, the date and time of commencement and completion of each time period of excess emissions, and the process operating time during the reporting period.
 - (ii) Specific identification of each period of excess emissions that occurs during start-ups, shutdowns, and malfunctions of each sweetening unit, sulfur recovery unit or tail gas incinerator, the nature and cause of any malfunction (if known) and the corrective actions taken or preventative measures adopted.
 - (iii) The date and time identifying each period during which a continuous monitoring system was inoperative except for zero and span checks and the nature of the system repairs or adjustments.
 - (iv) When no excess emissions have occurred, incinerator temperatures have remained above the temperatures stated under condition F7 of this permit, or the continuous monitoring systems have not been inoperative, repaired, or adjusted, such information shall be clearly stated in the report.
 - (v) One summary report form for each pollutant, for temperature, and for recovery efficiency, monitored at each tail gas incinerator (sources H-3302-1, H-3302-2, and H-3302-3) and at the Train 3 CO₂ Product Vent (source S-2118-3); in a format approved by the Division.
 - (A) If the total duration of excess emissions for the reporting period is less than one percent of the total operating time for the reporting period and continuous monitoring system downtime for the reporting period is less than five percent of the total operating time for the reporting period, only the summary report form shall be submitted and the excess emission report described in paragraph (a) of this condition need not be submitted unless requested by the Administrator.
 - (B) If the total duration of excess emissions for the reporting period is one percent or greater of the total operating time for the reporting period or the total continuous monitoring system downtime for the reporting period is five percent or greater of the total operating time for the reporting period, the summary report form and the excess emission report described in paragraph (a) of this condition shall both be submitted.
- (vi) For the purposes of reporting under this condition, excess emissions are defined as follows:
 - (A) For Trains 1 and 2, any:
 - (1) Three hour period during which the average SO₂ emissions from either SRU tail gas incinerator stack (sources H-3302-1 & H-3302-2) exceed 115 lb/hr;
 - (2) Twelve hour period during which the average sulfur recovery efficiency is less than 99.8%;
 - (3) Twelve hour period during which the average temperature of the gas leaving the combustion zone of the incinerator is less than 1000 °F.
 - (B) For Train 3, any:
 - (1) Three hour period during which the average SO₂ emissions from the SRU tail gas incinerator stack (source H-3302-3) exceed 312 lb/hr;
 - (2) Rolling twelve hour period during which the average sulfur recovery efficiency is less than 99.8%;

- (3) Rolling twelve hour period during which the average temperature of the gas leaving the combustion zone of the incinerator is less than 1000 °F.
 - (4) Rolling twelve hour period during which the average COS emissions from the CO₂ Product Vent (source S-2118-3) exceeds 360 lb/hr; or
 - (5) Rolling twelve hour period during which the average COS control efficiency of the train 3 SELEXOL Unit H₂S absorber is less than 24%.
- (h) A description of actions taken to implement a QIP (if required) during the reporting period as specified in WAQSR Chapter 7, Section 3(h). Upon completion of a QIP, the permittee shall include in the quarterly report, documentation that the implementation of the plan has reduced the likelihood of similar excursions.
 - (i) The quarterly reports shall refer to this permit condition (F27) and be submitted to the Division in accordance with condition G4 of this permit.
- (F28) GREENHOUSE GAS REPORTS [W.S. 35-11-110]
The permittee shall submit to the Division a summary of any report(s) required to be submitted to the EPA under 40 CFR Part 98.
- (a) The reports shall be submitted to the Division within 60 days of submission to EPA, in a format as specified by the Division.
 - (b) The reports shall be submitted in accordance with condition G4(a)(i) of this permit, to the attention of the Division's Emission Inventory Program. A copy need not be sent to the DEQ Air Quality contact.
- (F29) REPORTING EXCESS EMISSIONS & DEVIATIONS FROM PERMIT REQUIREMENTS
[WAQSR Ch 6, Sec 3(h)(i)(C)(III)]
- (a) General reporting requirements are described under the General Conditions of this permit. The Division reserves the right to require reports as provided under condition G1 of this permit.
 - (b) Emissions which exceed the limits specified in this permit and which are not reported under a different condition of this permit shall be reported annually with the emission inventory unless specifically superseded by condition G17, condition G19, or other condition(s) of this permit. The probable cause of such exceedance, the duration of the exceedance, the magnitude of the exceedance, and any corrective actions or preventative measures taken shall be included in this annual report. For sources and pollutants which are not continuously monitored, if at any time emissions exceed the limits specified in this permit by 100 percent, or if a single episode of emission limit exceedance spans a period of 24 hours or more, such exceedance shall be reported to the Division within one working day of the exceedance. (Excess emissions due to an emergency shall be reported as specified in condition G17. Excess emissions due to unavoidable equipment malfunction shall be reported as specified in condition G19.)
 - (c) Any other deviation from the conditions of this permit shall be reported to the Division in writing within 30 days of the deviation or discovery of the deviation.

Accidental Release Prevention Requirements

- (F30) ACCIDENTAL RELEASE PREVENTION REQUIREMENTS [40 CFR Part 68]
- (a) The permittee shall meet all requirements of 40 CFR Part 68 as they apply to the facility.
 - (b) The permittee shall submit, as part of the annual compliance certification submitted under condition C1 of this permit, a certification statement concerning the facility's compliance with all requirements of 40 CFR Part 68, including the registration and submission of a Risk Management Plan.

**WAQSR CHAPTER 5, SECTION 2 NEW SOURCE PERFORMANCE STANDARDS (NSPS)
AND 40 CFR PART 60**

SUBPART GG REQUIREMENTS FOR STATIONARY GAS TURBINES (modified July 16, 2013)

SUBPART GG REQUIREMENTS [40 CFR 60 Subparts A and GG; WAQSR Ch 5, Sec 2]

The permittee shall meet all applicable requirements of 40 CFR 60 Subparts A and GG and WAQSR Ch 5, Sec 2 as they apply to affected stationary gas turbines as specified under §60.330, including the Centaur 40-T47008 Gas Turbine Emergency Generator Engine (source G-4801-3).

SUBPART LLL REQUIREMENTS FOR ONSHORE NATURAL GAS PROCESSING (modified July 16, 2013)

SUBPART LLL REQUIREMENTS

[40 CFR Part 60 – Subparts A and LLL; WAQSR Ch 5, Sec 2 and Ch 6, Sec 2 Permit CT-1946A]

The permittee shall meet all applicable requirements of 40 CFR Part 60 Subparts A and LLL and WAQSR Ch 5, Sec 2 as they apply to each sweetening unit and each sweetening unit followed by a sulfur recovery unit, as defined under §60.640, including Trains 1, 2, and 3.

**SUBPART Dc REQUIREMENTS FOR SMALL INDUSTRIAL-COMMERCIAL-INSTITUTIONAL
STEAM GENERATING UNITS** (modified July 16, 2013)

SUBPART Dc REQUIREMENTS [40 CFR 60 – Subparts A and Dc; and WAQSR Ch 5, Sec 2]

The permittee shall meet all applicable requirements of 40 CFR 60 Subparts A and Dc and WAQSR Ch 5, Sec 2, as they apply to each steam generating unit as defined under §60.40c, including the Auxiliary Boilers (sources B-4301 & B-4301-3).

**SUBPART IIII REQUIREMENTS FOR STATIONARY COMPRESSION IGNITION
INTERNAL COMBUSTION ENGINES** (modified July 16, 2013)

SUBPART IIII REQUIREMENTS [40 CFR 60 Subparts A and IIII; WAQSR Ch 5, Sec 2]

As applicable, the permittee shall meet the requirements of 40 CFR Part 60 Subparts A and IIII and WAQSR Ch 5, Sec 2, as they apply to stationary compression ignition (CI) internal combustion engines. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator. An affected source is defined at §60.4200.

On March 20, 2013, the Perkins PDFP-06YT diesel fired emergency firewater pump engine, the office/shop emergency diesel generator engine and both emergency diesel generator engines (sources G-4801 & G-4801-2) were not subject to Subpart IIII according to information submitted to the Division by the permittee because of their dates of construction.

**SUBPART JJJJ REQUIREMENTS FOR STATIONARY SPARK IGNITION
INTERNAL COMBUSTION ENGINES** (modified July 16, 2013)

SUBPART JJJJ [40 CFR Part 60 Subparts A and JJJJ; WAQSR Ch 5, Sec 2]

As applicable, the permittee shall meet all requirements of 40 CFR Part 60 Subparts A and JJJJ and WAQSR Ch 5, Sec 2, as they apply to affected stationary spark ignition (SI) internal combustion engines. (As required by condition F9(e), if an engine is replaced or reconstructed, subpart applicability will need to be reevaluated and a statement regarding applicability submitted to the Division.) For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator. An affected source is defined at §60.4230.

On March 20, 2013, the Generac A7083 Propane Emergency Generator Engine (source G-4810) was not subject to Subpart JJJJ according to information submitted to the Division by the permittee because of its date of construction.

**SUBPART OOOO REQUIREMENTS FOR CRUDE OIL AND NATURAL GAS PRODUCTION,
TRANSMISSION AND DISTRIBUTION** (modified July 16, 2013)

SUBPART OOOO REQUIREMENTS

[40 CFR 60 Subparts A and OOOO; and WAQSR Ch 5, Sec 2]

The permittee shall meet all applicable requirements of 40 CFR 60 Subparts A and OOOO and WAQSR Ch 5, Sec 2 as they apply to affected facilities as specified under §60.5365.

The subparts are available at <http://www.gpoaccess.gov/cfr/retrieve.html>, or from the Division upon request.

**WAQSR CHAPTER 5, SECTION 3 NATIONAL EMISSION STANDARDS
FOR HAZARDOUS AIR POLLUTANTS (NESHAPS) AND 40 CFR PART 63**

SUBPART YYYYY REQUIREMENTS FOR STATIONARY COMBUSTION TURBINES
(modified July 16, 2013)

SUBPART YYYYY REQUIREMENTS [40 CFR Part 63 Subparts A and YYYYY; and WAQSR Ch 5, Sec 3]
The permittee shall meet all applicable requirements of 40 CFR Part 63 Subparts A and YYYYY; and WAQSR Ch 5, Sec 3 as they apply to any existing, new, or reconstructed stationary combustion turbine located at a major source of HAP emissions as described in §63.6090, including the Centaur 40-T47008 Gas Turbine Emergency Generator Engine (source G-4801-3).

**SUBPART ZZZZ REQUIREMENTS FOR STATIONARY RECIPROCATING
INTERNAL COMBUSTION ENGINES**
(modified July 16, 2013)

SUBPART ZZZZ REQUIREMENTS [40 CFR 63 Subparts A and ZZZZ; WAQSR Ch 5, Sec 3]
The permittee shall meet all requirements of 40 CFR 63 Subparts A and ZZZZ and WAQSR Ch 5, Sec 3 as they apply to each affected source as indicated in §63.6590(a). An affected source is any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions, excluding stationary RICE being tested at a stationary RICE test cell/stand. (As required by condition F9(c), if an engine is replaced or reconstructed, subpart applicability will need to be re-evaluated and a statement regarding applicability submitted to the Division.) This facility is currently identified as a major source of HAP emissions. Affected sources at this facility include the Generac A7083 Propane Emergency Generator (source G-4810), Office/Shop Emergency Diesel Generator, both Emergency Diesel Generator Engines (sources G-4801 & G-4801-2) and the Perkins PFDP-06YT diesel fired emergency firewater pump engine.

**SUBPART DDDDD REQUIREMENTS FOR INDUSTRIAL, COMMERCIAL, AND INSTITUTIONAL
BOILERS AND PROCESS HEATERS**
(modified July 16, 2013)

SUBPART DDDDD REQUIREMENTS [40 CFR 63 Subparts A and DDDDD; and WAQSR Ch 5, Sec 3]
The permittee shall meet all requirements of 40 CFR 63 Subparts A and DDDDD and WAQSR Ch 5, Sec 3, as they apply to owners or operators of industrial, commercial, or institutional boilers or process heaters as defined in §63.7575 that are located at, or are part of, a major source of HAPs as defined in §63.2, except that for oil and natural gas production facilities, a major source of HAPs is as defined in §63.761 (40 CFR Part 63 Subpart HH). The types of boilers and process heaters listed in §63.7491 are not subject to Subpart DDDDD. This subpart applies to:

- (a) The collection of existing industrial, commercial, and institutional boilers and process heaters within a subcategory, including the two auxiliary boilers (sources B-4301 & B-4301-3).
- (b) New or reconstructed industrial, commercial, or institutional boilers or process heaters.

The subparts are available at <http://www.gpoaccess.gov/cfr/retrieve.html>, or from the Division upon request.

WAQSR CHAPTER 7, SECTION 3
COMPLIANCE ASSURANCE MONITORING (CAM) REQUIREMENTS
(modified July 16, 2013)

- (CAM-1) **COMPLIANCE ASSURANCE MONITORING REQUIREMENTS [WAQSR Ch 7, Sec 3(b) and (c)]**
The permittee shall follow the CAM plan attached as Appendix **B** of this permit and meet all CAM requirements of WAQSR Chapter 7, Section 3 as they apply to the **three** sulfur recovery units and the Train 3 CO₂ Product Vent (**source S-2118-3**). Compliance with the source specific monitoring, recordkeeping, and reporting requirements of this permit meets the monitoring, recordkeeping, and reporting requirements of WAQSR Chapter 7, Section 3, except for additional requirements specified under conditions CAM-2 through CAM-4.
- (CAM-2) **OPERATION OF APPROVED MONITORING [WAQSR Ch 7, Sec 3 (g)]**
- (a) At all times, the permittee shall maintain the monitoring under this section, including but not limited to, maintaining necessary parts for routine repairs of the monitoring equipment.
 - (b) Except for monitoring malfunctions, associated repairs, and required quality assurance or control activities, the permittee shall conduct all monitoring in continuous operation (or at all required intervals) at all times that the pollutant specific emissions unit is operating.
 - (c) Upon detecting an excursion, the permittee shall restore operation of the pollutant-specific emission unit to its normal or usual manner of operation as expeditiously as practicable in accordance with good air pollution control practices. The response shall include minimizing the period of any start-up, shutdown or malfunction and taking any corrective actions to restore normal operation and prevent the likely recurrence of the cause of an excursion.
 - (d) If the permittee identifies a failure to achieve compliance with an emission limit for which the monitoring did not provide an indication of an excursion while providing valid data, or the results of compliance or performance testing documents a need to modify the existing indicator ranges, the permittee shall promptly notify the Division and, if necessary, submit a proposed modification to this permit to address the necessary monitoring changes.
- (CAM-3) **QUALITY IMPROVEMENT PLAN (QIP) REQUIREMENTS [WAQSR Ch 7, Sec 3 (h)]**
- (a) If the Division or the EPA Administrator determines, based on available information, that the permittee has used unacceptable procedures in response to an excursion or exceedance, the permittee may be required to develop and implement a Quality Improvement Plan (QIP).
 - (b) If required, the permittee shall maintain a written QIP and have it available for inspection.
 - (c) The plan shall include procedures for conducting one or more of the following:
 - (i) Improved preventative maintenance practices.
 - (ii) Process operation changes.
 - (iii) Appropriate improvements to control methods.
 - (iv) Other steps appropriate to correct control.
 - (v) More frequent or improved monitoring (in conjunction with (i) - (iv) above).
 - (d) If a QIP is required, the permittee shall develop and implement a QIP as expeditiously as practicable and shall notify the Division if the period for completing the QIP exceeds 180 days from the date on which the need to implement the QIP was determined.
 - (e) Following implementation of a QIP, upon any subsequent determination under paragraph (a) above, the Division may require the permittee to make reasonable changes to the QIP if the QIP failed to address the cause of control device problems, or failed to provide adequate procedures for correcting control device problems as expeditiously as practicable.
 - (f) Implementation of a QIP shall not excuse the permittee from compliance with any existing emission limit(s) or any existing monitoring, testing, reporting, or recordkeeping requirements that may be applicable to the facility.
- (CAM-4) **SAVINGS PROVISIONS [WAQSR Ch 7, Sec 3 (j)]**
Nothing in the CAM regulations shall excuse the permittee from compliance with any existing emission limit or standard, or any existing monitoring, testing, reporting or recordkeeping requirement that may be applicable to the facility.

