

Commonwealth of Kentucky  
Division for Air Quality

**PERMIT APPLICATION SUMMARY FORM**

Completed by: Andrew True

**GENERAL INFORMATION:**

Name: Chisolm Energy, LLC.  
Address: Adjacent to KY-194, Phelps, Kentucky 41553  
Date application received: 4/20/2011  
SIC Code/SIC description: 2999, Products of Petroleum and Coal, NEC  
Source ID: 21-195-00288  
Agency Interest: 111334  
Activity: APE20110001  
Permit: F-11-030

**APPLICATION TYPE/PERMIT ACTIVITY:**

Initial issuance                       General permit  
 Permit modification                 Conditional major  
    \_\_Administrative                     Title V  
    \_\_Minor                               Synthetic minor  
    \_\_Significant                       Operating  
 Permit renewal                       Construction/operating

**COMPLIANCE SUMMARY:**

Source is out of compliance                       Compliance schedule included  
 Compliance certification signed

**APPLICABLE REQUIREMENTS LIST:**

NSR     NSPS     SIP  
    \_\_ Non-Attainment                       NESHAPS                                       Other  
    \_\_ PSD                                       CAM  
    \_\_ Netted out of PSD/NSR  
    \_\_ Not major modification per 401 KAR 51:001, 1(116)(b)

**MISCELLANEOUS:**

Acid rain source  
 Source subject to 112(r)  
 Source applied for federally enforceable emissions cap  
 Source provided terms for alternative operating scenarios  
 Source subject to a MACT standard  
 Source requested case-by-case 112(g) or (j) determination  
 Application proposes new control technology  
 Certified by responsible official  
 Diagrams or drawings included  
 Confidential business information (CBI) submitted in application  
 Pollution Prevention Measures  
 Area is non-attainment (list pollutants):

**EMISSIONS SUMMARY:**

<b>Pollutant</b>	<b>Potential (tpy)</b>
PM	64.63
PM <sub>10</sub>	55.49
PM <sub>2.5</sub>	49.67
NO <sub>x</sub>	48.73
SO <sub>2</sub>	92.07
CO	66.08
VOC	51.50
H <sub>2</sub> S	1.11
LEAD	0
Single HAPs:	
methanol	2.97
benzene	0.03
isooctane	0.01
toluene	0.04
ethylbenzene	0.02
xylene	0.02
isopropyl benzene	0.01
1,2,4 trimethylbenzene	0.01
cyclohexane	0.01
hexane	0.02
COS	0.30
Ni(CO) <sub>4</sub>	0.04
HCN	0.07
HCl	0.07
HG	0.10
Source wide HAPs	3.71
GHG Emissions:	
CO <sub>2</sub>	3,946,558.18
CH <sub>4</sub>	6.39
CO <sub>2</sub> e	3,946,692.29

**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, CO<sub>2</sub> Purification Unit,
- Acid Gas Removal (removes the acid gases CO<sub>2</sub>, H<sub>2</sub>S, 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

**EMISSIONS AND OPERATING CAPS DESCRIPTIONS:**

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) PM<sub>10</sub>/PM<sub>2.5</sub> emission of 90 tons per year;
- (2) NO<sub>x</sub> emission of 90 tons per year;
- (3) SO<sub>2</sub> 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) CH<sub>3</sub>OH 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 PM<sub>10</sub>/PM<sub>2.5</sub>, NO<sub>x</sub>, SO<sub>2</sub>, CO, VOC, COS, CH<sub>3</sub>OH, and HAPS that are enforceable as a practical matter are contained in Section B of the permit. The source-wide emission limitations for PM<sub>10</sub>, PM<sub>2.5</sub>, NO<sub>x</sub>, CO, VOC, COS, CH<sub>3</sub>OH, SO<sub>2</sub>, and HAPS specified in Section D of the permit are set below the major source thresholds for each pollutant.

