

Commonwealth of Kentucky
Division for Air Quality
PERMIT STATEMENT OF BASIS

Conditional Major/Synthetic Minor, Construction / Operating

Permit: F-11-030

Chisolm Energy, LLC.

Phelps, Kentucky 41553

May 2, 2011

Andrew True, Reviewer

SOURCE ID: 21-195-00288

AGENCY INTEREST: 111334

ACTIVITY: APE20110001

SOURCE DESCRIPTION:

On April 21, 2011, the source applied to the Division for the construction/operation of a Petroleum and Coal Products Manufacturing facility adjacent to KY-194 in Phelps, Kentucky 41553. The facility will produce gasoline and liquefied petroleum gas (LPG) from coal as well as elemental sulfur. The facility will utilize multiple processes. Coal will be used as a raw material fed to a gasification process to produce syngas. The syngas will then undergo a cleaning process where impurities (major impurities are sulfur and mercury), will be removed. The cleaned syngas will then be modified to produce methanol. The methanol will then be fed to a methanol to gasoline (MTG) process to produce gasoline.

Some of the facility's processes will produce steam which will be used to provide process heat as needed, feed steam driven sections of the process, or will be converted into electrical power as needed to drive electrical systems. A cooling tower will allow process water to be cooled and reentered into the process. Electric power produced by the process steam will be utilized at the facility and additional needs for electric will be supplied by utility connections. There will be no sales of electric power.

The maximum coal input will be 346 tons per hour (3,030,960 tons per year) into the systems and produce 18,000 barrels (42 gallons/barrel) of gasoline per day and 6,570,000 barrels per year. Raw materials for the plant will be trucked into the site. Product gasoline and LPG will be removed from the site via the preferred method of loading to railcar and some allowance is made for trucking for the delivery to markets.

The facility is divided into several areas for the purpose of permitting:

(1) Material Handling, Storage Sizing, & Preparation

- Handling, preparation, and storage of coal, limestone, ash/slag, and filter cake.
- Paved haul roads

(2) Gasification & Gas Cleanup

- Mill Heaters, Startup vessels, lock hoppers, CO₂ Purification Unit,
- Acid Gas Removal (removes the acid gases CO₂, H₂S, COS, mercury, and HCN)

- (3) MTG (Methanol to Gasoline Plant)
- MTG Fired Heaters
 - MTG Regeneration Off-Gas
 - Methanol to Gasoline Plant Flared stream
- (4) Other Equipment/Emission Units
- Flare
 - Cooling Tower
 - Methanol Tank
 - Gasoline Storage Tanks
 - Sulfur (liquid) Storage Tank
 - Sulfur Vehicle Loading
 - Gasoline Loading Racks
 - LPG Loading Racks
 - Start-up Boiler/Process Heater
 - MTG Regeneration Off-Gas
 - Methanol to Gasoline Plant Flared stream
 - Fugitive Equipment Leaks

The following are emission units in Section B of the permit:

Emission Unit/Point ID	Description
TPC1-12	Coal Transfer Points and Conveyors
CR1	Coal Crusher
PR	Paved Haulroads
FH 1, 3, 5, 7, 9	Coal Feed Bunkers
TPA1-5	Ash/Slag Transfer Points and Conveyors
SSP	Ash/Slag Stockpile
B	Load-out Bin
TPFC 1&2	Filter Cake Transfer Points and Conveyors
FCS1	Filter Cake Silo
TPL1-5	Transfer Points and Conveyors
CR7	Limestone Crusher
LS	Limestone Stockpile
FH 2, 4, 6 8, 10	Limestone Feed Bunkers
A1/1 – A1/5	Mill and Heaters
A2/1	Startup Vessel No.1
A2/2	Startup Vessel No.2
B1/1	Lock Hoppers No.1-6 (Feed Bunker No.1)
B1/2	Lock Hoppers No.7-12 (Feed Bunker No.2)
C1	CO ₂ Purification Unit
C2	Acid Gas (CO ₂ /H ₂ S) Removal
E1 (SURGH)	MTG Fired Heater (Start-Up/Regeneration Gas Heater)
E2 (SURH)	MTG Fired Heater (Start-Up/Reactivation Heater)