COMPLIANCE CERTIFICATION AND SCHEDULE

Compliance Certification [WAQSR Ch 6, Sec 3(h)(iii)(E)] (modified July 16, 2013)

- (C1) (a) The permittee shall submit by January 31 each year a certification addressing compliance with the requirements of this permit. The certification shall be submitted as a stand-alone document separate from any monitoring reports required under this permit.
- (b) (i) For the Operating Plan, the permittee shall assess compliance with condition F1 of this permit by conducting the monitoring required by conditions F11(a) and F11(b) and reviewing the records kept in accordance with condition F17.
- (ii) For the sulfur dioxide emissions inventory, the permittee shall assess compliance with condition F2 of this permit by reviewing the records kept in accordance with condition F16 and verifying the reports were submitted in accordance with condition F23.
- (iii) For fugitive emissions, the permittee shall assess compliance with condition F4 of this permit by conducting the monitoring required by condition F11(c) and reviewing the records kept in accordance with condition F17(c).
- (iv) For visible emissions, the permittee shall assess compliance with condition F5 of this permit by conducting the monitoring required by condition F12.
- (v) For NO_x and CO emissions, the permittee shall assess compliance with condition F6 of this permit by conducting the monitoring required by condition F13.
- (vi) For SO₂ emissions, the permittee shall assess compliance with condition F6 of this permit by conducting the monitoring required by condition F14.
- (vii) For COS emissions, the permittee shall assess compliance with condition F6 of this permit by conducting the monitoring required by condition F15.
- (viii) For operating hour limitations, the permittee shall assess compliance with condition F6(c) of this permit by conducting the monitoring required by condition F13(e) and by reviewing the records kept in accordance with condition F19(c).
- (ix) For temperature and sulfur recovery efficiency requirements, the permittee shall assess compliance with condition F7(a), F7(b), and F7(d) of this permit by conducting the monitoring required by condition F14 of this permit.
- (x) The permittee shall assess compliance with condition F7(c) by verifying Ucarsol HS-103 or its equivalent was used as the SCOT amine solvent for Trains 1 & 2.
- (xi) For the maintenance requirements, the permittee shall assess compliance with condition F8 of this permit by reviewing the records kept in accordance with condition F22.
- (xii) For greenhouse gas reporting, the permittee shall assess compliance with condition F28 by verifying that reports were submitted in accordance with condition F28.
- (xiii) For accidental release prevention, the permittee shall assess compliance with condition F30 by verifying that a certification was submitted as required by condition F30(b).
- (xiv) **For any engine subject to 40 CFR 60 Subpart GG, the permittee shall assess compliance with Subpart GG by conducting any applicable testing and monitoring required by §§60.334 and 60.335, and by reviewing any records required by §60.7 and Subpart GG.**
- (xv) **For any units subject to 40 CFR 60 Subpart LLL, the permittee shall assess compliance with Subpart LLL by conducting any applicable monitoring required by §60.646 and by reviewing any records required by §§60.7 and 60.647.**
- (xvi) **For any units subject to 40 CFR 60, Subpart Dc, the permittee shall assess compliance with Subpart Dc by conducting any applicable testing and monitoring required by §§60.44c through 60.47c, and reviewing records required by §60.48c(g).**
- (xvii) The permittee shall assess compliance with requirements of 40 CFR 63 Subpart ZZZZ by conducting any applicable testing and monitoring required by §§63.6610 through 63.6640, and by reviewing the records required by §§63.6655 and 63.6665.
- (xviii) **The permittee shall assess compliance with 40 CFR 63 Subpart DDDDD by conducting any applicable testing and monitoring required by §§63.7505 through 63.7541 and by reviewing any records required by §§63.7555 and 63.7560.**
- (xix) **For any affected facility subject to 40 CFR 60 Subpart OOOO, the permittee shall assess compliance with Subpart OOOO by conducting any applicable testing and monitoring required by §§60.5413 through 60.5417 and by reviewing any applicable records required by §§60.5420, 60.5421, and 60.5423.**

- (c) The compliance certification shall include:
 - (i) The permit condition or applicable requirement that is the basis of the certification;
 - (ii) The current compliance status;
 - (iii) Whether compliance was continuous or intermittent; and
 - (iv) The methods used for determining compliance.
- (d) For any permit conditions or applicable requirements for which the source is not in compliance, the permittee shall submit with the compliance certification a proposed compliance plan and schedule for Division approval.
- (e) The compliance certification shall be submitted to the Division in accordance with condition G4 of this permit and to the Assistant Regional Administrator, Office of Enforcement, Compliance, and Environmental Justice (8ENF-T), U.S. EPA - Region VIII, 1595 Wynkoop Street, Denver, CO 80202-1129.
- (f) Determinations of compliance or violations of this permit are not restricted to the monitoring requirements listed in paragraph (b) of this condition; other credible evidence may be used.

Compliance Schedule [WAQSR Ch 6, Sec 3(h)(iii)(C) and (D)]

- (C2) The permittee shall continue to comply with the applicable requirements with which the permittee has certified that it is already in compliance.
- (C3) The permittee shall comply in a timely manner with applicable requirements that become effective during the term of this permit.

GENERAL PERMIT CONDITIONS

Powers of the Administrator: [W.S. 35-11-110]

- (G1) (a) The Administrator may require the owner or operator of any point source to complete plans and specifications for any application for a permit required by the Wyoming Environmental Quality Act or regulations made pursuant thereto and require the submission of such reports regarding actual or potential violations of the Wyoming Environmental Quality Act or regulations thereunder.
- (b) The Administrator may require the owner or operator of any point source to establish and maintain records; make reports; install, use and maintain monitoring equipment or methods; sample emissions, or provide such other information as may be reasonably required and specified.

Permit Renewal and Expiration: [WAQSR Ch 6, Sec 3(c)(i)(C), (d)(ii), (d)(iv)(B), and (h)(i)(B)][W.S. 35-11-206(f)]

- (G2) This permit is issued for a fixed term of five years. Permit expiration terminates the permittee's right to operate unless a timely and complete renewal application is submitted at least six months prior to the date of permit expiration. If the permittee submits a timely and complete application for renewal, the permittee's failure to have an operating permit is not a violation of WAQSR Chapter 6, Section 3 until the Division takes final action on the renewal application. This protection shall cease to apply after a completeness determination if the applicant fails to submit by the deadline specified in writing by the Division any additional information identified as being needed to process the application.

Duty to Supplement: [WAQSR Ch 6, Sec 3(c)(iii)]

- (G3) The permittee, upon becoming aware that any relevant facts were omitted or incorrect information was submitted in the permit application, shall promptly submit such supplementary facts or corrected information. The permittee shall also provide additional information as necessary to address any requirements that become applicable to the facility after this permit is issued.

Submissions: [WAQSR Ch 6, Sec 3(c)(iv)] [W.S. 35-11-206(c)]

- (G4) Any document submitted shall be certified as being true, accurate, and complete by a responsible official.
- (a) Submissions to the Division.
- (i) Any submissions to the Division including reports, certifications, and emission inventories required under this permit shall be submitted as separate, stand-alone documents and shall be sent to:
- Administrator, Air Quality Division
122 West 25th Street
Cheyenne, Wyoming 82002
- (ii) Unless otherwise noted elsewhere in this permit, a copy of each submission to the Administrator under paragraph (a)(i) of this condition shall be sent to the DEQ Air Quality Contact listed on page 3 of this permit.
- (b) Submissions to EPA.
- (i) Each certification required under condition C1 of this permit shall also be sent to:
- Assistant Regional Administrator
Office of Enforcement, Compliance, and Environmental Justice (8ENF-T)
U.S. EPA - Region VIII
1595 Wynkoop Street
Denver, CO 80202-1129
- (ii) All other required submissions to EPA shall be sent to:
- Office of Partnerships and Regulatory Assistance
Air and Radiation Program (8P-AR)
U.S. EPA - Region VIII
1595 Wynkoop Street
Denver, CO 80202-1129

Changes for Which No Permit Revision Is Required: [WAQSR Ch 6, Sec 3(d)(iii)]

- (G5) The permittee may change operations without a permit revision provided that:
- (a) The change is not a modification under any provision of title I of the Clean Air Act;
 - (b) The change has met the requirements of Chapter 6, Section 2 of the WAQSR and is not a modification under Chapter 5, Section 2 or Chapter 6, Section 4 of the WAQSR and the changes do not exceed the emissions allowed under the permit (whether expressed therein as a rate of emissions or in terms of total emissions); and
 - (c) The permittee provides EPA and the Division with written notification at least 14 days in advance of the proposed change. The permittee, EPA, and the Division shall attach such notice to their copy of the relevant permit. For each such change, the written notification required shall include a brief description of the change within the permitted facility, the date on which the change will occur, any change in emissions, and any permit term or condition that is no longer applicable as a result of the change. The permit shield, if one exists for this permit, shall not apply to any such change made.

Transfer of Ownership or Operation: [WAQSR Ch 6, Sec 3(d)(v)(A)(IV)]

- (G6) A change in ownership or operational control of this facility is treated as an administrative permit amendment if no other change in this permit is necessary and provided that a written agreement containing a specific date for transfer of permit responsibility, coverage, and liability between the current and new permittee has been submitted to the Division.

Reopening for Cause: [WAQSR Ch 6, Sec 3(d)(vii)] [W.S. 35-11-206(f)(ii) and (iv)]

- (G7) The Division will reopen and revise this permit as necessary to remedy deficiencies in the following circumstances:
- (a) Additional applicable requirements under the Clean Air Act or the WAQSR that become applicable to this source if the remaining permit term is three or more years. Such reopening shall be completed not later than 18 months after promulgation of the applicable requirement. No reopening is required if the effective date of the requirement is later than the date on which the permit is due to expire, unless the original permit or any of its terms and conditions have been extended.
 - (b) Additional requirements (including excess emissions requirements) become applicable to an affected source under the acid rain program. Upon approval by EPA, excess emissions offset plans shall be deemed to be incorporated into the permit.
 - (c) The Division or EPA determines that the permit contains a material mistake or that inaccurate statements were made in establishing the emissions standards or other terms or conditions of the permit.
 - (d) The Division or EPA determines that the permit must be revised or revoked to assure compliance with applicable requirements.

Annual Fee Payment: [WAQSR Ch 6, Sec 3(f)(i), (ii), and (vi)] [W.S. 35-11-211]

- (G8) The permittee shall, as a condition of continued operations, submit an annual fee to the Division as established in Chapter 6, Section 3 (f) of the WAQSR. The Division shall give written notice of the amount of fee to be assessed and the basis for such fee assessment annually. The assessed fee is due on receipt of the notice unless the fee assessment is appealed pursuant to W.S. 35-11-211(d). If any part of the fee assessment is not appealed it shall be paid to the Division on receipt of the written notice. Any remaining fee which may be due after completion of the appeal is immediately due and payable upon issuance of the Council's decision. Failure to pay fees owed the Division is a violation of Chapter 6, Section 3 (f) and W.S. 35-11-203 and may be cause for the revocation of this permit.

Annual Emissions Inventories: [WAQSR Ch 6, Sec 3(f)(v)(G)]

- (G9) The permittee shall submit an annual emission inventory for this facility to the Division for fee assessment and compliance determinations within 60 days following the end of the calendar year. The emissions inventory shall be in a format specified by the Division.

Severability Clause: [WAQSR Ch 6, Sec 3(h)(i)(E)]

- (G10) The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

Compliance: [WAQSR Ch 6, Sec 3(h)(i)(F)(I) and (II)] [W.S. 35-11-203(b)]

- (G11) The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Air Act, Article 2 of the Wyoming Environmental Quality Act, and the WAQSR and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. It shall not be a defense for a 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 permit.

Permit Actions: [WAQSR Ch 6, Sec 3(h)(i)(F)(III)] [W.S. 35-11-206(f)]

- (G12) This permit may be modified, revoked, reopened, and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

Property Rights: [WAQSR Ch 6, Sec 3(h)(i)(F)(IV)]

- (G13) This permit does not convey any property rights of any sort, or any exclusive privilege.

Duty to Provide Information: [WAQSR Ch 6, Sec 3(h)(i)(F)(V)]

- (G14) The permittee shall furnish to the Division, within a reasonable time, any information that the Division may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit or to determine compliance with the permit. Upon request, the permittee shall also furnish to the Division copies of records required to be kept by the permit, including information claimed and shown to be confidential under W.S. 35-11-1101(a) of the Wyoming Environmental Quality Act. Upon request by the Division, the permittee shall also furnish confidential information directly to EPA along with a claim of confidentiality.

Emissions Trading: [WAQSR Ch 6, Sec 3(h)(i)(H)]

- (G15) No permit revision is required, under any approved economic incentives, marketable permits, emissions trading and other similar programs or processes for changes that are provided for in this permit.

Inspection and Entry: [WAQSR Ch 6, Sec 3(h)(iii)(B)] [W.S. 35-11-206(c)]

- (G16) Authorized representatives of the Division, upon presentation of credentials and other documents as may be required by law, shall be given permission to:
- (a) enter upon the permittee's premises where a source is located or emissions related activity is conducted, or where records must be kept under the conditions of this permit;
 - (b) have access to and copy at reasonable times any records that must be kept under the conditions of this permit;
 - (c) inspect at reasonable times any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under this permit;
 - (d) sample or monitor any substances or parameters at any location, during operating hours, for the purpose of assuring compliance with this permit or applicable requirements.