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

<b>Emission Unit/Point ID</b>	<b>Description</b>
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 <sub>2</sub> Purification Unit

C2	Acid Gas (CO <sub>2</sub> /H <sub>2</sub> 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

Emission Limitations:

<b>Emission Unit or Emission Point ID</b>	<b>Emission limit</b>	<b>Pollutant(s) limited</b>
(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 <sub>10</sub> /PM <sub>2.5</sub>

<p>FH1-FH10, CR1, CS, SSP,                  FCS1, CR7, LS</p>	<p><math>E_{\text{Allowable}} = 2.34 \text{ lb/hr}</math> for P less than or equal to 0.5 ton/hr  <math>= 3.59 * P^{0.62}</math> for P greater than 0.5 ton/hr but less than or equal to 30 ton/hr  <math>= 17.31 * P^{0.16}</math> for P greater than 30 ton/hr</p> <p>[401 KAR 59:010 Section 3(2)]</p>	<p>PM</p>
<p>(BC1-6) TPC1-12, CS, PR,                  TPA 1-5, SSP, TPFC 1 &amp; 2,                  FCS1, TPL 1-5</p>	<p>Visible fugitive dust emissions beyond the property line is prohibited.</p> <p>[401 KAR 63:010]</p>	<p>PM/PM<sub>10</sub>/PM<sub>2.5</sub></p>
<p>CR7, LS, FH 2, FH4, FH6,                  FH8, FH10</p>	<p>Table 2 of 40 CFR 60 Subpart OOO (stacks)</p>	<p>PM/PM<sub>10</sub>/PM<sub>2.5</sub></p>
<p>TPL 1-5</p>	<p>Table 3 of 40 CFR 60 Subpart OOO (Fugitives)</p>	<p>PM/PM<sub>10</sub>/PM<sub>2.5</sub>,                  Opacity</p>
<p>A1/1 – A1/5, A2/1, A2/2,                  B1/1, B1/2</p>	<p><math>E_{\text{Allowable}} = 2.34 \text{ lb/hr}</math> for P less than or equal to 0.5 ton/hr  <math>= 3.59 * P^{0.62}</math> for P greater than 0.5 ton/hr but less than or equal to 30 ton/hr  <math>= 17.31 * P^{0.16}</math> for P greater than 30 ton/hr</p> <p>[401 KAR 59:010 Section 3(2)]</p>	<p>PM/PM<sub>10</sub>/PM<sub>2.5</sub></p>
<p>A1/1 – A1/5, A2/1, A2/2,                  B1/1, B1/2</p>	<p>&lt;20 % Opacity, [401 KAR 59:010 Section 3(1)(a)]</p>	<p>Opacity</p>
<p>A1/1 – A1/5, A2/1, A2/2,                  B1/1, B1/2</p>	<p>40 CFR 60 Subpart Y limits</p>	<p>PM/PM<sub>10</sub>/PM<sub>2.5</sub>,                  Opacity</p>

<p>C1, C2</p>	<p>H<sub>2</sub>S &lt; ten (10) gr/100 dscf (165 ppm by volume) at zero (0) percent O<sub>2</sub> or without reducing the concentration by 85 percent, based on a three (3) hour average. [401 KAR 59:105]</p>	<p>H<sub>2</sub>S</p>
<p>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)</p>	<p>&lt; Quantities or duration as to be harmful to the health and welfare of humans, animals and plants. [401KAR 63:020]</p>	<p>hazardous matter or toxic substances</p>
<p>E1</p>	<p>No gases that contain SO<sub>2</sub> in excess of 50 percent (0.50) of the potential SO<sub>2</sub> emission rate and no gases containing SO<sub>2</sub> in excess of 260 ng/J (0.60 lb/MMBtu) heat input.</p>	<p>SO<sub>2</sub></p>
<p>E1</p>	<p>&lt;20 percent opacity [40 CFR 60.43c (c)]</p>	<p>Opacity</p>
<p>E1</p>	<p>No gases that contain PM &gt;13 ng/J (0.030 lb/MMBtu) heat input</p>	<p>PM</p>
<p>E2 (SURH)</p>	<p>No gases that contain SO<sub>2</sub> in excess of 87 ng/J (0.20 lb/MMBtu) heat input or 8 percent (0.08) of the potential SO<sub>2</sub> emission rate (92 percent reduction) and 520 ng/J (1.2 lb/MMBtu) heat input. [40 CFR 60.42b (k)(1)]</p> <p>SO<sub>2</sub> emissions shall not exceed 0.819 lb/MMBtu [401 KAR 59:015, Section 5 (1) (c)]</p>	<p>SO<sub>2</sub></p>