E3 (RCH)	MTG Fired Heater (HGT Reactor Charge Heater)
E4	MTG Regeneration Off-Gas
E5	Methanol to Gasoline Plant Flared Process Stream from MTG
FL	Flare
B2/1 (FL ST)	Gasifier Startup (flared streams)
B2/2 (FL ST)	Gasifier Startup (flared streams)
G	Pilots on Flare
CT	Cooling Tower
TK6	Methanol Tank
TK1	Gasoline Storage Tank No.1
TK2	Gasoline Storage Tank No.2
TK3	Gasoline Storage Tank No.3
TK7	Sulfur (liquid) Storage Tank
SVL	Sulfur Vehicle Loading
LR1	Loading Rack No.1
LR2	Loading Rack No.2
LPGL	LPG Loading
F (SUSB)	Startup Boiler – Process Heater
FUGL	Fugitive Equipment Leaks
GFUG	Gasoline System Fugitives
MFUG	Methanol System Fugitives

APPLICABLE REGULATIONS:

Applicable Regulation	Emission Unit or Emission Point ID
401 KAR 59:010, <i>New process operations.</i>	CR1, CS, PR, FH1, FH3, FH5, FH7, FH9, TPA 1-5, SSP, TPFC 1 & 2, FCS1, CR7, LS, FH2, FH4, FH6, FH8, FH10, A1/1–A1/5, A2/1, A2/2, B1/1, and B1/2
401 KAR 63:010, <i>Fugitive Emissions.</i>	(BC1-6) TPC1-12, CS, PR, TPA 1-5, SSP, TPFC 1 & 2, FCS1, TPL 1-5, CR7, LS, and CT
40 CFR 60 Subpart Y, <i>Standards of Performance for Coal Preparation and Processing Plants.</i>	(BC1-6) TPC1-12, CR1, CS, FH1, FH3, FH5, FH7, FH9
40 CFR 60 Subpart OOO, <i>Standards of Performance for Non-metallic Mineral Processing Plants.</i>	TPL 1-5, CR7, LS, FH2, FH4, FH6, FH8, FH10, A1/1–A1/5, A2/1, A2/2, B1/1, and B1/2
401 KAR 59:105, <i>New process gas streams.</i>	C1, FL, G, B2/1 (FL ST), B2/2 (FL ST), E5 (FL), TK7, SVL, and F (SUSB)
401 KAR 63:020, <i>Potentially hazardous matter or toxic substances.</i>	C1, E1 (SURGH), E2 (SURH), E3 (RCH), E4, E5, FL, G, B2/1 (FL ST), B2/2 (FL ST), E5 (FL), TK7, SVL, (GFUG), (MFUG), and (FUGL)
401 KAR 60:005 – 40 C.F.R. Part 60, <i>Standards of Performance for New Stationary</i>	E1 (SURGH)

<i>Sources, incorporating by reference 40 CFR Part 60 Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units.</i>	
401 KAR 60:005 – 40 C.F.R. Part 60, <i>Standards of Performance for New Stationary Sources, incorporating by reference 40 CFR Part 60 Subpart Db Standards of Performance for Industrial Commercial-Institutional Steam Generating Units.</i>	E2 (SURH)
401 KAR 59:015, <i>New indirect heat exchangers.</i>	E2 (SURH), E3 (RCH)
401 KAR 63:015, <i>Flares.</i>	FL, G, B2/1 (FL ST), B2/2 (FL ST), and E5 (FL)
40 CFR 60 Subpart NNN, <i>Standards of Performance for Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations.</i>	FL, G, B2/1 (FL ST), B2/2 (FL ST), and E5 (FL)
40 CFR 60 Subpart RRR, <i>Standards of Performance for Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes.</i>	FL, G, B2/1 (FL ST), B2/2 (FL ST), and E5 (FL)
40 CFR 60 Subpart A, <i>General Provisions, 60.18 General control device and work practice requirements.</i>	FL, G, B2/1 (FL ST), B2/2 (FL ST), and E5 (FL)
40 CFR 60 Subpart Kb, <i>Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984.</i>	TK6, TK1, TK2, and TK3
40 CFR 63 Subpart R, <i>National Emission Standards for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations).</i>	TK6, TK1, TK2, TK3, LR1, LR2, (GFUG),
40 CFR 60 Subpart XX, <i>Standard of Performance for Bulk Gasoline Terminals</i>	LR1, LR2
40 CFR 60 Subpart Dc, <i>Standards Of Performance For Industrial-Commercial-</i>	F (SUSB)