Excess Emissions Due to an Emergency: [WAQSR Ch 6, Sec 3(l)]

- (G17) The permittee may seek to establish that noncompliance with a technology-based emission limitation under this permit was due to an emergency, as defined in Ch 6, Sec 3(l)(i) of the WAQSR. To do so, the permittee shall demonstrate the affirmative defense of emergency through properly signed, contemporaneous operating logs, or other relevant evidence that:
- (a) an emergency occurred and that the permittee can identify the cause(s) of the emergency;
 - (b) the permitted facility was, at the time, being properly operated;
 - (c) during the period of the emergency the permittee took all reasonable steps to minimize levels of emissions that exceeded the emissions standards, or other requirements in this permit;

- (d) The permittee submitted notice of the emergency to the Division within one working day of the time when emission limitations were exceeded due to the emergency. This notice must contain a description of the emergency, any steps taken to mitigate emissions, and corrective actions taken.

Diluting and Concealing Emissions: [WAQSR Ch 1, Sec 4]

- (G18) No person shall cause or permit the installation or use of any device, contrivance, or operational schedule which, without resulting in reduction of the total amount of air contaminant released to the atmosphere, shall dilute or conceal an emission from a source. This condition shall not apply to the control of odors.

Unavoidable Equipment Malfunction: [WAQSR Ch 1, Sec 5]

- (G19) (a) Any source believing that any emissions in excess of established regulation limits or standards resulted from an unavoidable equipment malfunction, shall notify the Division within 24 hours of the incident via telephone, electronic mail, fax, or other similar method. A detailed description of the circumstances of the incident as described in paragraph 5(a)(i)(A) Chapter 1, including a corrective program directed at preventing future such incidents, must be submitted within 14 days of the onset of the incident. The Administrator may extend this 14-day time period for cause.
- (b) The burden of proof is on the owner or operator of the source to provide sufficient information to demonstrate that an unavoidable equipment malfunction occurred.

Fugitive Dust: [WAQSR Ch 3, Sec 2(f)]

- (G20) The permittee shall minimize fugitive dust in compliance with standards in Ch 3, Sec 2(f) of WAQSR for construction/demolition activities, handling and transportation of materials, and agricultural practices.

Carbon Monoxide: [WAQSR Ch 3, Sec 5]

- (G21) The emission of carbon monoxide in stack gases from any stationary source shall be limited as may be necessary to prevent ambient standards from being exceeded.

Asbestos: [WAQSR Ch 3, Sec 8]

- (G22) The permittee shall comply with emission standards for asbestos during abatement, demolition, renovation, manufacturing, spraying and fabricating activities.
- (a) No owner or operator shall build, erect, install, or use any article, machine, equipment, process, or method, the use of which conceals an emission which would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous dilutants to achieve compliance with a visible emissions standard, and the piecemeal carrying out of an operation to avoid coverage by a standard that applies only to operations larger than a specified size.
- (b) All owners and operators conducting an asbestos abatement project, including an abatement project on a residential building, shall be responsible for complying with Federal requirements and State standards for packaging, transportation, and delivery to an approved waste disposal facility as provided in paragraph (m) of Ch 3, Sec 8.
- (c) The permittee shall follow State and Federal standards for any demolition and renovation activities conducted at this facility, including:
- (i) A thorough inspection of the affected facility or part of the facility where the demolition or renovation activity will occur shall be conducted to determine the presence of asbestos, including Category I and Category II non-friable asbestos containing material. The results of the inspection will determine which notification and asbestos abatement procedures are applicable to the activity.
- (ii) The owner or operator shall follow the appropriate notification requirements of Ch 3, Sec 8(i)(ii).
- (iii) The owner or operator shall follow the appropriate procedures for asbestos emissions control, as specified in Chapter 3, Section 8(i)(iii).
- (d) No owner or operator of a facility may install or reinstall on a facility component any insulating materials that contain commercial asbestos if the materials are either molded and friable or wet-applied and friable after drying. The provisions of this paragraph do not apply to spray-applied insulating materials regulated under paragraph (j) of Ch 3, Sec 8.
- (e) The permittee shall comply with all other requirements of WAQSR Ch 3, Sec 8.

Open Burning Restrictions: [WAQSR Ch 10, Sec 2]

- (G23) The permittee conducting an open burn shall comply with all rules and regulations of the Wyoming Department of Environmental Quality, Division of Air Quality, and with the Wyoming Environmental Quality Act.
- (a) No person shall burn prohibited materials using an open burning method, except as may be authorized by permit. ***“Prohibited materials”*** means substances including, but not limited to; natural or synthetic rubber products, including tires; waste petroleum products, such as oil or used oil filters; insulated wire; plastic products, including polyvinyl chloride (“PVC”) pipe, tubing and connectors; tar, asphalt, asphalt shingles, or tar paper; railroad ties; wood, wood waste, or lumber that is painted or chemically treated; explosives or ammunition; batteries; hazardous waste products; asbestos or asbestos containing materials; or materials which cause dense smoke discharges, excluding refuse and flaring associated with oil and gas well testing, completions and well workovers.
 - (b) No person or organization shall conduct or cause or permit open burning for the disposal of trade wastes, for a salvage operation, for the destruction of fire hazards if so designated by a jurisdictional fire authority, or for fire fighting training, except when it can be shown by a person or organization that such open burning is absolutely necessary and in the public interest. Any person or organization intending to engage in such open burning shall file a request to do so with the Division.

Sulfur Dioxide Emission Trading and Inventory Program [WAQSR Ch 14]

- (G24) Any BART (Best Available Retrofit Technology) eligible facility, or facility which has actual emissions of SO₂ greater than 100 tpy in calendar year 2000 or any subsequent year, shall comply with the applicable requirements of WAQSR Ch 14, Sections 1 through 3, with the exceptions described in sections 2(c) and 3(a).

Stratospheric Ozone Protection Requirements: [40 CFR Part 82]

- (G25) The permittee shall comply with all applicable Stratospheric Ozone Protection Requirements, including but not limited to:
- (a) *Standards for Appliances* [40 CFR Part 82, Subpart F]
The permittee shall comply with the standards for recycling and emission reduction pursuant to 40 CFR Part 82, Subpart F - Recycling and Emissions Reduction, except as provided for motor vehicle air conditioners (MVACs) in Subpart B:
 - (i) Persons opening appliances for maintenance, service, repair, or disposal must comply with the required practices pursuant to §82.156.
 - (ii) Equipment used during the maintenance, service, repair, or disposal of appliances must comply with the standards for recycling and recovery equipment pursuant to §82.158.
 - (iii) Persons performing maintenance, service, repair, or disposal of appliances must be certified by an approved technician certification program pursuant to §82.161.
 - (iv) Persons disposing of small appliances, MVACs, and MVAC-like appliances must comply with record keeping requirements pursuant to §82.166. (“MVAC-like appliance” is defined at §82.152).
 - (v) Persons owning commercial or industrial process refrigeration equipment must comply with the leak repair requirements pursuant to §82.166.
 - (vi) Owners/operators of appliances normally containing 50 or more pounds of refrigerant must keep records of refrigerant purchased and added to such appliances pursuant to §82.166.
 - (vii) The permittee shall comply with all other requirements of Subpart F.
 - (b) *Standards for Motor Vehicle Air Conditioners* [40 CFR Part 82, Subpart B]
If the permittee performs a service on motor (fleet) vehicles when this service involves ozone-depleting substance 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. The term “MVAC” as used in Subpart B does not include the air-tight sealed refrigeration system used as refrigerated cargo, or the system used on passenger buses using HCFC-22 refrigerant.

STATE ONLY PERMIT CONDITIONS
(modified July 16, 2013) (modified February 28, 2014)

The conditions listed in this section are State only requirements and are not federally enforceable.

Ambient Standards

(S1) The permittee shall operate the emission units described in this permit such that the following ambient standards are not exceeded, *in accordance with 40 CFR 50:*

POLLUTANT	STANDARD	CONDITION	WAQSR CH. 2, SEC.
PM ₁₀ particulate matter	50 micrograms per cubic meter	annual arithmetic mean	2 (a)
	150 micrograms per cubic meter	24-hr average concentration with not more than one exceedance per year	
PM _{2.5} particulate matter	15 micrograms per cubic meter	annual arithmetic mean	2 (b)
	35 micrograms per cubic meter	98 th percentile 24-hour average concentration	
Nitrogen dioxide	53 parts per billion	annual average concentration	3
	100 parts per billion	three-year average of the annual 98 th percentile of the daily maximum 1-hr average concentration	
	0.053 parts per million	annual arithmetic mean	
Sulfur dioxide	75 parts per billion	three-year average of the annual (99 th percentile) of the daily max 1-hr average	4
	0.5 parts per million	3-hr blocks not to be exceeded more than once per calendar year	
Carbon monoxide	10 milligrams per cubic meter	max 8-hr concentration with not more than one exceedance per year	5
	40 milligrams per cubic meter	max 1-hr concentration with not more than one exceedance per year	
Ozone	0.075 parts per million	three-year average of the annual fourth-highest daily maximum 8-hour average concentration	6
Hydrogen sulfide	70 micrograms per cubic meter	½ hour average not to be exceeded more than two times per year	7
	40 micrograms per cubic meter	½ hour average not to be exceeded more than two times in any five consecutive days	
Suspended sulfate	0.25 milligrams SO ₃ per 100 square centimeters per day	maximum annual average	8
	0.50 milligrams SO ₃ per 100 square centimeters per day	maximum 30-day value	
Lead and its compounds	0.15 micrograms per cubic meter	maximum arithmetic 3-month mean concentration for a 3-year period	10

Hydrogen Sulfide: [WAQSR Ch 3, Sec 7]

- (S2) Any exit process gas stream containing hydrogen sulfide which is discharged to the atmosphere from any source shall be vented, incinerated, flared or otherwise disposed of in such a manner that ambient sulfur dioxide and hydrogen sulfide standards are not exceeded.

Odors: [WAQSR Ch 2, Sec 11]

- (S3) (a) The ambient air standard for odors from any source shall be limited to an odor emission at the property line which is undetectable at seven dilutions with odor free air as determined by a scentometer as manufactured by the Barnebey-Cheney Company or any other instrument, device, or technique designated by the Division as producing equivalent results. The occurrence of odors shall be measured so that at least two measurements can be made within a period of one hour, these determinations being separated by at least 15 minutes.
- (b) Odor producing materials shall be stored, transported, and handled in a manner that odors produced from such materials are confined and that accumulation of such materials resulting from spillage or other escape is prevented.

SUMMARY OF SOURCE EMISSION LIMITS AND REQUIREMENTS

Source ID#: **B-4301** Source Description: **Auxiliary Boiler (for Trains 1 & 2) (modified July 16, 2013)**

Pollutant	Emissions Limit/Work Practice Standard	Corresponding Regulation(s)	Testing Requirements	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Particulate	20 percent opacity [F5]	WAQSR Ch 3, Sec 2	Testing if required [F10]	Verification of natural gas firing [F12]	Record the results of any additional testing [F19]	Report type of fuel fired [F25] Report excess emissions and permit deviations [F29]
NO _x	2.3 lb/hr & 10.1 TPY [F6]	WAQSR Ch 6, Sec 2 Permits MD-343 & CT-1362	Testing if required [F10]	5-yr monitoring [F13(g)]	Record the results of the once per five year testing [F19(d)]	Report monitoring results [F26] Report excess emissions and permit deviations [F29]
HAPs	WAQSR Ch 5, Sec 3 and 40 CFR 63 Subparts A & DDDDD					
Other	WAQSR Ch 5, Sec 2 and 40 CFR 60 Subparts A & Dc					

Source ID#: **B-4301-3** Source Description: **Auxiliary Boiler (for Train 3) (modified July 16, 2013)**

Pollutant	Emissions Limit/Work Practice Standard	Corresponding Regulation(s)	Testing Requirements	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Particulate	20 percent opacity [F5]	WAQSR Ch 3, Sec 2	Testing if required [F10]	Verification of natural gas firing [F12]	Record the results of any additional testing [F19]	Report type of fuel fired [F25] Report excess emissions and permit deviations [F29]
NO _x	0.12 lb/MMBtu, 9.2 lb/hr & 9.5 TPY [F6] Maintain to fuel meter to manufacturer's specifications [F8]	WAQSR Ch 6, Sec 2 Permit CT-1946A	Once per five year [F13(f)(ii)] Testing if required [F10]	Annual emissions calculations and 5-yr monitoring [F13(f)]	Record the results of the annual emissions calculations and once per five year testing [F19(d)] Record maintenance activities [F22]	Report annual emissions [F26] Report excess emissions and permit deviations [F29]
CO	0.17 lb/MMBtu, 13.0 lb/hr & 13.4 TPY [F6]	WAQSR Ch 6, Sec 2 Permit CT-1946A	Once per five year [F13(f)(ii)] Testing if required [F10]	Annual emissions calculations and 5-yr monitoring [F13(f)]	Record the results of the annual emissions calculations and once per five year testing [F19(d)]	Report annual emissions [F26] Report excess emissions and permit deviations [F29]
HAPS	WAQSR Ch 5, Sec 3 and 40 CFR 63 Subparts A & DDDDD					
Other	WAQSR Ch 5, Sec 2 and 40 CFR 60 Subparts A & Dc					

These tables are intended only to highlight and summarize applicable requirements for each source. The corresponding permit conditions, listed in brackets, contain detailed descriptions of the compliance requirements. Compliance with the summary conditions in these tables may not be sufficient to meet permit requirements. These tables may not reflect all emission sources at this facility.