E2 (SURH)	No gases that contain NO <sub>x</sub> ( expressed as NO <sub>2</sub> ) in excess of 210 ng/J (0.50 lb/MMBtu) heat input	NO <sub>x</sub>
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 <sub>2</sub>
FL	No gases from the flare that contain H <sub>2</sub> S that exceed ten (10) gr/100 dscf (165 ppm by volume) at zero (0) percent O <sub>2</sub> or without reducing the concentration by 85 percent, based on a three (3) hour average.	H <sub>2</sub> 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 <sub>2</sub> S that exceed ten (10) gr/100 dscf (165 ppm by volume) at zero (0) percent O <sub>2</sub> or without reducing the concentration by 85 percent, based on a three (3) hour average.	H <sub>2</sub> 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 <sub>2</sub>

Operating Limitations:

<b>Emission Unit or Emission Point ID</b>	<b>Operating limit</b>	<b>Pollutant(s) limited</b>
(TPC1-12, TPA1-5, TPFC1-2), CR7	Install and Operate with specified enclosures	PM/PM <sub>10</sub> /PM <sub>2.5</sub> , Opacity
CR1	Install and Operate with specified Baghouse	PM/PM <sub>10</sub> /PM <sub>2.5</sub> , Opacity

CS	Coal Stockpiles enclosed in building(s) vented to Baghouse(s)	PM/PM <sub>10</sub> /PM <sub>2.5</sub> , Opacity
PR	Watering Trucks/Wet Dust Suppression consistent with good air pollution control practices for minimizing emissions	PM/PM <sub>10</sub> /PM <sub>2.5</sub> , Opacity
FH1-10	Install and operate vent filter	PM/PM <sub>10</sub> /PM <sub>2.5</sub> , Opacity
Transfer Points and Conveyors (TPC1-12)	3,030,960 tons/year per transfer point/conveyor	PM/PM <sub>10</sub> /PM <sub>2.5</sub>
CR1	346 tons/hour (tph)	PM/PM <sub>10</sub> /PM <sub>2.5</sub>
TPA1-5	604,440 tons per year each transfer point/conveyor	PM/PM <sub>10</sub> /PM <sub>2.5</sub>
TPFC1 & TPFC2	61,320 tons/year each	PM/PM <sub>10</sub> /PM <sub>2.5</sub> PM/PM <sub>10</sub> /PM <sub>2.5</sub>
LS	Limestone Stockpiles enclosed in building(s) vented to Baghouse(s)	PM/PM <sub>10</sub> /PM <sub>2.5</sub>
Material Handling, Storage Sizing, & Preparation (all units subject to 401 KAR 63:010)	reasonable precautions shall be taken to prevent particulate matter from becoming airborne	PM/PM <sub>10</sub> /PM <sub>2.5</sub> , Opacity
TPL 1-5	166,440 tons/year each (feed rate to plant), 100 tph bin filling rate	PM/PM <sub>10</sub> /PM <sub>2.5</sub> , Opacity
CR7	166,440 tons/year each (feed rate to plant) 100 tph bin filling rate	PM/PM <sub>10</sub> /PM <sub>2.5</sub> , Opacity
LS	0.2 mmscf/hr vented through baghouse	PM/PM <sub>10</sub> /PM <sub>2.5</sub> , Opacity
A1/1 – A1/5	3,030,960 tons per year coal for gasification	NO <sub>x</sub> , CO, VOC, PM, PM <sub>2.5</sub> , PM <sub>10</sub>
A1/1 – A1/5	During Normal Plant Operation, the permittee shall	NO <sub>x</sub> , CO, VOC, PM, PM <sub>2.5</sub> , PM <sub>10</sub>

	<p>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>	
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>	<p>NO<sub>x</sub>, CO, VOC, PM, PM<sub>2.5</sub>, PM<sub>10</sub></p>
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>	<p>SO<sub>2</sub>, CO, VOC, PM, PM<sub>2.5</sub>, PM<sub>10</sub></p>
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> <p>90 hours of startup/year</p>	<p>SO<sub>2</sub>, CO, VOC, PM, PM<sub>2.5</sub>, PM<sub>10</sub></p>
B1/1	<p>1,515,480 tons per year coal for gasification and 173 tons/hr</p> <p>7008 mmscf discharge from lockhopper/year and an additional 0.57 mmscf/hr allowed during 30 feedstock changes per year</p>	<p>SO<sub>2</sub>, CO, VOC, PM, PM<sub>2.5</sub>, PM<sub>10</sub></p>
B1/2	<p>1,515,480 tons per year coal for gasification and 173 tons/hr</p> <p>7008 mmscf discharge from lockhopper/year</p>	<p>SO<sub>2</sub>, CO, VOC, PM, PM<sub>2.5</sub>, PM<sub>10</sub></p>