<i>Institutional Steam Generating Units,</i>	
40 CFR 60 Subpart VVa, <i>Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006.</i>	(GFUG), (MFUG), (FUGL)

NON APPLICABLE REGULATIONS:

401 KAR 63:010, *Fugitive Emissions*, is applicable to each affected facility as an apparatus, operation, or road which emits or may emit fugitive emissions provided that the fugitive emissions from such facility are not elsewhere subject to an opacity standard within the administrative regulations of the Division for Air Quality. The emissions from Emission Points A1-A5, A2/1, A2/2, B1/1, B1/2, and C1 do not meet the definition of “fugitive emissions” as defined in 401 KAR 63:010, Section 2(2), since the emissions are emitted from stack.

40 CFR Part 63 Subpart Q *National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers*. This regulation is not applicable as long as the cooling towers are not operated with chromium-based water treatment chemicals.

40 CFR 63 Subpart R, *National Emission Standards for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations)*, does not apply to the LPG storage tanks or LPG loading.

40 CFR 61 Subpart J, *National Emission Standard for Equipment Leaks (Fugitive Emission Sources) of Benzene*, applies to pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, and control devices or systems required by this subpart to, operating “ in benzene service”. *In benzene service* means that a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 10 percent benzene by weight as determined according to the provisions of 40 CFR 61.245(d). The provisions of 40 CFR 61.245(d) also specify how to determine that a piece of equipment is not in benzene service. The source does not have any equipment “in benzene service.”

40 CFR 61 Subpart V, *National Emission Standard for Equipment Leaks (Fugitive Emission Sources)*, as referenced from 40 CFR 61.112(a).

40 CFR 63 Subpart R, *National Emission Standards for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations)* is not applicable to the methanol Tank (TK6), LPG Loading, and Fugitive leaks outside of the Gasoline System Fugitives (GFUG).

PRECLUDED REGULATIONS:

401 KAR 52:020, *Title V Permits*.

401 KAR 51:017, *Prevention of significant deterioration of air quality.*

COMMENTS:

Emission Factors:

Emission factors used are based on AP-42, EPA guidance documents, material balance, vendor supplied information, process knowledge, and engineering calculations which include but are not limited the following:

Emission Factor Source	Emission Unit or Emission Point ID
AP42-13.2.4	Transfer Points (TPC1-12, TPA1-5, TPFC1-2), Coal Feed Bunks (FH1-FH10)
Thorwesten Vent Vendor Information and process knowledge	Dust Collectors: Limestone Stockpile (LS), Coal Stock Pile (CS)
Prematechnik Vendor Information, process knowledge	Flare (F)
AP42-13.2.1	Paved Haulroads (PR)
AP42-11.9.2	Limestone Crusher (CR7)
AP42-13.4	Cooling Tower (CT)
Uhde Vendor Information/process knowledge	Mill and Heaters (A1/1-A1/5), Startup Vessels (A2/1 – A2/2), Lock hopper No 1-6 (B1/1), Lock hopper No 7-12 (B1/2), CO ₂ Purification (C1), MTG units (E1-E5), Gas Discharge, Flare pilots (G), Startup Boiler F (SUSB), Gas Discharges through flare (B2/1-B2/2)
EPA-453/R-453/R-95-017, Table 2-1	Fugitive equipment leaks (FUGL, MFUG, GFUG)
Tanks 4.0	Gasoline Storage Tanks (TK1-3), Methanol Tank (TK6)
AP42-5.2/AP42-5.3	Loading Racks (LR1 - LR2)
AP42-1.4-2	Flare Pilots (G)

Control Efficiencies:

Emission Unit ID	Control Method	Control Efficiency (CE%)
Transfer Points and Conveyors (TPC1-12, TPA1-5, TPFC1-2)	Enclosures	50% (Partially Enclosed) 80% (Fully Enclosed) 0% (No enclosure)
CR1	Baghouse(s)	99 %
CS	Baghouse(s)	95%
PR	Watering Truck/Dust Suppression	85%
FH 1, 3, 5, 7, 9 FH 2, 4, 6, 8, 10	Vent Filters	99%
CR7	Full Enclosure	80%
LS	Baghouse(s)	95%
FUGL, MFUG, GFUG	Leak Detection and Repair (LDAR) implementation	Various

	and Design Modifications (i.e., sealless/leakless components, welded connections, etc...)	
LR1 & LR2	Vapor Recovery	99.2/99.0%
Flared Streams, C2, B2/1, B2/2, E5	Flare ¹	98% (NO _x , SO ₂ , and VOC) 99.5% (CO)