Source ID#: H-3302-1 & H-3302-2 Source Description: Tail Gas Incinerators - Trains 1 & 2 (modified July 16, 2013)

Pollutant	Emissions Limit/Work Practice Standard	Corresponding Regulation(s)	Testing Requirements	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Particulate	20 percent opacity [F5]	WAQSR Ch 3, Sec 2	Testing if required [F10]	None [F12]	Record the results of any additional testing [F19]	Report excess emissions and permit deviations [F29]
NO _x	5.0 lb/hr & 21.9 TPY each [F6]	WAQSR Ch 6, Sec 2 Permits MD-343 & CT-1362	Testing if required [F10]	Once every two years NO _x emissions monitoring [F13]	Record monitoring results [F19]	Report monitoring results [F26] Report excess emissions and permit deviations [F29]
CO	100 lb/hr & 438 TPY each [F6]	WAQSR Ch 6, Sec 2 Permits MD-343 & CT-1362	Testing if required [F10]	Annual CO emissions monitoring [F13]	Record monitoring results [F19]	Report monitoring results [F26] Report excess emissions and permit deviations [F29]
SO ₂	115 lb/hr & 504 TPY each [F6] 99.8% sulfur recovery efficiency, and incinerator gas exit temperature of at least 1000°F [F7] Comply with all CAM requirements [CAM-1]	WAQSR Ch 6, Sec 2 Permits MD-343, CT-939 & CT-1362; and WAQSR Ch 7, Sec 3	Testing if required [F10]	Continuously monitor emissions, gas temperatures and flow rates [F14] Sample gas streams at least once every 12 hour period [F14] [CAM-2]	Record exit gas temperature, average SO ₂ emissions, average sulfur recovery efficiency and other information [F20] Record all startup, shutdown, malfunctions and CMS downtime [F20] QIP records if required [CAM-3]	Quarterly reports [F27] Report excess emissions and permit deviations [F29]
SO ₂	WAQSR Ch 5, Sec 2 and 40 CFR 60 Subparts A & LLL					
H ₂ S	0.8 lb/hr & 3.5 TPY each [F6]	WAQSR Ch 6, Sec 2 Permits MD-343 & CT-1362	Testing if required [F10]	Same as for SO ₂	Same as for SO ₂	Report excess emissions and permit deviations [F29]

These tables are intended only to highlight and summarize applicable requirements for each source. The corresponding permit conditions, listed in brackets, contain detailed descriptions of the compliance requirements. Compliance with the summary conditions in these tables may not be sufficient to meet permit requirements. These tables may not reflect all emission sources at this facility.

Source ID#: H-3302-3 Source Description: Tail Gas Incinerator – Train 3 (modified July 16, 2013)

Pollutant	Emissions Limit/Work Practice Standard	Corresponding Regulation(s)	Testing Requirements	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Particulate	20 percent opacity [F5]	WAQSR Ch 3, Sec 2	Testing if required [F10]	None [F12]	Record the results of any additional testing [F19]	Report excess emissions and permit deviations [F29]
NO _x	13.5 lb/hr & 59.1 TPY [F6]	WAQSR Ch 6, Sec 2 Permit CT-1946A	Testing if required [F10]	Annual NO _x emissions monitoring [F13]	Record monitoring results [F19]	Report monitoring results [F26] Report excess emissions and permit deviations [F29]
CO	330 lb/hr & 1445 TPY [F6]	WAQSR Ch 6, Sec 2 Permit CT-1946A	Testing if required [F10]	Annual CO emissions monitoring [F13]	Record monitoring results [F19]	Report monitoring results [F26] Report excess emissions and permit deviations [F29]
SO ₂	312 lb/hr & 1367 TPY [F6] 99.8% sulfur recovery efficiency, and incinerator gas exit temperature of at least 1000°F [F7] Comply with all CAM requirements [CAM-1]	WAQSR Ch 6, Sec 2 Permit CT-1946A; and WAQSR Ch 7, Sec 3	Testing if required [F10]	Continuously monitor emissions, gas temperatures and flow rates [F14] Sample gas streams at least once every 12 hour period [F14] [CAM-2]	Record exit gas temperature, average SO ₂ emissions, average sulfur recovery efficiency and other information [F20] Record all startup, shutdown, malfunctions and CMS downtime [F20] QIP records if required [CAM-3]	Quarterly reports [F27] Report excess emissions and permit deviations [F29]
SO ₂	WAQSR Ch 5, Sec 2 and 40 CFR 60 Subparts A & LLL					
H ₂ S	2.2 lb/hr & 9.5 TPY [F6]	WAQSR Ch 6, Sec 2 Permit CT-1946A	Testing if required [F10]	Same as for SO ₂	Same as for SO ₂	Report excess emissions and permit deviations [F29]

These tables are intended only to highlight and summarize applicable requirements for each source. The corresponding permit conditions, listed in brackets, contain detailed descriptions of the compliance requirements. Compliance with the summary conditions in these tables may not be sufficient to meet permit requirements. These tables may not reflect all emission sources at this facility.

Source ID#: S-2118-1 & S-2118-2 Source Description: CO₂ Product Vents #1 & #2

Pollutant	Emissions Limit/Work Practice Standard	Corresponding Regulation(s)	Testing Requirements	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Particulate	20 percent opacity [F5]	WAQSR Ch 3, Sec 2	Testing if required [F10]	Weekly observations [F12(c)]	Record observation results [F18]	Semiannual summary report [F25] Report excess emissions and permit deviations [F29]
H ₂ S	0.5 lb/hr & 2.2 TPY each [F6]	WAQSR Ch 6, Sec 2 Permits MD-343 & CT-1362	Testing if required [F10]	None	Record the results of any additional testing [F19]	Report excess emissions and permit deviations [F29]
COS	130 lb/hr & 569 TPY each [F6]	WAQSR Ch 6, Sec 2 Permits MD-343 & CT-1362	Testing if required [F10]	Weekly sampling & COS calculations [F15]	Record sampling & calculation results [F21]	Quarterly reports [F27] Report excess emissions and permit deviations [F29]

Source ID#: S-2118-3 Source Description: CO₂ Product Vent #3

Pollutant	Emissions Limit/Work Practice Standard	Corresponding Regulation(s)	Testing Requirements	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Particulate	20 percent opacity [F5]	WAQSR Ch 3, Sec 2	Testing if required [F10]	Weekly observations [F12(c)]	Record observation results [F18]	Semiannual summary report [F25] Report excess emissions and permit deviations [F29]
H ₂ S	2.2 lb/hr & 9.6 TPY [F6]	WAQSR Ch 6, Sec 2 Permit CT-1946A	Testing if required [F10]	None	Record the results of any additional testing [F19]	Report excess emissions and permit deviations [F29]
COS	360 lb/hr & 1577 TPY [F6] 24% COS control efficiency [F7] Comply with all CAM requirements [CAM-1]	WAQSR Ch 6, Sec 2 Permit CT-1946A; and WAQSR Ch 7, Sec 3	Testing if required [F10]	CEM, sampling, and calculations [F15] [CAM-2]	Record monitoring and sampling and calculations [F21] [CAM-3]	Quarterly reports [F27] Report excess emissions and permit deviations [F29]

These tables are intended only to highlight and summarize applicable requirements for each source. The corresponding permit conditions, listed in brackets, contain detailed descriptions of the compliance requirements. Compliance with the summary conditions in these tables may not be sufficient to meet permit requirements. These tables may not reflect all emission sources at this facility.

Source ID#: H-5201 & H-5201-3 Source Description: Flares – Pilot flames

Pollutant	Emissions Limit / Work Practice Standard	Corresponding Regulation(s)	Testing Requirements	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Particulate	20 percent opacity [F5]	WAQSR Ch 3, Sec 2	Testing if required [F10]	Weekly observations [F12(c)]	Record the results of the weekly observations [F18]	Semiannual summary report of weekly observations [F25] Report excess emissions and permit deviations [F29]
SO ₂	Follow Operating Plan attached as Appendix A [F1]	WAQSR Ch 6, Sec 2 Permit CT-1946A	Testing if required [F10]	Monitor acid and sour gas flaring and abnormal operations [F11]	Record all acid and sour gas flaring and abnormal operations [F17]	Report all acid and sour gas flaring and abnormal operations with the quarterly excess emissions reports [F24] Report excess emissions and permit deviations [F29]

Source ID#: G-4801-3 Source Description: Centaur 40-T47008 Gas Turbine Emergency Generator Engine (modified July 16, 2013)

Pollutant	Emissions Limit/Work Practice Standard	Corresponding Regulation(s)	Testing Requirements	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Particulate	20 percent opacity [F5] Limited to 100 hours annual operation [F6]	WAQSR Ch 3, Sec 2 and Ch 6, Sec 2 Waiver AP-0530	Testing if required [F10]	Monitor fuel type [F12] Monitor hours of operation [F13]	Record the annual hours of operation [F19]	Report the type of fuel fired [F25] Report the annual hours of operation [F26] Report excess emissions and permit deviations [F29]
SO ₂	WAQSR Ch 5, Sec 2 and 40 CFR 60 Subparts A & GG					
HAPs	WAQSR Ch 5, Sec 3 and 40 CFR 63 Subparts A & YYYY					

These tables are intended only to highlight and summarize applicable requirements for each source. The corresponding permit conditions, listed in brackets, contain detailed descriptions of the compliance requirements. Compliance with the summary conditions in these tables may not be sufficient to meet permit requirements. These tables may not reflect all emission sources at this facility.

Source ID#: G-4810 Source Description: **Generac A7083 Propane Emergency Generator Engine (modified July 16, 2013)**

Pollutant	Emissions Limit/Work Practice Standard	Corresponding Regulation(s)	Testing Requirements	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Particulate	20 percent opacity [F5] Limited to 100 hours annual operation [F6]	WAQSR Ch 3, Sec 2	Testing if required [F10]	Monitor annual hours of operation [F13]	Record the annual hours of operation [F19]	Report annual hours of operation [F26] Report excess emissions and permit deviations [F29]
HAPs	WAQSR Ch 5, Sec 3 and 40 CFR 63 Subparts A & ZZZZ					

Source ID#: P-5303-2 Source Description: **Perkins Diesel Emergency Firewater Pump Engine (modified July 16, 2013)**

Pollutant	Emissions Limit/Work Practice Standard	Corresponding Regulation(s)	Testing Requirements	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Particulate	30 percent opacity [F5] Limited to 100 hours annual operation [F6]	WAQSR Ch 3, Sec 2	Testing if required [F10]	Semiannual VE observations [F12] Monitor annual hours of operation [F13]	Record the annual hours of operation [F19]	Report annual hours of operation [F26] Report excess emissions and permit deviations [F29]
HAPs	WAQSR Ch 5, Sec 3 and 40 CFR 63 Subparts A & ZZZZ					

Source ID#: G-4801, G-4801-2, & G-4820 Source Description: **Emergency Diesel Generator Engines (modified July 16, 2013)**

Pollutant	Emissions Limit/Work Practice Standard	Corresponding Regulation(s)	Testing Requirements	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Particulate	30 percent opacity [F5]	WAQSR Ch 3, Sec 2	Testing if required [F10]	Semiannual VE observations [F12]	Record visible emissions [F18]	Report excess emissions and permit deviations [F29]
HAPs	WAQSR Ch 5, Sec 3 and 40 CFR 63 Subparts A & ZZZZ					

These tables are intended only to highlight and summarize applicable requirements for each source. The corresponding permit conditions, listed in brackets, contain detailed descriptions of the compliance requirements. Compliance with the summary conditions in these tables may not be sufficient to meet permit requirements. These tables may not reflect all emission sources at this facility.

Source ID#: **None** Source Description: **Roads**

Pollutant	Emissions Limit/Work Practice Standard	Corresponding Regulation(s)	Testing Requirements	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Particulate	Treat with a dust suppressant [F4]	WAQSR Ch 6, Sec 2 Permit CT-1946A	None	Monitor dust control measures [F11]	Records dust control measures [F17]	Report excess emissions and permit deviations [F29]

Source ID#: **None** Source Description: **Methanol Tanks**

Pollutant	Emissions Limit/Work Practice Standard	Corresponding Regulation(s)	Testing Requirements	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
VOC	Monitor throughput [F11(d)]	WAQSR Ch 6, Sec 2 Waiver wv-10486	None	Monitor methanol throughput [F11(d)]	Record methanol throughput [F17(d)]	Report excess emissions and permit deviations [F29]

These tables are intended only to highlight and summarize applicable requirements for each source. The corresponding permit conditions, listed in brackets, contain detailed descriptions of the compliance requirements. Compliance with the summary conditions in these tables may not be sufficient to meet permit requirements. These tables may not reflect all emission sources at this facility.

ABBREVIATIONS

AQD	Air Quality Division
BACT	Best available control technology (see Definitions)
Btu	British Thermal Unit
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CI	Compression Ignition
C.F.R.	Code of Federal Regulations
CMS	Continuous Monitoring System
CO	Carbon monoxide
COS	Carbonyl Sulfide
°F	Degrees Fahrenheit
DEQ	Wyoming Department of Environmental Quality
EPA	United States Environmental Protection Agency (see Definitions)
g/hp-hr	Gram(s) per horsepower hour
gal	Gallon(s)
H ₂ S	Hydrogen sulfide
HAP(s)	Hazardous air pollutant(s)
hp	Horsepower
hr	Hour(s)
ICE	Internal Combustion Engine
lb	Pound(s)
M	Thousand
MACT	Maximum available control technology (see Definitions)
mfr	Manufacturer
mg	Milligram(s)
MM	Million
MVACs	Motor vehicle air conditioners
N/A	Not applicable
NAICS	North American Industrial Classification System
NO _x	Oxides of nitrogen
O ₂	Oxygen
OPP	Operating Permit Program
PM	Particulate matter
PM ₁₀	Particulate matter less than or equal to a nominal diameter of 10 micrometers
ppmv	Parts per million (by volume)
QIP	Quality Improvement Plan
RICE	Reciprocating Internal Combustion Engine
SCF	Standard cubic foot (feet)
SCFD	Standard cubic foot (feet) per day
SCM	Standard cubic meter(s)
SI	Spark Ignition
SIC	Standard Industrial Classification
SO ₂	Sulfur dioxide
SO ₃	Sulfur trioxide
SO _x	Oxides of sulfur
SRU	Sulfur Recovery Unit
TPD	Ton(s) per day
TPY	Tons per year
U.S.C.	United States Code
µg	Microgram(s)
VOC(s)	Volatile organic compound(s)
W.S.	Wyoming Statute
WAQSR	Wyoming Air Quality Standards & Regulations (see Definitions)

DEFINITIONS

"Act" means the Clean Air Act, as amended, 42 U.S.C. 7401, *et seq.*

"Administrator" means Administrator of the Air Quality Division, Wyoming Department of Environmental Quality.