	and an additional 0.57 mmscf/hr allowed during 30 feedstock changes per year	
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 <sub>2</sub>
Gasification and Cleanup Units	When reasonably possible, low sulfur coal shall be re-introduced for shutdowns.	SO <sub>2</sub>
C1	Install and operate CO <sub>2</sub> Stripping and/or Catalytic Purification unit	CO, H <sub>2</sub> 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 <sub>2</sub>
C1	The mass flow rate of off-gas from the AGR system shall not exceed 3,058,660 tons per year.	CO, SO <sub>2</sub>
C1	8,000 hours per year of operation	CO, SO <sub>2</sub>
C2	280 metric tons of gas flared per year	NO <sub>x</sub> , SO <sub>2</sub> , 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 <sub>x</sub> , SO <sub>2</sub> , CO, VOC, PM, PM <sub>2.5</sub> , PM <sub>10</sub>
E5	31,120 pounds per year flared	NO <sub>x</sub> , CO, VOC
FL	Gas production sent to the flare shall be limited to 100,000 m <sup>3</sup> n/event (start-up + shutdown) per gasifier.	NO <sub>x</sub> , SO <sub>2</sub> , CO, VOC, PM, PM <sub>2.5</sub> , PM <sub>10</sub>
FL	Gas production sent to the flare shall be limited to 6,000,000 m <sup>3</sup> n/year (start-up + shutdown) from the gasifiers.	NO <sub>x</sub> , SO <sub>2</sub> , CO, VOC, PM, PM <sub>2.5</sub> , PM <sub>10</sub>
FL	Comply with 40 CFR 60.18	NO <sub>x</sub> , SO <sub>2</sub> , CO, VOC, PM, PM <sub>2.5</sub> , PM <sub>10</sub>
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	NO <sub>x</sub> , SO <sub>2</sub> , CO, VOC, PM, PM <sub>2.5</sub> , PM <sub>10</sub>

	control efficiency of regulated air pollutants.	
FL	The permittee shall use, whenever the flare is in operation, natural gas fuel	NO <sub>x</sub> , SO <sub>2</sub> , CO, VOC, PM, PM <sub>2.5</sub> , PM <sub>10</sub>
CT	Maintain the total dissolved solids (TDS) concentration in the circulation cooling water at or below 5,000 ppm.	PM, PM <sub>2.5</sub> , PM <sub>10</sub>
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 <sub>2.5</sub> , PM <sub>10</sub>
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 <sub>2</sub> 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 <sub>2</sub> S
SVL	The sulfur loading rack shall be equipped with a vapor recovery system and the unit shall be vented to the flare.	H <sub>2</sub> 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 <sub>x</sub> , SO <sub>2</sub> , and PM/PM <sub>10</sub> /PM <sub>2.5</sub>
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 <sub>x</sub> , SO <sub>2</sub> , and PM/PM <sub>10</sub> /PM <sub>2.5</sub> , VOC
FUGL, MFUG, GFUG	Implement a Leak Detection and Repair (LDAR program)	VOC/HAPs
FUGL, MFUG, GFUG	All valves, compressors, open ended lines, and sampling	VOC/HAPs

	<p>connections for which a control efficiency of 99% has been applied shall have the following modifications/design:</p> <ol style="list-style-type: none"> <li>(1) Valves must be designed to be sealless;</li> <li>(2) Compressors shall have dual mechanical seal with barrier fluid maintained at a higher pressure than the compressed gas;</li> <li>(3) Open ended lines must have a properly installed blind, cap, plug, or second valve on the open end;</li> <li>(4) Sampling connections, a closed-loop sampling system must be used.</li> <li>(5) Pumps must have a sealless design or dual mechanical seal with barrier fluid maintained at a higher pressure than the pumped fluid.</li> </ol>	
<p>FUGL, MFUG, GFUG</p>	<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 closed vent system routed to a control device.</p>	<p>VOC/HAPs</p>

**OPERATIONAL FLEXIBILITY:**

None