¹ The flare efficiency was evaluated by the Division. The control efficiencies applied are supported by a vendor guarantee from Prematechnik GmbH (see application Attachment 5). Information provided by Uhde (see application Attachment 5) states that the flare will be designed and operated according to API521 and 40 CFR 60.18. The flare is also subject to the requirements of 40 CFR 60.18 as referred from multiple regulations that are applicable to the source including but not limited to the following: 40 CFR 60 Subpart NNN, 40 CFR 60 Subpart RRR, 401 KAR 59:105 (compliance demonstration method), and 401 KAR 63:015 (compliance demonstration method). The Division also relied upon the EPA document *Basis and Purpose Document for Hydrogen-Fueled Flares* (EPA-453/R-98-001, March 1998), which is the basis document for 40 CFR 60.18, when evaluating the flare efficiency.

EMISSION AND OPERATING CAPS DESCRIPTION:

Source Wide Emission Limitations:

To preclude the applicability of 401 KAR 52:020, *Title V permits*, and 401 KAR 51:017, *Prevention of significant deterioration of air quality*, the source wide emissions shall not equal or exceed the following limits on a consecutive twelve (12)-month basis:

- (1) PM₁₀/PM_{2.5} emission of 90 tons per year;
- (2) NO_x emission of 90 tons per year;
- (3) SO₂ emission of 94 tons per year;
- (4) CO emission of 90 tons per year;
- (5) VOC emission of 90 tons per year;
- (6) COS emissions of 9.0 tons per year;
- (7) CH₃OH emissions of 9.0 tons per year;
- (8) Single HAPS of 9.0 tons per year; and
- (9) Combined HAP emission of 22.5 tons per year.

The Division evaluated the sources potential to emit and determined that the source’s potential emissions do not exceed the emission limits described above. Physical and/or operational limitations on the capacity of the source to emit PM₁₀/PM_{2.5}, NO_x, SO₂, CO, VOC, COS, CH₃OH, and HAPS that are enforceable as a practical matter are contained in Section B of the permit. The source-wide emission limitations for PM₁₀, PM_{2.5}, NO_x, CO, VOC, COS, CH₃OH, SO₂, and HAPS specified in Section D of the permit are set below the major source thresholds for each pollutant.

Emission Limitations:

Emission Unit or Emission Point ID	Emission limit	Pollutant(s) limited
(BC1-6) TPC1-12, CR1, CS, FH 1, FH3, FH5, FH7, FH9	< 10 percent opacity	Opacity
(BC1-6) TPC1-12, CR1, CS, FH 1, FH3, FH5, FH7, FH9	< 0.023 g/dscm (0.010 gr/dscf)	PM/PM ₁₀ /PM _{2.5}
FH1-FH10, CR1, CS, SSP, FCS1, CR7, LS	$E_{\text{Allowable}} = 2.34 \text{ lb/hr}$ for P less than or equal to 0.5 ton/hr $= 3.59 * P^{0.62}$ for P greater than 0.5 ton/hr but less than or equal to 30 ton/hr $= 17.31 * P^{0.16}$ for P greater than 30 ton/hr [401 KAR 59:010 Section 3(2)]	PM
(BC1-6) TPC1-12, CS, PR, TPA 1-5, SSP, TPFC 1 & 2, FCS1, TPL 1-5	Visible fugitive dust emissions beyond the property line is prohibited. [401 KAR 63:010]	PM/PM ₁₀ /PM _{2.5}
CR7, LS, FH 2, FH4, FH6, FH8, FH10	Table 2 of 40 CFR 60 Subpart OOO (stacks)	PM/PM ₁₀ /PM _{2.5}
TPL 1-5	Table 3 of 40 CFR 60 Subpart OOO (Fugitives)	PM/PM ₁₀ /PM _{2.5} , Opacity
A1/1 – A1/5, A2/1, A2/2, B1/1, B1/2	$E_{\text{Allowable}} = 2.34 \text{ lb/hr}$ for P less than or equal to 0.5 ton/hr $= 3.59 * P^{0.62}$ for P greater than 0.5 ton/hr but less than or equal to 30 ton/hr $= 17.31 * P^{0.16}$ for P greater than 30 ton/hr	PM/PM ₁₀ /PM _{2.5}