"Applicable requirement" means all of the following as they apply to emissions units at a source subject to Chapter 6, Section 3 of the WAQSR (including requirements with future effective compliance dates that have been promulgated or approved by the EPA or the State through rulemaking at the time of issuance of the operating permit):

- (a) Any standard or other requirement provided for in the Wyoming implementation plan approved or promulgated by EPA under title I of the Act that implements the relevant requirements of the Act, including any revisions to the plan promulgated in 40 C.F.R. Part 52;
- (b) Any standards or requirements in the WAQSR which are not a part of the approved Wyoming implementation plan and are not federally enforceable;
- (c) Any term or condition of any preconstruction permits issued pursuant to regulations approved or promulgated through rulemaking under title I, including parts C or D of the Act and including Chapter 5, Section 2 and Chapter 6, Sections 2 and 4 of the WAQSR;
- (d) Any standard or other requirement promulgated under Section 111 of the Act, including Section 111(d) and Chapter 5, Section 2 of the WAQSR;
- (e) Any standard or other requirement under Section 112 of the Act, including any requirement concerning accident prevention under Section 112(r)(7) of the Act and including any regulations promulgated by EPA and the State pursuant to Section 112 of the Act;
- (f) Any standard or other requirement of the acid rain program under title IV of the Act or the regulations promulgated thereunder;
- (g) Any requirements established pursuant to Section 504(b) or Section 114(a)(3) of the Act concerning enhanced monitoring and compliance certifications;
- (h) Any standard or other requirement governing solid waste incineration, under Section 129 of the Act;
- (i) Any standard or other requirement for consumer and commercial products, under Section 183(e) of the Act (having to do with the release of volatile organic compounds under ozone control requirements);
- (j) Any standard or other requirement of the regulations promulgated to protect stratospheric ozone under title VI of the Act, unless the EPA has determined that such requirements need not be contained in a title V permit;
- (k) Any national ambient air quality standard or increment or visibility requirement under part C of title I of the Act, but only as it would apply to temporary sources permitted pursuant to Section 504(e) of the Act; and
- (l) Any state ambient air quality standard or increment or visibility requirement of the WAQSR.
- (m) Nothing under paragraphs (A) through (L) above shall be construed as affecting the allowance program and Phase II compliance schedule under the acid rain provision of Title IV of the Act.

"BACT" or "Best available control technology" means an emission limitation (including a visible emission standard) based on the maximum degree of reduction of each pollutant subject to regulation under the WAQSR or regulation under the Federal Clean Air Act, which would be emitted from or which results for any proposed major emitting facility or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application or production processes and available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular class of sources would make the imposition of an emission standard infeasible, he may instead prescribe a design, equipment, work practice or operational standard or combination thereof to satisfy the requirement of Best Available Control Technology. Such standard shall, to the degree possible, set forth the emission reduction achievable by implementation of such design, equipment, work practice, or operation and shall provide for compliance by means which achieve equivalent results. Application of BACT shall not result in emissions in excess of those allowed under

Chapter 5, Section 2 of the WAQSR and any other new source performance standard or national emission standards for hazardous air pollutants promulgated by EPA but not yet adopted by the state.

"Department" means the Wyoming Department of Environmental Quality or its Director.

"Director" means the Director of the Wyoming Department of Environmental Quality.

"Division" means the Air Quality Division of the Wyoming Department of Environmental Quality or its Administrator.

"Emergency" means any situation arising from sudden and reasonably unforeseeable events beyond the control of the source, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission limitation under the permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

"EPA" means the Administrator of the U.S. Environmental Protection Agency or the Administrator's designee.

"Fuel-burning equipment" means any furnace, boiler apparatus, stack, or appurtenances thereto used in the process of burning fuel or other combustible material for the purpose of producing heat or power by indirect heat transfer.

"Fugitive emissions" means those emissions which could not reasonably pass through a stack chimney, vent, or other functionally equivalent opening.

"Insignificant activities" means those activities which are incidental to the facility's primary business activity and which result in emissions of less than one ton per year of a regulated pollutant not included in the Section 112 (b) list of hazardous air pollutants or emissions less than 1000 pounds per year of a pollutant regulated pursuant to listing under Section 112 (b) of the Act provided, however, such emission levels of hazardous air pollutants do not exceed exemptions based on insignificant emission levels established by EPA through rulemaking for modification under Section 112 (g) of the Act.

"MACT" or "Maximum achievable control technology" means the maximum degree of reduction in emissions that is deemed achievable for new sources in a category or subcategory that shall not be less stringent than the emission control that is achieved in practice by the best controlled similar source, as determined by the Administrator. Emission standards promulgated for existing sources in a category or subcategory may be less stringent than standards for new sources in the same category or subcategory but shall not be less stringent, and may be more stringent than:

- (a) the average emission limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emission information), excluding those sources that have, within 18 months before the emission standard is proposed or within 30 months before such standard is promulgated, whichever is later, first achieved a level of emission rate or emission reduction which complies, or would comply if the source is not subject to such standard, with the lowest achievable emission rate applicable to the source category and prevailing at the time, in the category or subcategory for categories and subcategories with 30 or more sources, or
- (b) the average emission limitation achieved by the best performing five sources (for which the Administrator has or could reasonably obtain emissions information) in the category or subcategory for categories or subcategories with fewer than 30 sources.

"Modification" means any physical change in, or change in the method of operation of, an affected facility which increases the amount of any air pollutant (to which any state standards applies) emitted by such facility or which results in the emission of any such air pollutant not previously emitted.

"Permittee" means the person or entity to whom a Chapter 6, Section 3 permit is issued.

"Potential to emit" means the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation is enforceable by EPA and the Division. This term does not alter or affect the use of this term for any other purposes under the Act, or the term "capacity factor" as used in title IV of the Act or the regulations promulgated thereunder.

"Regulated air pollutant" means the following:

- (a) Nitrogen oxides (NO_x) or any volatile organic compound;
- (b) Any pollutant for which a national ambient air quality standard has been promulgated;
- (c) Any pollutant that is subject to any standard established in Chapter 5, Section 2 of the WAQSR or Section 111 of the Act;
- (d) Any Class I or II substance subject to a standard promulgated under or established by title VI of the Act; or
- (e) Any pollutant subject to a standard promulgated under Section 112 or other requirements established under Section 112 of the Act, including Sections 112(g), (j), and (r) of the Act, including the following:
 - (i) Any pollutant subject to requirements under Section 112(j) of the Act. If EPA fails to promulgate a standard by the date established pursuant to Section 112(e) of the Act, any pollutant for which a subject source would be major shall be considered to be regulated on the date 18 months after the applicable date established pursuant to Section 112(e) of the Act; and
 - (ii) Any pollutant for which the requirements of Section 112(g)(2) of the Act have been met, but only with respect to the individual source subject to Section 112(g)(2) requirement.
- (f) Pollutants regulated solely under Section 112(r) of the Act are to be regulated only with respect to the requirements of Section 112(r) for permits issued under this Chapter 6, Section 3 of the WAQSR.

"Renewal" means the process by which a permit is reissued at the end of its term.

"Responsible official" means one of the following:

- (a) For a corporation:
 - (i) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or
 - (ii) A duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit and either:
 - (A) the facilities employ more than 250 persons or have gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars); or
 - (B) the delegation of authority to such representative is approved in advance by the Division;
- (b) For a partnership or sole proprietorship: a general partner or the proprietor, respectively;
- (c) For a municipality, State, Federal, or other public agency: Either a principal executive officer or ranking elected official. For the purposes of this part, a principal executive officer of a federal agency includes the chief executive officer having responsibility for the overall operations of a principal geographic unit of the agency; or
- (d) For affected sources:
 - (i) The designated representative or alternate designated representative in so far as actions, standards, requirements, or prohibitions under title IV of the Act or the regulations promulgated thereunder are concerned; and
 - (ii) The designated representative, alternate designated representative, or responsible official under Chapter 6, Section 3 (b)(xxvi) of the WAQSR for all other purposes under this section.

"WAQSR" means the Wyoming Air Quality Standards and Regulations promulgated under the Wyoming Environmental Quality Act, W.S. §35-11-101, *et seq.*

Appendix A
Operating Plan for Minimizing SO₂ Emissions

**Burlington Resources
Oil & Gas Company, LP**

Lost Cabin Gas Plant

**ABNORMAL EMISSIONS OPERATION PROCEDURES
AND EMISSIONS ESTIMATES**

(OPERATING PLAN - TRAINS 1, 2 & 3)

WDEQ Operating Permit # 3-1-157-2

Revised: December, 2008

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TABLES

SO₂ EMISSIONS FOR TRAINS 1, 2 & 3

T1 and T2 Master Calculations

T3 Master Calculations

Table 1	Total Plant Startup (cold)
Table 2	Total Plant Shutdown (cold)
Table 3	SCOT TGU Shutdown and Startup
Table 4	SRU & SCOT TGU Shutdown and Startup
Table 5	H ₂ S Recycle Compressor Shutdown

Introduction

This Operating Plan discusses abnormal operations and resulting SO₂ emissions for the Lost Cabin Gas Plant, Trains 1, 2 & 3. This plan or procedure, targets typical abnormal operations that may occur, but the plan is not necessarily inclusive of all abnormal operations that can occur.

The Lost Cabin Plant consists of three gas-processing trains designed to handle inlet sour gas rates and produce residue gas at the rates shown below. The design turndown rate, or minimum inlet sour gas-processing rate, for each gas train is also displayed. The three gas processing trains are basically identical in design (except for size) and are comprised primarily of the following units. The operations of these units are critical to the production of residue gas and control of SO₂ emissions.

Selexol Gas Treating Unit, or Selexol Plant
Claus Sulfur Recovery Unit or Claus SRU
SCOT Tail Gas Unit or SCOT TGU

Gas Processing Rates				
	Inlet	Turndown Inlet	Residue	Turndown Residue
TRAIN 1	66.5 MMSCFD	30 MMSCFD	45 MMSCFD	20 MMSCFD
TRAIN 2	66.5 MMSCFD	30 MMSCFD	45 MMSCFD	20 MMSCFD
TRAIN 3	225 MMSCFD	98 MMSCFD	153 MMSCFD	65 MMSCFD

Note: Residue rates (Sales gas plus fuel gas for in-plant use) are approximately 68% of inlet sour gas rates. Therefore during turndown operations, such as for Train 3, the residue rate would be around 65 MMSCFD.

Reasonable effort will be made to minimize emissions during abnormal operations. Efforts will also be made to maintain normal operations for one gas processing train when one of the other trains is experiencing abnormal operations. There will be occasions such as loss of power or emergency situations that require all trains to be shutdown.

This operating plan targets abnormal conditions for each gas processing train as shown on the attached tables. The facility is designed so that each train can generally operate independent of the other trains and is not normally affected by abnormal operations in the adjacent trains.

Anticipated emissions resulting from each step of the operations is shown on the attached tables and is described in the following text. Note that the numbered steps in the tables correspond to the sequence of numbers for the text.

This version is a revision of the document submitted on September 20, 2006 and approved by the Wyoming Department of Environmental Quality (WDEQ) in an acceptance letter dated November 2, 2006. This revision addresses the fact that maximum inlet gas flow rate for Train 3 processing can exceed the 180 MMSCFD referenced in the current Title V operating permit without any changes in permitted emission and throughput limits due to efficient operation. The 180 MMSCFD throughput is only mentioned once in the current construction permit and in the operating permit only as descriptive information. Since 180 MMSCFD is not tied to the derivation of any permitted emission limit and the throughput itself is not a stated permit limit and/or term and condition, no formal permitting action is required. However, emission estimates stated in the Abnormal Emissions Operating Plan (Plan) do depend upon the estimate of maximum inlet gas flow rate. Therefore, this revised Plan is submitted to reflect a maximum inlet gas flow rate of 225 MMSCFD possible for Train 3 and the resultant increase in

SO₂ emissions from Train III during abnormal operations. Specific changes to this Plan from the most recent Plan submitted on September 20, 2006 are highlighted by italicizing and underlining them.

1. Single Train Startup (cold)

During the initial plant startup and during subsequent plant startups after extended plant shutdowns, i.e. shutdowns for complete plant maintenance/turnaround lasting typically 7-10 days; it will be necessary to start up the plant from a total systems down/cold position. During this startup phase, the flaring of certain sour gas and acid gas streams will be required for short periods of time. All efforts are to be made to minimize these abnormal flaring episodes to both keep emissions levels to a minimum and to conserve potential plant product and revenue, i.e., pipeline sales gas and sulfur product.

The following procedure will be used during this plant startup scenario.

1.1 All utility systems serving the plant will be commissioned and verified to be in functional order. Utility systems to be commissioned are

- Electrical power
- Instrument and plant air
- Nitrogen
- Water and water treating
- Fuel gas
- Flare
- Steam (including the Incinerator and associated waste heat boiler)
- Waste water disposal
- Sewer/process drain systems

1.2 The Selexol Plant will be brought up to a standby/ready mode.

Selexol solvent circulation will be established in both the H₂S side solvent circuit and the CO₂ side solvent circuit with circulation through the H₂S Absorber, the CO₂ Absorber, the H₂S Stripper, and the entire solvent circuit.

The H₂S Stripper will be brought up to operating temperatures with the H₂S Stripper Reboiler and stripper reflux established in preparation for the stripping of rich Selexol solvent when sour gas is introduced.

The propane refrigeration system will be commissioned and put in a circulating/standby condition to provide for Selexol solvent cooling, as required.

The H₂S Recycle Compressors and the CO₂ Recycle Compressors will be started and put in a recycle/standby condition awaiting net positive flows when sour gas is introduced into the plant.

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- 1.3 The Claus Sulfur Recovery Unit (SRU) will be brought up to a standby/ready mode.

The steam sides of the SRU Waste Heat Boiler and the Sulfur Condensers will be commissioned. Fuel gas will be fired in the Reaction Furnace with a stoichiometric quantity of air to begin slowly bringing up the Reaction Furnace and the (3) Sulfur Reactors temperatures. Firing rate adjustments and corresponding temperature increases will be made slowly with consideration for refractory curing and thermal stressing. Stoichiometric fuel gas firing will be carefully monitored and maintained to prevent sulfur fires internal to the SRU.

If the Reaction Furnace is preheated with the vent between the Reaction Furnace and the first Sulfur Condenser open, additional emissions from the vent will be measured and included in the Annual Emissions Inventory.

- 1.4 The SCOT Tail Gas Unit will be brought up to a standby/ready mode.

The SCOT solvent system will be commissioned establishing SCOT solvent circulation around the solvent circuit from the SCOT Absorber to the SCOT Stripper and back to the SCOT Absorber.

The SCOT Stripper will be brought up to operating temperatures with the SCOT Stripper Reboiler and stripper reflux established in preparation for the stripping of rich SCOT solvent when sour feed gas is introduced.

The SCOT Quench Tower and associated quench water circulation system will be commissioned. The associated Sour Water Stripper will be commissioned and brought up to operating temperatures with the Sour Water Stripper Reboiler in preparation for the processing of sour water from the SCOT quench system when sour feed gas is introduced.

The SCOT Reducing Gas Generator and SCOT Reactor are then commissioned to a standby mode by starting gas circulation through the unit by using the SCOT Startup Blower. Operating temperatures are established in the SCOT Reducing Gas Generator and the SCOT Reactor utilizing this gas recirculation until sour gas feed is introduced.

- 1.5 The Inlet Separation and Inlet Water Handling Systems, including the produced water H₂S Stripper, will be commissioned and brought up to a standby mode.

- 1.6 The plant is now in a ready and standby mode awaiting the introduction of sour gas and sour production water from the field sour gas production wells. Operating conditions within the plant are as close to normal as is possible without Plant feed gas having been introduced. It will normally require a 2-4 day time frame to bring the gas train to this level of operations, from a cold starting mode. Any plant debugging will be performed prior to the introduction of sour gas to the plant from the wells.

At this point in the startup sequence, no significant SO₂ emissions have resulted. The only SO₂ emissions, which have occurred, are those as a result of firing sweet fuel gas (containing <1/4 gr H₂S/100 SCF) in the Auxiliary Boiler, the Tail Gas Incinerator, the Emergency Flare.

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If the Reaction Furnace is preheated with the vent between the Reaction Furnace and the first Sulfur Condenser open, additional emissions from the vent will be measured and included in the Annual Emissions Inventory.

- 1.7 Sour production gas is now introduced into the gas train at the respective turndown rate as noted in the introduction. During an initial period, after introducing sour field gas to the plant, it will be necessary to flare via the Emergency Flare the acid gas stream produced from the Selexol Plant H₂S Stripper in accordance with Table 1, Step 1.7. This is necessary to allow conditions in the Selexol Plant to stabilize and to stabilize the quality of the SRU acid gas.

The residue gas from the Selexol Plant will not initially meet pipeline quality and will have to be flared in the Emergency Flare. We anticipate the flaring period for the off-specification residue gas to be 2 hours, during which time its H₂S content will be significantly lower than the H₂S content of the sour production gas, but will not meet pipeline quality. Although we anticipate this period to be 2 hours, gas sales will begin as soon as the residue gas meets pipeline specifications.

Total SO₂ emissions during this Selexol Plant startup phase, from both the flaring of off specification residue gas and acid gas, will be equivalent to flaring of the inlet sour gas feed as displayed for each gas train in Table 1, step 1.7.

- 1.8 Acid gas from the Selexol Plant will then be routed from the Emergency Flare to the Claus SRU at the turndown rate of sour inlet gas to the respective gas train (step 1.8). The tail gas from the Claus SRU will be initially incinerated in the Tail Gas Incinerator. The initial sulfur recovery for the Claus SRU will be no lower than 90% at the point of introduction of acid gas to the SRU and it will climb to at least 95% during a SRU stabilization period of 4 hours.

During the initial startup and during any subsequent restart before which the SCOT Reactor catalyst is replaced, a slipstream of SRU feed gas will be used to pre-sulfide the SCOT Reactor catalyst.

Total SO₂ emissions during this Claus SRU startup phase, from the Tail Gas Incinerator, are listed in Table 1, step 1.8.

- 1.9 Tail gas from the Claus SRU will then be routed from the Tail Gas Incinerator to the SCOT TGU while still at the turndown rate. The vent gas or tail gas from the SCOT TGU will then be incinerated in the Tail Gas Incinerator. The initial sulfur recovery when Claus SRU tail gas is introduced to the SCOT TGU will be no lower than 99.0% and it will climb to at least 99.8% during a SCOT TGU stabilization period of 12 hours.

Total SO₂ emissions during this SCOT TGU startup phase, from the Tail Gas Incinerator, are shown in Table 1, step 1.9 along with the respective gas train-processing rate for turndown conditions.

- 1.10 The entire train, at this point, has been fully commissioned and is processing sour gas from the wells at the rates shown. SO₂ emissions correspond to that of at least a 99.8% sulfur recovery.

The facility may now be gradually brought up to the desired production level, or up to the permit limits, of inlet sour gas from the production field.

Sufficient time will be allowed between increases in plant throughput to provide for process stabilization and to maintain the sulfur recovery of at least 99.8% during changes. Each gas train is permitted for maximum SO₂ emissions from its respective incinerator stack at the expected design Plant feed rates as shown below.

Train 1	115 LB/hr SO ₂	66.5	MMSCFD
Train 2	115 LB/hr SO ₂	66.5	MMSCFD
Train 3	312 LB/hr SO ₂	<u>225</u>	MMSCFD

2. Single Train Shutdown (cold)

From time to time a complete gas train shutdown will be required, i.e., maintenance / turnaround lasting typically 7-10 days. During this time, it will be necessary to shutdown the entire plant facility resulting in the flaring of certain sour gas and acid gas streams for short periods of time. All efforts are to be made to minimize these abnormal flaring episodes to both keep emissions levels to a minimum and to conserve potential plant product and revenue, i.e., pipeline sales gas and sulfur product.

The following procedure will be used during this plant shutdown scenario.

- 2.1 Reduce the sour gas production from the wells until the Plant feed is at minimum turndown rates as listed herein.
- 2.2 Introduce sweet fuel gas to the Selexol Plant (at the recycle flash drum) to maintain a stable pressure in Selexol Plant upon sour gas removal.
- 2.3 Shut-off sour gas feeding Selexol Plant. Maintain operations on sweet fuel gas while cleaning up Selexol Plant solvent. Acid gas rates to the SRU will continue to decline while the solvent is stripped of hydrogen sulfide and carbon dioxide.
- 2.4 Begin an orderly shutdown of the Claus SRU prior to an emergency trip on low flow (due to declining acid gas rates, and corresponding air rates, feeding the SRU). Plant acid gas will be diverted to the Emergency Flare as acid gas feed rates become too low to process in the SRU.

A nitrogen purge will be initiated to eliminate sulfur vapors in the Claus SRU, and the unit will be totally shutdown and prepared for maintenance as required.

- 2.5 Begin an orderly shutdown of the SCOT TGU. Shutdown the reducing gas generator and continue to circulate TGU solvent for 1 hour. SCOT TGU Stripper overhead product will be diverted to the Emergency Flare as the TGU solvent is cleaned. As time allows, the SCOT TGU is to be totally shut down and prepared for maintenance as required.

Emissions during the SCOT TGU shutdown phase are shown in Table 2, step 2.4B.

Continue processing sweet fuel gas in the Selexol Plant until the solvent inventory is clean. It is estimated that it will take approximately 3 hours from the time that acid gas is diverted to the flare until the solvent is totally clean. Acid gas rates to the flare will average values shown in step 2.4A of Table 2.

Eliminate sweet gas feeding the Selexol Plant. As time allows, the Selexol Plant system is to be totally shut down and prepared for maintenance, as required.

- 2.6 Shutdown plant utility systems as time allows and as required for maintenance.

3. SCOT TGU Shutdown and Startup

From time to time a planned, or an unplanned, shutdown of the SCOT TGU will be required, i.e., for maintenance or due to equipment failure. During this time, it will usually be expedient to continue to operate all other units of the specific gas train at full capacity unless it is determined that the shutdown will require over a 1 hour period. After the initial 1 hour of SCOT TGU shutdown time, the train capacity is reduced to turndown conditions, unless it is determined that the shutdown will require more than 48 hours. If the SCOT TGU shutdown time period is greater than 48 hours, then a probable decision will be made to shut down the entire train. Otherwise, after the abnormal condition in the SCOT TGU is rectified, the unit will be immediately restarted.

The following procedure will be used during this gas train shutdown/startup scenario.

- 3.1 Use the procedure described in step 2.4, paragraph 3, for the SCOT TGU shutdown.

The SO₂ emissions rate will increase as the sulfur recovery decreases to at least 95% from 99.8%. It is expected that operation during this mode will be for a 1-hour period.

Total SO₂ emissions during this SCOT TGU shutdown phase, from the Tail Gas Incinerator, are shown in Table 3, step 3.1-train capacity is at design rates.

- 3.2 Decrease the Plant feed gas rate to turndown conditions.

If the SCOT TGU is still down after 1 hour, then adjust the train inlet flow in the time specified in Table 3 to turndown flow rates. Total SO₂ emissions during this SCOT TGU shutdown phase, from the Tail Gas Incinerator, are shown in Table 3, step 3.2A.

Operations at the turned down rate may continue for up to 48 hours, resulting in total SO₂ emissions as shown in step 3.2B.

- 3.3 Use the procedures described in steps 1.4 and 1.9 to restart the SCOT TGU.

The SO₂ emissions should immediately decrease as the SRU tail gas is routed from the Tail Gas Incinerator to the SCOT TGU with an initial recovery of 99.0%. The SO₂ emissions rate should then decrease over a 12-hour time frame as the SCOT TGU stabilizes at 99.8% recovery. For total SO₂ emissions over this 12-hour period see step 3.3 on Table 3.

- 3.4 Implement the procedures of step 1.10 to bring the total facility throughput up to the desired rates of sour inlet gas from the production field.

4. SRU & SCOT TGU Shutdown and Startup

From time to time an unplanned shutdown of the Claus SRU and the SCOT TGU may occur as a result of equipment failure in the Claus SRU. During this time it will usually be appropriate to continue to operate the Selexol Plant at full capacity unless it is determined that the shutdown will last over 30 minutes. After the initial 30 minutes of Claus SRU down time, it will usually be expedient to continue to operate *the* upstream gas train unit at turndown capacity unless it is determined that the shutdown will require more than the time stated in Table 4. If the Claus SRU shutdown time period is greater than the time stated in Table 4, then a probable decision will be made to shut down the entire train and the production wells, as needed. Otherwise, after the abnormal condition in the Claus SRU is rectified, the Claus SRU and the SCOT TGU will immediately be restarted.

The following procedure will be used during this gas train shutdown/startup scenario.

- 4.1 Use the procedure described in step 2.4, Paragraph 3, for the SCOT TGU shutdown.
- 4.2 Simultaneously initiate the procedure described in step 2.4, Paragraph 1, for the Claus SRU shutdown.

Since the plant is operating at design inlet sour gas feed rates, the SO₂ emissions rate will increase as the sulfur recovery decreases to 0% from 99.8%. It is expected that operation during this mode, with both the Claus SRU and the SCOT TGU not processing tail gas, will be for a 30 minute period, yielding a total SO₂ emissions as shown in Table 4, step 4.1 & 4.2.

- 4.3 Decrease the train inlet flow to turndown flow rates:

...the ... of ...

If the Claus SRU is still down after 30 minutes, then adjust the Plant feed over the time period specified in Table 4 to turndown rates as listed. It is expected that operation during this mode at plant turndown capacity will be for 3 hours as shown in Table 4, step 4.3B.

Total SO₂ emissions during this Claus SRU shutdown phase, from the Emergency Flare, is listed in step 4.3A, Table 4 (45 minutes for Trains 1 & 2 and 1 hour for Train 3). Additionally, the total SO₂ emissions for 3 hours at the turndown conditions are listed in step 4.3B, Table 4.

- 4.4 Use the procedures described in steps 1.3 and 1.8 to startup the Claus SRU.

The SO₂ emissions rate should immediately decrease by 90% at the point of introduction of acid gas to the SRU. The recovery will then climb to at least 95% during a SRU stabilization period of 4 hours. Total SO₂ emissions during this Claus SRU period, from the Tail Gas Incinerator, are shown in step 4.4, Table 4.

- 4.5 Use the procedures described in steps 1.4 and 1.9 to start up the SCOT TGU.

The resulting SO₂ emissions are equal to the emissions shown in step 4.5 of Table 4, over a 12-hour period to bring the SCOT TGU into full compliance.

- 4.6 Implement the procedures of step 1.10 to bring the gas train capacity up to design sour inlet gas rates as defined herein.

5. H₂S Recycle Compressor Shutdowns - single gas train

The Selexol Plant contains H₂S recycle compressors to handle the flashed gases from the solvent as part of the solvent regeneration scheme. When the Selexol system is operating and the H₂S compressors are down, the off gas is routed to the flare. This event results in SO₂ emissions. This section of this document reflects flaring associated with the inadvertent shutdowns of the H₂S Recycle Compressors.

- 5.1 When the gas train is operating at design inlet sour gas feed rates and one of the Recycle Compressors automatically shuts down due a problem associated with that particular compressor, the inlet gas that was flowing to the machine is diverted to the flare. Typically the flowrate of this gas stream to the flare is at a rate of about 10% of the inlet sour gas rate. The quantity of SO₂ flared within a 40-minute period before operations or maintenance can resolve the problem is shown in Table 5, step 5.1.

- 5.2 If the problem with the Recycle Compressor (which has shutdown) cannot be resolved as described above within the first 40 minutes, the inlet sour gas feed rate to gas train will be reduced to turndown conditions. This reduction will occur during a 15 minute period, resulting in the SO₂ emissions flared from the H₂S recycle off gas as shown in step 5.2A. This mode of operations at the turndown flow rate may continue for 1 hour and result in flared SO₂ emissions as shown in step 5.2B.

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5.3 On certain occasions trouble shooting of the H₂S Recycle Compressor problems may require an additional 2 hours to resolve. At the reduced rate as described in step 5.2B, this 2-hour period will result in SO₂ flared at rates as shown in step 5.3.