	[401 KAR 59:010 Section 3(2)]	
A1/1 – A1/5, A2/1, A2/2, B1/1, B1/2	<20 % Opacity, [401 KAR 59:010 Section 3(1)(a)]	Opacity
A1/1 – A1/5, A2/1, A2/2, B1/1, B1/2	40 CFR 60 Subpart Y limits	PM/PM ₁₀ /PM _{2.5} , Opacity
C1, C2	H ₂ S < ten (10) gr/100 dscf (165 ppm by volume) at zero (0) percent O ₂ or without reducing the concentration by 85 percent, based on a three (3) hour average. [401 KAR 59:105]	H ₂ S
C1, E1 (SURGH), E2 (SURH), E3 (RCH), E4, E5, FL, G, B2/1 (FL ST), B2/2 (FL ST), E5 (FL), TK7, SVL, (GFUG), (MFUG), and (FUGL)	< Quantities or duration as to be harmful to the health and welfare of humans, animals and plants. [401KAR 63:020]	hazardous matter or toxic substances
E1	No gases that contain SO ₂ in excess of 50 percent (0.50) of the potential SO ₂ emission rate and no gases containing SO ₂ in excess of 260 ng/J (0.60 lb/MMBtu) heat input.	SO ₂
E1	<20 percent opacity [40 CFR 60.43c (c)]	Opacity
E1	No gases that contain PM >13 ng/J (0.030 lb/MMBtu) heat input	PM

E2 (SURH)	<p>No gases that contain SO₂ in excess of 87 ng/J (0.20 lb/MMBtu) heat input or 8 percent (0.08) of the potential SO₂ emission rate (92 percent reduction) and 520 ng/J (1.2 lb/MMBtu) heat input. [40 CFR 60.42b (k)(1)]</p> <p>SO₂ emissions shall not exceed 0.819 lb/MMBtu [401 KAR 59:015, Section 5 (1) (c)]</p>	SO ₂
E2 (SURH)	No gases that contain NO _x (expressed as NO ₂) in excess of 210 ng/J (0.50 lb/MMBtu) heat input	NO _x
E2 (SURH)	No gases any gases that contain PM in excess of 13 ng/J (0.030 lb/MMBtu) heat input.	PM
E2 (SURH)	<20 percent opacity	Opacity
E3 (RCH)	< 0.266 lb/MMBTU.	PM
E3 (RCH)	< 20% Opacity	Opacity
E3 (RCH)	<0.819 lb/MMBTU	SO ₂
FL	No gases from the flare that contain H ₂ S that exceed ten (10) gr/100 dscf (165 ppm by volume) at zero (0) percent O ₂ or without reducing the concentration by 85 percent, based on a three (3) hour average.	H ₂ S

FL	20 percent for more than three (3) minutes in any one (1) day	Opacity
CT	No visible fugitive dust emissions beyond the lot line of the property	PM
TK1, TK2, TK3	40 CFR 63.423 requirements	VOC/HAP
TK7, SVL	No gases that contain H ₂ S that exceed ten (10) gr/100 dscf (165 ppm by volume) at zero (0) percent O ₂ or without reducing the concentration by 85 percent, based on a three (3) hour average.	H ₂ S
LR1, LR2, LPGL	Emissions to the atmosphere from the vapor collection system due to the loading of liquid product into gasoline tank trucks are not to exceed 35 milligrams of total organic compounds per liter of gasoline loaded.	VOC
LR1, LR2	40 CFR 63.422 limitations	VOC
F (SUSB)	< 0.266 lb/MMBTU	PM
F (SUSB)	< 20 percent	Opacity
F (SUSB)	< 0.819 lb/MMBTU.	SO ₂

Operating Limitations:

Emission Unit or Emission Point ID	Operating limit	Pollutant(s) limited
(TPC1-12, TPA1-5, TPFC1-2), CR7	Install and Operate with specified enclosures	PM/PM ₁₀ /PM _{2.5} , Opacity
CR1	Install and Operate with specified Baghouse	PM/PM ₁₀ /PM _{2.5} , Opacity
CS	Coal Stockpiles enclosed in building(s) vented to Baghouse(s)	PM/PM ₁₀ /PM _{2.5} , Opacity
PR	Watering Trucks/Wet Dust Suppression consistent with good air pollution control practices for minimizing emissions	PM/PM ₁₀ /PM _{2.5} , Opacity
FH1-10	Install and operate vent filter	PM/PM ₁₀ /PM _{2.5} , Opacity
Transfer Points and Conveyors (TPC1-12)	3,030,960 tons/year per transfer point/conveyor	PM/PM ₁₀ /PM _{2.5}
CR1	346 tons/hour (tph)	PM/PM ₁₀ /PM _{2.5}
TPA1-5	604,440 tons per year each transfer point/conveyor	PM/PM ₁₀ /PM _{2.5}
TPFC1 & TPFC2	61,320 tons/year each	PM/PM ₁₀ /PM _{2.5} PM/PM ₁₀ /PM _{2.5}
LS	Limestone Stockpiles enclosed in building(s) vented to Baghouse(s)	PM/PM ₁₀ /PM _{2.5}
Material Handling, Storage Sizing, & Preparation	reasonable precautions shall be taken to prevent particulate	PM/PM ₁₀ /PM _{2.5} , Opacity

(all units subject to 401 KAR 63:010)	matter from becoming airborne	
TPL 1-5	166,440 tons/year each (feed rate to plant), 100 tph bin filling rate	PM/PM ₁₀ /PM _{2.5} , Opacity
CR7	166,440 tons/year each (feed rate to plant) 100 tph bin filling rate	PM/PM ₁₀ /PM _{2.5} , Opacity
LS	0.2 mmscf/hr vented through baghouse	PM/PM ₁₀ /PM _{2.5} , Opacity
A1/1 – A1/5	3,030,960 tons per year coal for gasification	NO _x , CO, VOC, PM, PM _{2.5} , PM ₁₀
A1/1 – A1/5	<p>During Normal Plant Operation, the permittee shall not operate more than four (4) units, two (2) units per gasifier, when the full plant is operational.</p> <p>(One (1) unit must be in standby and NOT operating when the full plant is operational.)</p>	NO _x , CO, VOC, PM, PM _{2.5} , PM ₁₀
A1/1 – A1/5	<p>During cold startup, the permittee shall use only one unit with natural gas when hydrogen is not available for fuel and the remaining units shall be started on hydrogen. The duration of cold startups per year shall be limited to 40 (forty) hours.</p> <p>Any one (1) unit may be used for coal startup.</p>	NO _x , CO, VOC, PM, PM _{2.5} , PM ₁₀
A2/1	<p>15,570 tons per year coal for gasification and 173 tons/hr.</p> <p>31.5 million standard cubic feet (mmscf) gas discharge per /year</p> <p>90 hours of startup/year</p>	SO ₂ , CO, VOC, PM, PM _{2.5} , PM ₁₀
A2/2	<p>15,570 tons per year coal for gasification and 173 tons/hr.</p> <p>31.5 million standard cubic feet (mmscf) gas discharge per /year</p>	SO ₂ , CO, VOC, PM, PM _{2.5} , PM ₁₀

	90 hours of startup/year	
B1/1	1,515,480 tons per year coal for gasification and 173 tons/hr 7008 mmscf discharge from lockhopper/year and an additional 0.57 mmscf/hr allowed during 30 feedstock changes per year	SO ₂ , CO, VOC, PM, PM _{2.5} , PM ₁₀
B1/2	1,515,480 tons per year coal for gasification and 173 tons/hr 7008 mmscf discharge from lockhopper/year and an additional 0.57 mmscf/hr allowed during 30 feedstock changes per year	SO ₂ , CO, VOC, PM, PM _{2.5} , PM ₁₀
Gasification and Cleanup Units	The permittee shall use PRB-coal or other low sulfur coal with a maximum sulfur content of 0.5% during startup.	SO ₂
Gasification and Cleanup Units	When reasonably possible, low sulfur coal shall be re-introduced for shutdowns.	SO ₂
C1	Install and operate CO ₂ Stripping and/or Catalytic Purification unit	CO, H ₂ S and VOC
C1	Regeneration off-gas rate from the MTG plant (regeneration of catalyst) shall not exceed 356.3 MMscf per year.	CO, SO ₂
C1	The mass flow rate of off-gas from the AGR system shall not exceed 3,058,660 tons per year.	CO, SO ₂
C1	8,000 hours per year of operation	CO, SO ₂
C2	280 metric tons of gas flared per year	NO _x , SO ₂ , CO, VOC, HAPS
E1 (SURGH) E2 (SURH) E3 (RCH)	Combustion of syngas fuel only, except for 40 hours per year when the MTG tailgas (secondary fuel) is utilized (exception is for E3 only).	NO _x , SO ₂ , CO, VOC, PM, PM _{2.5} , PM ₁₀
E5	31,120 pounds per year flared	NO _x , CO, VOC
FL	Gas production sent to the flare shall be limited to	NO _x , SO ₂ , CO, VOC, PM, PM _{2.5} , PM ₁₀