LOST CABIN GAS PLANT-TRAINS 1&2
FLARING & INCINERATOR CALCULATIONS

H2S = 0.123 MOL FRAC IN SOUR GAS
H2S = 0.85 MOL FRAC IN ACID GAS

Condition	Recovery	mmscfd	LTPD S	ton-SO2/day	ton-SO2/hr
flare sour gas at rate shown	0.0%	30	139.14	311.39	12.97
<i>flare acid gas at rate shown</i>	<i>0.0%</i>	<i>4.5</i>	<i>144.60</i>	<i>323.59</i>	<i>13.48</i>
incinerate tail gas initial recovery =	90.0%	30	13.91	31.14	1.30
incinerate tail gas final recovery =	95.0%	30	6.96	15.57	0.65
incinerate TGU abs initial recovery =	99.0%	30	1.39	3.11	0.13
incinerate TGU abs final recovery =	99.8%	30	0.28	0.62	0.03
flare sour gas at rate shown	0.0%	66.5	308.43	690.24	28.76
<i>flare acid gas at rate shown</i>	<i>0.0%</i>	<i>10</i>	<i>320.52</i>	<i>717.29</i>	<i>29.89</i>
incinerate tail gas initial recovery =	90.0%	66.5	30.84	69.02	2.88
incinerate tail gas final recovery =	95.0%	66.5	15.42	34.51	1.44
incinerate TGU abs initial recovery =	99.0%	66.5	3.08	6.90	0.29
incinerate TGU abs final recovery =	99.8%	66.5	0.62	1.38	0.06

	PLANT FEED MMSCFD	SALES RATE MMSCFD
DESIGN FEED RATE	66.5	45
MINIMUM PLANT TURNDOWN RATE	30	20

RECYCLE COMPRESSOR (flaring when down @ 66.5 MMSCFD)						
MMSCFD to flare	ft3/mol	% H2S	#SO2/mol	#/ton	hr/day	ST SO2/hr
6	379.5	0.36	64.06	2000	24	7.60
Reduce plant rate to 30 MMSCFD						
3	379.5	0.36	64.06	2000	24	3.80

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LOST CABIN GAS PLANT-TRAIN 3
FLARING & INCINERATOR CALCULATIONS

H2S = 0.123 MOL FRAC IN SOUR GAS
H2S = 0.85 MOL FRAC IN SOUR GAS

Condition	Recovery	mmscfd	LTPD \$	ton-SO2/day	ton-SO2/hr
flare sour gas at rate shown	0.0%	98	454.53	1017.20	42.38
flare acid gas at rate shown	0.0%	19	604.48	1352.78	56.37
incinerate tail gas initial recovery =	90.0%	98	45.45	101.72	4.24
incinerate tail gas final recovery =	95.0%	98	22.73	50.86	2.12
incinerate TGU abs initial recovery =	99.0%	98	4.55	10.17	0.42
incinerate TGU abs final recovery =	99.8%	98	0.91	2.03	0.08
flare sour gas at rate shown	0.0%	225	1043.57	2335.42	97.31
flare acid gas at rate shown	0.0%	43	1387.85	3105.87	129.41
incinerate tail gas initial recovery =	90.0%	225	104.36	233.54	9.73
incinerate tail gas final recovery =	95.0%	225	52.18	116.77	4.87
incinerate TGU abs initial recovery =	99.0%	225	10.44	23.35	0.97
incinerate TGU abs final recovery =	99.8%	225	2.09	4.67	0.19

	PLANT FEED MMSCFD	SALES RATE MMSCFD
DESIGN FEED RATE	225	153
MINIMUM PLANT TURNDOWN RATE	98	65

RECYCLE COMPRESSOR (flaring when down @ 225 MMSCFD)							
	MMSCFD to flare	ft3/mol	% H2S	#SO2/mol	#/ton	hr/day	ST SO2/hr
HP Flash	11	379.5	0.168	64.06	2000	24	6.50
MP Flash	10	379.5	0.311	64.06	2000	24	10.94
Reduce plant rate to 98 MMSCFD							
HP Flash	5	379.5	0.168	64.06	2000	24	2.95
MP Flash	4	379.5	0.311	64.06	2000	24	4.37

TABLE 1
Total Plant Startup (cold)
ESTIMATED SO₂ EMISSIONS

Trains 1 & 2			
Step	Emission Source	ST SO ₂	Time (hrs)
1.7	flare Selexol Plant acid gas while stabilizing stripper (Plant Feed = 30 MMSCFD)	<u>25.95</u>	<u>2</u>
1.8	start SRU with 90% recovery to 95%; SRU tail gas to incinerator (Plant Feed = 30 MMSCFD)	3.89	4
1.9	start SCOT with 99.0% initial recovery to 99.8%; emissions to incinerator (Plant Feed = 30 MMSCFD)	0.93	12
1.10	increase plant feed to design rates	-	-
Total anticipated emissions per startup/train		<u>30.78</u>	<u>17.00</u>

Train 3			
Step	Emission Source	ST SO ₂	Time (hrs)
1.7	flare Selexol Plant acid gas while stabilizing stripper (Plant Feed = <u>98</u> MMSCFD)	<u>84.77</u>	<u>2</u>
1.8	start SRU with 90% recovery to 95%; SRU tail gas to incinerator (Plant Feed = <u>98</u> MMSCFD)	<u>12.72</u>	4
1.9	start SCOT with 99.0% initial recovery to 99.8%; emissions to incinerator (Plant Feed = <u>98</u> MMSCFD)	<u>3.05</u>	12
1.10	increase plant feed to design rates	-	-
Total anticipated emissions per startup		<u>100.53</u>	<u>18.00</u>

Gas Processing Rates				
	Inlet	Turndown Inlet	Residue	Turndown Residue
TRAIN 1	66.5 MMSCFD	30 MMSCFD	45 MMSCFD	20 MMSCFD
TRAIN 2	66.5 MMSCFD	30 MMSCFD	45 MMSCFD	20 MMSCFD
TRAIN 3	<u>225</u> MMSCFD	<u>98</u> MMSCFD	<u>153</u> MMSCFD	<u>65</u> MMSCFD

TABLE 1

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LECTURE 1

1.1. THE CLASSICAL LIMIT

1.2. QUANTIZATION

1.3. THE HEISENBERG UNCERTAINTY PRINCIPLE

1.4. THE SCHRÖDINGER EQUATION

1.5. THE WAVEFUNCTION

1.6. THE CLASSICAL LIMIT

TABLE 2
Total Plant Shutdown (cold)
ESTIMATED SO₂ EMISSIONS

TRAINS 1&2			
Step	Emission Source	ST SO ₂	Time (hrs)
2.1	reduce plant feed to 30 MMSCFD	-	-
2.2	eliminate sour gas feed to Selexol Plant; maintain operation on sweet gas to clean up Selexol	-	-
2.3	introduce sweet gas in Selexol Plant (recycle flash drum) to maintain Selexol Plant pressure	-	-
2.4A	flare acid gas when SRU is shutdown to clean up solvent inventory (Plant feed = 0 MMSCFD)	<u>20.22</u>	<u>3</u>
2.4B	flare SCOT TGU stripper overhead product to clean up solvent inventory (Plant feed = 0 MMSCFD)	0.15	0
2.6	shutdown utility systems	-	-
Total anticipated emissions per shutdown/train		<u>20.37</u>	<u>3.00</u>

TRAIN 3			
Step	Emission Source	ST SO ₂	Time (hrs)
2.1	reduce plant feed to <u>98</u> MMSCFD	-	-
2.2	eliminate sour gas feed to Selexol Plant maintain operation on sweet gas to clean up Selexol	-	-
2.3	introduce sweet gas in Selexol Plant (recycle flash drum) to maintain Selexol Plant pressure	-	-
2.4A	flare acid gas when SRU is shutdown to clean up solvent inventory (Plant feed = 0 MMSCFD)	<u>84.55</u>	<u>3</u>
2.4B	flare SCOT TGU stripper overhead product to clean up solvent inventory (Plant feed = 0 MMSCFD)	0.45	0
2.6	shutdown utility systems	-	-
Total anticipated emissions per shut down		<u>85.00</u>	<u>3.00</u>

Gas Processing Rates				
	Inlet	Turndown Inlet	Residue	Turndown Residue
TRAIN 1	66.5 MMSCFD	30 MMSCFD	45 MMSCFD	20 MMSCFD
TRAIN 2	66.5 MMSCFD	30 MMSCFD	45 MMSCFD	20 MMSCFD
TRAIN 3	<u>225</u> MMSCFD	<u>98</u> MMSCFD	<u>153</u> MMSCFD	<u>65</u> MMSCFD

TABLE 2

10/10/2020

1. The first part of the document discusses the importance of maintaining accurate records of all transactions.

2. It is essential to ensure that all entries are supported by appropriate evidence and documentation.

3. The second part of the document outlines the various methods used to collect and analyze data.

4. These methods include both qualitative and quantitative approaches, each with its own strengths and limitations.

5. The third part of the document provides a detailed overview of the theoretical framework underlying the research.

6. This framework is based on a combination of established theories and new insights from recent research.

7. The fourth part of the document describes the specific procedures and protocols used in the study.

8. These procedures were designed to ensure the reliability and validity of the findings.

9. The fifth part of the document presents the results of the study, which show a clear relationship between the variables.

10. These results are consistent with the theoretical framework and provide valuable insights into the phenomenon being studied.

11. The sixth part of the document discusses the implications of the findings for practice and policy.

12. These implications suggest that the findings have significant relevance for the field.

13. The seventh part of the document concludes the study and offers suggestions for future research.

14. These suggestions are based on the limitations of the current study and the need for further exploration.

15. In conclusion, this study has provided a comprehensive analysis of the research topic.

16. The findings are summarized in the following table:

17. The data shows a strong positive correlation between the variables.

18. This correlation is statistically significant and has practical implications.

TABLE 3
SCOT / TGU Shutdown and Startup
ESTIMATED SO₂ EMISSIONS

TRAINS 1&2			
Step	Emission Source	ST SO ₂	Time (hrs)
3.1	SRU tail gas to incinerator (Plant Feed = 66.5 mmscfd)	1.44	1
3.2A	SRU tail gas to incinerator (decreasing plant feed to 30 MMSCFD)	0.26	0.25
3.2B	SRU tail gas to incinerator (Plant Feed = 30 MMSCFD)	23.35	36
3.3	start TGU with 99.0% initial recovery to 99.8%; emissions to Incinerator (Plant Feed = 30 MMSCFD)	0.93	12
3.4	increase plant feed to design rates		
Emissions per Start-up/ Shut-down per train		25.99	49.25

TRAIN 3			
Step	Emission Source	ST SO ₂	Time (hrs)
3.1	SRU tail gas to incinerator (Plant Feed = <u>225</u> MMSCFD)	<u>4.87</u>	1
3.2A	SRU tail gas to incinerator (decreasing Plant feed to <u>98</u> MMSCFD)	<u>2.62</u>	0.75
3.2B	SRU tail gas to incinerator (Plant feed to <u>98</u> MMSCFD)	<u>101.72</u>	48
3.3	start TGU with 99.0% initial recovery to 99.8%; emissions to incinerator (Plant feed to <u>98</u> MMSCFD)	<u>3.05</u>	12
3.4	increase plant feed to design rates		
Emissions per Start-up/ Shut-down		<u>112.26</u>	61.75

Gas Processing Rates				
	Inlet	Turndown Inlet	Residue	Turndown Residue
TRAIN 1	66.5 MMSCFD	30 MMSCFD	45 MMSCFD	20 MMSCFD
TRAIN 2	66.5 MMSCFD	30 MMSCFD	45 MMSCFD	20 MMSCFD
TRAIN 3	<u>225</u> MMSCFD	<u>98</u> MMSCFD	<u>153</u> MMSCFD	<u>65</u> MMSCFD

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LECTURE 1

1.1

1.2

1.3

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1.5

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1.8

1.9

TABLE 4
SRU & SCOT / TGU Shutdown and Startup
ESTIMATED SO₂ EMISSIONS

TRAINS 1 & 2			
Step	Emission Source	ST SO ₂	Time (hrs)
4.1 & 4.2	flare Selexol Plant acid gas (Plant Feed = 66.5 MMSCFD)	<u>14.94</u>	<u>0.50</u>
4.3A	flare Selexol Plant acid gas (decreasing plant feed to 30 MMSCFD)	<u>16.26</u>	<u>0.75</u>
4.3B	flare Selexol Plant acid gas (Plant Feed = 30 MMSCFD)	<u>40.45</u>	<u>3</u>
4.4	start SRU with 90% recovery to 95%; SRU tail gas to incinerator (Plant feed = 30 MMSCFD)	3.89	4
4.5	start TGU with 99.0% initial recovery to 99.8%; emissions to incinerator (Plant feed = 30 MMSCFD)	0.93	12
Total anticipated emissions per startup and shutdown per train		<u>76.48</u>	<u>20.25</u>

TRAIN 3			
Step	Emission Source	ST SO ₂	Time (hrs)
4.1 & 4.2	flare Selexol Plant acid gas (Plant Feed = <u>225</u> MMSCFD)	<u>64.71</u>	<u>0.50</u>
4.3A	flare Selexol Plant acid gas (decreasing plant feed to <u>98</u> MMSCFD)	<u>92.89</u>	<u>1</u>
4.3B	flare Selexol Plant acid gas (Plant Feed = <u>98</u> MMSCFD)	<u>169.10</u>	<u>3</u>
4.4	start SRU with 90% recovery to 95%; SRU tail gas to incinerator (Plant feed = <u>98</u> MMSCFD)	<u>12.72</u>	4
4.5	start TGU with 99.0% initial recovery to 99.8%; emissions to incinerator (Plant feed = <u>98</u> MMSCFD)	<u>3.05</u>	12
Total anticipated emissions per startup and shutdown		<u>342.46</u>	<u>20.50</u>

Gas Processing Rates				
	Inlet	Turndown Inlet	Residue	Turndown Residue
TRAIN 1	66.5 MMSCFD	30 MMSCFD	45 MMSCFD	20 MMSCFD
TRAIN 2	66.5 MMSCFD	30 MMSCFD	45 MMSCFD	20 MMSCFD
TRAIN 3	<u>225</u> MMSCFD	<u>98</u> MMSCFD	<u>153</u> MMSCFD	<u>65</u> MMSCFD

TABLE 4

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in the context of public administration and financial management.

2. The second part of the document outlines the various methods and tools used to collect, analyze, and report data. It highlights the need for standardized procedures and the use of modern technology to ensure the reliability and accuracy of the information gathered.

3. The third part of the document focuses on the role of the reporting officer in ensuring that all data is correctly recorded and presented. It stresses the importance of attention to detail and the need to verify the accuracy of the information before it is submitted for review.

4. The fourth part of the document discusses the process of reviewing and auditing the records. It explains how the information is used to identify trends, detect anomalies, and ensure compliance with relevant laws and regulations. It also mentions the importance of maintaining confidentiality and security of the data throughout the process.

5. The fifth part of the document provides a summary of the key findings and conclusions drawn from the analysis. It notes that the data indicates a general trend of improvement in certain areas, while also identifying areas that require further attention and resources.

6. The final part of the document offers recommendations for future actions and improvements. It suggests that continued investment in training and technology is necessary to enhance the efficiency and effectiveness of the reporting process. It also recommends regular communication and collaboration between all stakeholders involved in the process.

TABLE 5
H₂S RECYCLE COMPRESSOR SHUTDOWNS
ESTIMATED SO₂ EMISSIONS

TRAINS 1 & 2			
Step	Emission Source	ST SO ₂	Time (hrs)
5.1	Recycle compressor down, divert suction to flare (Plant feed = 66.5 MMSCFD)	5.06	0.67
5.2A	Begin repairs of compressor: (Reduce plant feed to 30 MMSCFD)	1.42	0.25
5.2B	Begin repairs of compressor: (Plant feed = 30 MMSCFD)	3.80	1
5.3	Typical time to repair problems with compressors	7.60	2
Total anticipated emission per shutdown per train		17.88	3.92

TRAIN 3			
Step	Emission Source	ST SO ₂	Time (hrs)
5.1	Recycle compressor down, divert suction to flare (Plant feed = <u>225</u> MMSCFD)	<u>11.61</u>	0.67
5.2A	Begin repairs of compressor: (Reduce plant feed to <u>98</u> MMSCFD)	<u>9.29</u>	0.75
5.2B	Begin repairs of compressor: (Plant feed = <u>98</u> MMSCFD)	<u>7.33</u>	1
5.3	Typical time to repair problems with compressors	<u>14.66</u>	2
Total anticipated emission per shutdown per train		<u>42.89</u>	4.42

Gas Processing Rates				
	Inlet	Turndown Inlet	Residue	Turndown Residue
TRAIN 1	66.5 MMSCFD	30 MMSCFD	45 MMSCFD	20 MMSCFD
TRAIN 2	66.5 MMSCFD	30 MMSCFD	45 MMSCFD	20 MMSCFD
TRAIN 3	<u>225</u> MMSCFD	<u>98</u> MMSCFD	<u>153</u> MMSCFD	<u>65</u> MMSCFD

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that this is crucial for ensuring the integrity of the financial statements and for providing a clear audit trail. The text notes that any discrepancies or errors in the records can lead to significant complications during an audit and may result in the disallowance of certain expenses.

2. The second part of the document addresses the issue of proper documentation. It states that all receipts, invoices, and other supporting documents must be properly filed and organized. This not only facilitates the audit process but also helps in identifying any missing or incomplete documentation. The document advises that the organization should have a systematic approach to document management to avoid any potential issues.

3. The third part of the document discusses the importance of timely reporting. It highlights that all financial information should be reported to the appropriate authorities in a timely and accurate manner. This is essential for maintaining the trust of stakeholders and for ensuring compliance with relevant regulations. The text notes that any delays or inaccuracies in reporting can have serious consequences for the organization.

4. The fourth part of the document focuses on the role of internal controls. It explains that a strong system of internal controls is necessary to prevent and detect errors or fraud. The document provides guidance on how to design and implement effective internal controls, including the segregation of duties, the use of authorization procedures, and the regular monitoring of financial activities. It stresses that internal controls are a key component of a robust financial management system.

5. The fifth part of the document discusses the importance of transparency and communication. It states that the organization should be open and transparent in its financial reporting and should provide clear and concise information to all stakeholders. This includes providing regular updates on the financial performance and any significant changes in the financial position. The document also emphasizes the importance of maintaining open lines of communication with the audit firm and other external parties involved in the financial reporting process.

Appendix B
Compliance Assurance Monitoring Plans

COMPLIANCE ASSURANCE MONITORING PLAN
LOST CABIN GAS PLANT, TRAINS 1, 2 & 3
SULFUR RECOVERY EFFICIENCY

I. Background

A. Emissions Unit

Each of the three gas existing gas processing trains at The Lost Cabin Gas Plant includes a Claus and SCOT unit for recovery of the sulfur compounds that are removed from the natural gas. The Claus unit typically recovers approximately 96 % of the inlet sulfur compounds while the SCOT unit recovers the remainder of the sulfur compounds so that the combined overall sulfur recovery for both units meets the required 99.8% Sulfur Recovery Efficiency (SRE). The sulfur compounds, which are recovered in the SCOT unit, are recycled back to the front end of the Claus unit as H₂S for recovery as liquid sulfur. The effluent from each SCOT unit flows to the incinerators where the residual sulfur compounds are burned to SO₂ prior to discharging to the atmosphere. The gas trains 1 & 2 are currently operating under Chapter 6, Section 3 Operating Permit 31-157. Train 3 began operations on September 20, 2002 and is operating under a DEQ construction permit # CT-1946.

Description: Claus and SCOT Sulfur Recovery Units
Identification: Area 31 and 32
Facility: Trains 1, 2 & 3 Lost Cabin Gas Plant, Lost Cabin, WY.

B. Applicable Regulation, Emission Limit, and Monitoring Requirements

Regulation No.: WAQS Chapter 6, Section 3(d), and Permit 30-157-1
Emission limits: Sulfur Recovery Efficiency (SRE): 99.8 %, 12-hr avg.
Monitoring requirements: (input data for efficiency calculation)
1) Inlet flowrate measurement to the Claus unit
2) Composition of H₂S and COS in the inlet stream to the Claus unit
3) Flowrate measurement of SCOT recycle gases
4) Composition of the H₂S in the SCOT recycle gas stream back to the front-end of Claus unit.
5) Incinerator stack flowrate. (part of CEM)
6) SO₂ concentration in the incinerator stack gases. (part of CEM)

C. Control Technology

Claus and SCOT Units

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II. Monitoring Approach

The key elements of the monitoring approach are presented below:

A. Indicator

The plant computer system will calculate Sulfur Recovery Efficiency at least 4 times per hour. The calculation will be performed based on input data described below and displayed for the operator in charge of the plant performance.

B. Measurement Approach/Rationale

- 1) The inlet flowrate of acid gases to each Claus unit is measured with the existing metering system. The composition of the H₂S and COS in this gas stream is also determined by manual samples every 12 hours and subsequent gas chromatography analysis. (See justification for manual samples) Together with flowrate and composition of sulfur compounds the pounds of inlet sulfur can be calculated.
- 2) The inlet flowrate of SCOT recycle gases to the Claus unit is also measured with the existing metering system. Manual samples are taken once every 12 hours and input to the plant gas chromatography (GC) for quantity of H₂S. Together with flowrate and composition the quantity of sulfur can be calculated in this gas stream. Calculation of the quantity of sulfur in the SCOT recycle is required since the inlet meter to the Claus unit is downstream of the SCOT recycle tie-in point.
- 3) As part of the current requirements of WAQSR Chapter 6, Section 3, Operating Permit # 31-157 and CT-1946 the quantity of SO₂ in the incinerator stack is measured via the annually certified CEM.
- 4) With the above information SRE efficiency can be calculated and monitored based on the following equation: (all flows in lb/hr of SO₂)

$$\begin{aligned} \text{Claus Total Feed} - \text{Scot Recycle} &= \text{Claus Fresh Feed} \\ (\text{Claus Fresh Feed} - \text{Stack flow}) / \text{Claus Fresh Feed} &= \text{SRE \%} \end{aligned}$$

C. Indicator Range

The indicator level is SRE's below 99.8%. This value will be displayed for the operator to view.

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D. Performance Criteria

Data Representativeness: Measurements for flowrates on Claus and Scot Recycle feed along with SO₂ in the stack are continuously measured and recorded. The accuracy on these items is approximately +/- 2-3 %. Manual samples of the Claus and SCOT recycle feeds are analyzed with the plant GC and are expected to have an accuracy of +/- 5 %.

Verification of Operational Status: Not applicable.

QA / QC Practices and Criteria: All instruments will be calibrated at least annually in accordance with manufacturer's specifications. The plant GC will be calibrated as required when calibration error exceeds +/- 5 %.

Monitoring Frequency and Data: Basically continuously except for Claus and SCOT Feed analyzes.

Collection Procedure: SRE % will be calculated at least 4 times/hour.

III. Justifications

A. Background

The two gas processing trains at Lost Cabin are each equipped with Sulfur Recovery facilities consisting of Claus and SCOT units to achieve the required overall SRE efficiency of 99.8 %. The remainder of the sulfur compounds, which are not recovered by the SCOT unit, are sent to the incinerator and burned to SO₂ prior to venting to the atmosphere. Each incinerator stack is the emission point for its particular Sulfur Recovery facility. Current regulations require that the SO₂ emission be recorded continuously and not exceed:

Trains 1 and 2 : 115 lb/hr SO₂ maximum for each
Train 3 : 312 lb/hr SO₂ maximum

This data is collected via a certified CEM.

C. Rationale for Manual Samples of Claus and SCOT Feed Compositions

All of the data points required to calculate SRE% are measured continuously except for Claus and SCOT recycle feed gas compositions. This justification will show that the gas streams can continue to be manually sampled and analyzed on a 12-hour cycle. The GC results are then input into the plant computer for

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calculation of SRE% four times per hour.

The Claus feed gas stream is sampled for H₂S and COS while the SCOT recycle feed stream is sampled for H₂S; these compounds represent the sulfur compounds for the Sulfur Recovery facilities. Table 1 is provided herein to show how SRE% is calculated and typical results for specific conditions. The lower portion of the table displays the effect of H₂S concentration on SRE%. Based a review of historical plant data and the results shown in Table 1 the following conclusions can be made.

- 1) SCOT recycle feed gas compositions range between 50-60% H₂S based on historical data. This range in composition has little effect on SRE% since the SCOT recycle flow is small compared to the Claus Feed rate.
- 2) Historical data shows that the composition range on Claus feed is around 75-88% H₂S and 0.02-0.07 % COS. The COS range in composition has little effect on the SRE% since it also is small compared to the H₂S percentages. As the H₂S composition increases so does the SRE%, however not on a proportional basis. The H₂S composition will begin to effect SRE% as the percentage drops below the 65-70 % range. This however is below historical H₂S ranges and therefore is a scenario that is unlikely to occur except during extreme operating excursions.
- 3) Sensitivity analysis of the potential change in H₂S concentration in the feed to the Claus plant over a 12 hour period, and its effect on the calculation of SRE% indicates less than a 1 % error can be realized in SRE%.
- 4) Permit requirements for SRE% are based on a 12-hour average. Sampling inlet parameters four times per hour is in excess for the required monitoring period.
- 5) The final output parameter (SO₂ lb/hour in the stack) is continuously measured and is an immediate indication of overall Sulfur Recovery performance.

The conclusions of this analysis indicate manual sampling of the Claus and SCOT recycle streams on a 12-hour cycle provides adequate data to achieve CAM requirements.

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COMPLIANCE ASSURANCE MONITORING PLAN
LOST CABIN GAS PLANT, TRAIN 3
COS RECOVERY EFFICIENCY

I. Background

A. Emissions Unit

The third gas processing train for the Lost Cabin Gas plant began operations on September 20, 2002. Carbonyl sulfide (COS), contained in the sour natural gas, must be removed prior to sales and is considered to be a HAP. The construction permit requirements dictated that MACT analysis be considered for the control of carbonyl sulfide (COS) from the CO₂ Vent Stack located within the Selexol gas processing unit of Train 3. A reduction of COS emissions from the CO₂ Vent Stack is realized as the Selexol solvent flowing to the H₂S absorber is cooled to 20° F. Warmer solvent temperatures results in COS slipping past the H₂S Absorber and additional absorption taking place in the CO₂ Selexol solvent loop, where COS and CO₂ are vented to atmosphere via the CO₂ Vent Stack. COS absorbed in the H₂S solvent loop at the H₂S Absorber is routed to the H₂S Stripper where the solvent is boiled so that the H₂S, COS and CO₂ can be rejected from the solvent. The overhead gas stream from the Stripper is routed to the Sulfur Recovery Unit, where the H₂S and COS are converted to liquid sulfur for product sales. A determination of the amount of COS recovered, or sent to the Sulfur Recovery unit, is calculated by use of the pounds of COS feeding Train 3 and the pounds of COS exiting the CO₂ Vent Stack for Train 3. All COS routed to the Sulfur Recovery unit results in a reduction of COS emissions from the CO₂ Vent Stack. The CO₂ Vent Stack is equipped with a CEMS for monitoring the pounds of COS vented, and in conjunction with the plant computer system calculates the COS Control Efficiency.

Description: Selexol Gas Treating and Sulfur Recovery Units
Identification: Area 21, 31 and 32
Facility: Train 3 Lost Cabin Gas Plant, Lost Cabin, and WY.

B. Applicable Regulation, Emission Limit, and Monitoring Requirements

Regulation No.: WAQS Chapter 6, Section 6(h)(iii)(A),
DEQ construction permit # CT-1946A

Emission limits:

COS Recovery Efficiency (SRE): 24% minimum, 12-hour rolling average
(maximum 360 lb/hr COS)

Monitoring requirements: (input data for efficiency calculation)

- 1) Inlet flowrate to Train 3: will be calculated by CH₄ balance as defined in CT-1946A, Condition # 15

- 2) Composition of CH₄ and COS in the inlet gas to Train 3: weekly samples initially, if after six (6) months of operation, the results indicate that the CH₄ and COS concentrations are relatively stable, sampling is only required monthly. As a guideline, ±5% of the mean value will be considered stable.
- 3) CO₂ Vent Stack flow stack flowrate. (part of CEMS)
- 4) COS concentration in the CO₂ Vent Stack. (part of CEMS)

C. Control Technology

Selexol and Sulfur Recovery Units

II. Monitoring Approach

The key elements of the monitoring approach are presented below:

A. Indicator

The plant computer system will calculate COS Control Efficiency (COS-CE) at least 4 times per hour. The calculation will be performed based on input data described below and displayed for the operator in charge of the plant performance.

B. Measurement Approach/Rationale

- 1) The inlet flowrate of sour gases feeding Train 3 is calculated based on measured flows of sales gas, fuel, SRU feed and CO₂ Vent Stack. The inlet flow of sour gas is calculated rather than measured due historical problems associated with measurement of inlet sour gas. Weekly manual samples and subsequent gas chromatography analysis determine the composition of the CH₄ and COS in the inlet sour gas stream. If after six (6) months of operation, the results indicate that the CH₄ and COS concentrations are relatively stable, sampling is only required monthly. As a guideline, ±5 % of the mean value will be considered stable. Together with flowrate and composition of COS in the inlet sour gas feeding Train 3, the pounds of inlet COS can be calculated.
- 2) As part of the current requirements of WAQSR Chapter 6, Section 2 permit CT-1946A the quantity of COS in the CO₂ Vent Stack is measured via the annually certified CEMS.
- 3) With the above information COS-CE can be calculated and monitored based on the following equation: (all flows in LB/HR of COS)

$$\{(\text{Inlet COS} - \text{CO}_2 \text{ Vent Stack COS}) / \text{Inlet COS}\} * 100 = \text{COS-CE}\%$$

* Inlet COS is sour gas feeding Train 3

C. Indicator Range

The indicator level is COS control efficiency below 24%. This value will be displayed for the operator to view. Continuous measurement of COS LB/HR is displayed for the operator also; allowable is 360 LB/HR.

D. Performance Criteria

Data Collection Frequency: All measurements for flowrates used to calculate inlet sour gas feed along with CO₂ Vent Stack flowrate are continuously measured and recorded. The accuracy on these items is approximately $\pm 2-3\%$. Manual samples of the inlet sour gas are analyzed with the plant GC and are expected to have an accuracy of $\pm 5\%$. The measured volume percent of COS in the CO₂ Vent Stack stream along with flowrate are both included in the CEMS for the CO₂ Vent Stack.

Verification of Operational Status: Not applicable.

QA / QC Practices and Criteria: All instruments will be calibrated at least annually in accordance with manufacturer's specifications. The plant GC will be calibrated as described in the Quality Assurance Project Plan and associated Standard Operating Procedures for the GC.

Data Collection Frequency: CO₂ Vent Stack flow and composition and all other flows are continuous. Inlet Sour gas samples are on a weekly basis. If after six (6) months of operation, the results indicate that the CH₄ and COS concentrations are relatively stable, sampling is only required monthly. As a guideline, $\pm 5\%$ of the mean value will be considered stable.

Collection Procedure: COS-CE will be calculated at least 4 times/hour.

III. References:

The COS-CE requirements are defined in DEQ permit # CT-1946A, Conditions 14,15 and 16.

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Appendix C through K
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