	100,000 m ³ n/event (start-up + shutdown) per gasifier.	
FL	Gas production sent to the flare shall be limited to 6,000,000 m ³ n/year (start-up + shutdown) from the gasifiers.	NO _x , SO ₂ , CO, VOC, PM, PM _{2.5} , PM ₁₀
FL	Comply with 40 CFR 60.18	NO _x , SO ₂ , CO, VOC, PM, PM _{2.5} , PM ₁₀
FL	Flare shall be equipped with a wind deflector designed to stabilize the flare flame, positively influencing the flame and efficiency of combustion and pollution control efficiency of regulated air pollutants.	NO _x , SO ₂ , CO, VOC, PM, PM _{2.5} , PM ₁₀
FL	The permittee shall use, whenever the flare is in operation, natural gas fuel	NO _x , SO ₂ , CO, VOC, PM, PM _{2.5} , PM ₁₀
CT	Maintain the total dissolved solids (TDS) concentration in the circulation cooling water at or below 5,000 ppm.	PM, PM _{2.5} , PM ₁₀
CT	The cooling tower shall not be operated with chromium-based water treatment chemicals	To preclude applicability of 401 CFR 63 Subpart Q
CT	Reasonable precautions to prevent particulate matter from becoming airborne.	PM, PM _{2.5} , PM ₁₀
TK1, TK2, TK3, TK6	Fixed roof in combination with an internal floating roof meeting	VOC, HAPs
TK1, TK2, TK3	Most Stringent between: 40 CFR 60 Subpart Kb or 40 CFR 63 Subpart R	VOC, HAPs
SVL	Maximum sulfur vehicle loading shall not exceed 51.6 million pounds (lb) per year.	H ₂ S
TK7	Degassing and/or sweep air from the sulfur storage tank shall be incinerated in the SRU furnace or vented to the flare.	H ₂ S
SVL	The sulfur loading rack shall be equipped with a vapor recovery system and the unit shall be vented to the flare.	H ₂ S

LPGL	40 CFR 60 Subpart XX	VOC
LR1 and LR2	40 CFR 60 Subpart XX and 40 CFR 63 Subpart R restrictions	VOC
F(SUSB)	Combust natural gas or LPG only	CO, NO _x , SO ₂ , and PM/PM ₁₀ /PM _{2.5}
F(SUSB)	Maximum operation at full capacity (81.84 mmBtu/hr) shall be limited to 384 hours per year based on a twelve (12) month rolling total.	CO, NO _x , SO ₂ , and PM/PM ₁₀ /PM _{2.5} , VOC
FUGL, MFUG, GFUG	Implement a Leak Detection and Repair (LDAR program)	VOC/HAPs
FUGL, MFUG, GFUG	<p>All valves, compressors, open ended lines, and sampling connections for which a control efficiency of 99% has been applied shall have the following modifications/design:</p> <ol style="list-style-type: none"> (1) Valves must be designed to be sealless; (2) Compressors shall have dual mechanical seal with barrier fluid maintained at a higher pressure than the compressed gas; (3) Open ended lines must have a properly installed blind, cap, plug, or second valve on the open end; (4) Sampling connections, a closed-loop sampling system must be used. (5) Pumps must have a sealless design or dual mechanical seal with barrier fluid maintained at a higher pressure than the pumped fluid. 	VOC/HAPs
FUGL, MFUG, GFUG	<p>All connectors for which a control efficiency of 100% has been applied shall be properly welded to eliminate emissions.</p> <p>All compressors for which a control efficiency of 90% has been applied shall utilize a</p>	VOC/HAPs

	closed vent system routed to a control device.	
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PERIODIC MONITORING:

Material Handling and storage:

For CR1, CS, LS, and CR7: Visual Observations/Method 22 or bag leak detection system.

Gasification and Cleanup:

- a. (A1/1 – A1/5, A2/1, A2/2, B1/1, and B1/2)
Visual Monitoring for visible emissions/opacity or as alternate continuous opacity monitoring system (COMS).
- b. For A1/1 – A1/5: Continuous monitoring of temperature of the gas stream at the exit of the thermal dryers.
- c. C1 (CO₂ Purification Unit)
 - (1) CEMS for: CO, H₂S, SO₂, and VOC; or A performance test shall be conducted every 2½ years.
 - (2) Continuous monitoring system (CMS) on the inlet and outlet of the CO₂ Purification unit to measure and record the off-gas processing rate for the unit.
 - (3) Continuous monitoring system (CMS) on the MTG Reaction Section vent to the CO₂ Purification unit to measure and record the vent rate during MTG catalyst regeneration.
 - (4) Continuous monitoring of the catalytic oxidizer - gas temperature monitors upstream and downstream of the catalyst bed.
- d. C2 (Acid Gas (CO₂/H₂S) Removal)
 - (1) Continuous monitoring system (CMS) to measure and record the exhaust gas flow rate of Emission Unit C2.
 - (2) Gas chromatograph (GC) analyzer to determine the sulfur, CO, and non-CO hydrocarbon content and heating value of gas vented to the flare.

MTG (Methanol to Gasoline Plant)

- a. E1 (SURGH) MTG Fired Heater
 - (1) Monitoring requirements in 40 CFR 60.46c (a), (b), (c), (d) and (f) for SO₂ emissions.
 - (2) COMS are not required if the applicable procedures in 40 CFR 60.48c(f) are followed.
 - (3) Opacity performance tests.
- b. E2 (SURH) MTG Fired Heater
 - (1) Continuous opacity monitoring system (COMS) for measuring opacity.
 - (2) If burning gaseous fuels with potential SO₂ emissions rates of 26 ng/J (0.060 lb/MMBtu) or less and does not use a post-combustion technology to reduce SO₂ or PM emissions, then continuous opacity monitoring system (COMS) not required.

(3) Comply with all applicable SO₂ emission monitoring requirements in 40 CFR 60.47b.

c. E3 (RCH) MTG Fired Heater

(1) Monitor the monthly syngas usage in Emission Unit E3.

d. E5 Methanol to Gasoline Plant

(1) Continuous monitoring system (CMS) to measure and record the exhaust gas flow rate of Emission Unit E5.

(2) Gas chromatograph (GC) analyzer to determine the sulfur, CO, and non-CO hydrocarbon content and heating value of gas vented to the flare.

Flare

(1) A heat sensing device, such as an ultra-violet beam sensor or thermocouple, at the pilot light to indicate the continuous presence of a flame; and

(2) A flow indicator that provides a record of vent stream flow to the flare at least once every hour for each affected facility.

(3) A flow indicator that provides a record of vent stream flow diverted from being routed to the flare at least once every 15 minutes for each affected facility.

(4) CMS to monitor and record the usage of pilot and assist (if required by the manufacturer's specifications) gas by the flare.

(5) CMS to measure and record: total volumetric flow rate of process gas sent to the flare; the sulfur, CO, and non-CO hydrocarbon content and heating value of the process gas sent to the flare; and exhaust gas flow rate.

(6) Reduced sulfur CEMS

(7) Periodic Process Gas Sampling

(8) Weekly visual observations when only the flare pilots are in operation.

CT (Cooling Tower)

(1) Sample and analyze the cooling tower circulation water on a monthly basis for the TDS concentration.

TK6 (Methanol Tank) and TK1, TK2, & TK3 (Gasoline Storage Tanks)

(1) Continuous monitoring requirements in 40 CFR 63.427.

TK7 (Sulfur (liquid) Storage Tank) and SVL (Sulfur Vehicle Loading)

(1) Testing to determine the concentration of H₂S in the sulfur vehicle loading area during the operation of sulfur vehicle loading.

LR1 & LR2 (Loading Rack No.1 and No.2)

(1) Continuous monitoring requirements in 40 CFR 63.427.

F(SUSB) Startup Boiler – Process Heater

(1) Monitor the monthly natural gas usage in Emission Unit F.

(2) Monitor the monthly and annual hours of operation of the boiler.

(FUGL) Fugitive Equipment Leaks, (GFUG) Gasoline System Fugitives, & (MFUG) Methanol System Fugitives

(1) Leak detection and repair program (LDAR) and comply with 40 CFR 60 Subpart VVa

OPERATIONAL FLEXIBILITY:

None