



**Statement of Basis**

**Title V Air Quality Operating Permit  
Modification**

**Valero Renewable Fuels Company, LLC  
Aurora, South Dakota**

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## 1.0 Background

On November 8, 2002, the South Dakota Department of Environment and Natural Resources (DENR) issued a Title V air quality operating permit to VeraSun Aurora Corporation (VeraSun) for the ethanol production facility near Aurora, South Dakota. VeraSun requested several changes during the term of this Title V air quality operating permit. The following is a summary of those changes:

1. On April 19, 2005, the permit was amended to revise equipment descriptions, emission limits, and ethanol production;
2. On December 23, 2005, the permit was modified to revise the maximum ethanol production rate; and
3. On October 6, 2006 the permit was amended to eliminate the short term nitrogen oxide (NO<sub>x</sub>) limit on Unit #5.

On October 19, 2007, DENR renewed VeraSun’s Title V air quality operating permit. The following is a summary of changes that occurred during the term of the renewed permit:

1. On September 8, 2008, the permit was amended to allow the installation of a wet scrubber in series with the original wet scrubber on the existing fermentation equipment at the plant, and to change the inspection frequency of the storage tanks that utilize internal floating roofs; and
2. On June 5, 2009, the permit was amended to change the ownership of the ethanol plant from VeraSun to Valero Renewable Energy Company, LLC (Valero) along with changes to the mailing address, responsible official, etc.

On May 2, 2014, DENR renewed Valero’s Title V air quality operating permit.

### 1.1 Existing Equipment

Table 1.1 provides a list of the units presently permitted which was taken from the current Title V air quality operating permit issued May 2, 2014.

**Table 1.1 – Description of Permitted Units, Operations, and Processes**

Unit	Description	Operating Rate	Control Device
#1	Enclosed truck and railcar grain handling system	40,000 bushels of grain per hour	Baghouse
	Elevator legs transport corn from receiving pits to one of four grain storage bins		
#2	Reclamation and conveyor system transports dried distiller grain and solubles (DDGS) from storage building and silos to enclosed truck and rail load out area	200 tons of DDGS per hour	Baghouse
	DDGS loading into trucks		

<b>Unit</b>	<b>Description</b>	<b>Operating Rate</b>	<b>Control Device</b>
<b>#3</b>	Elevator legs transport corn from storage bins to a scalper, and hammer mill feed system	40,000 bushels of grain per hour	Baghouse
	Grain milling. Grain is milled in one of four hammer mills	2,000 bushels of grain per hour per hammer mill	
<b>#4</b>	Fermentation #1 –Nine fermenters (807,000 gallons each) and one beer well (1,080,000 gallons)	130,000 gallons of slurry per hour	Wet scrubber
<b>#5</b>	Two DDGS dryer systems – Each dryer system consists of two dryers in series. Dryers A, B, C, and D are fired with natural gas and have a multi cyclone to collect product. Each dryer is equipped with a Low NOx burner.	51 million Btus per hour per dryer. Each dryer system capable of drying 32 tons of DDGS per hour	#5a
	Distillation process consists of a mixer, two slurry tanks, flash tank, two liquefaction tanks, two yeast tanks, beer column, side stripper, rectifier, molecular sieves, 190 proof condenser, and 200 proof condenser	130,000 gallons of whole stillage per hour	
	Cooling drum system	See Unit #7	
	Fermentation #1	See Unit #4	
<b>#5a</b>	Two thermal oxidizer and heat recovery boiler systems. When the dryers are not in operation, the thermal oxidizers are fired solely with natural gas. Each thermal oxidizer is equipped with a Low NOx burner.	198 million Btus per hour heat input per thermal oxidizer and heat recovery boiler system	
<b>#7</b>	Cooling drum system	64 tons of DDGS per hour	Baghouse. The exhaust gases from the baghouse may be routed to Unit #5a
<b>#9</b>	Ethanol loading rack for trucks and railcar	156,000 gallons of denatured ethanol per hour	Unit #9a
<b>#9a</b>	Enclosed ground flare fired with natural gas	6.4 million Btus per hour heat input	Flare
<b>#10</b>	Tank #1 - Above ground storage tank – denatured ethanol	1,500,000 gallons	Internal floating roof
<b>#11</b>	Tank #2 - Above ground storage tank. – denatured ethanol	1,500,000 gallons	Internal floating roof
<b>#12</b>	Tank #3 - Above ground storage tank – 200 proof ethanol	200,000 gallons	Internal floating roof

Unit	Description	Operating Rate	Control Device
#13	Tank #4 - Above ground storage tank – denaturant (natural gasoline)	200,000 gallons	Internal floating roof
#14	Tank #5- Above ground storage tank – 190 proof ethanol	200,000 gallons	Internal floating roof
#33	Fire pump #1	265 horsepower	Not applicable

## 1.2 Proposed Revisions

On September 30, 2014, DENR issued an air quality construction permit #28.0502-06-05C to Valero to replace the current Enclosed Ground Flare (Unit #9a) with a Vapor Combustion Unit.

On October 20, 2014, DENR issued air quality construction permit #28.0502-06-06C to Valero to construct and operate an additional molecular sieve train in Unit #5. Valero requested the flexibility to store undenatured or denatured ethanol in Units #10 and #11 and to load railcars and trucks with undenatured or denatured ethanol.

On May 31, 2016, DENR received an application from Valero to incorporate the appropriate requirements from Air Quality Construction permit #28.0502-06-05C and #28.0502-06-06C in Valero’s Title V air quality operating permit and some other changes. Valero requested the following changes to the Title V air quality operating permit:

1. Replace references to the flare to reference the new vapor combustion unit;
2. Listing eight fermenters instead of nine fermenters in Unit #4;
3. Listing one slurry tank instead of two slurry tanks in Unit #5;
4. Adding the cooling tower back into the permit;
5. Removing the reference to grain cleaning, which does not occur at the facility; and
6. Remove the Permit Conditions for connectors in 40 CFR Part 60 Subpart VVa, which were stayed on June 2, 2008; and
7. Correct the maximum operating rate of Unit #33 (fire pump) from 265 horsepower to 375 horsepower.

In the 2014 renewal, DENR incorporated Construction Permit #28.0502-06-02C, which incorporated an addition of an eighth fermentation tank. Valero has not requested to construct and operate a ninth fermenter in Unit #4. Therefore, DENR will change the number of fermenters from nine to eight in Unit #4.

In the 2014 renewal the cooling tower (Unit #8) was removed in the Title V air quality operating permit. Valero did not request in the application to remove the cooling tower from the Title V air quality operating permit. Therefore, DENR will add the cooling tower back into the permit.

Valero indicated in a phone call on June 21, 2016, that one of the slurry tanks was decommissioned in 2011 and the description of the distillation process did not get updated. Therefore, DENR will change the number of slurry tanks in Unit #5 from two slurry tanks to one slurry tank.

In 2007 the fire pump #1 (Unit #33) was added from the Prevention of Significant Deterioration construction permit. The 2007 application indicated the fire pump has a maximum operating rate of 265 horsepower, but Valero discovered the maximum operating rate of the fire pump is 375 horsepower instead of 265 horsepower. The effects of the increase of the maximum operating are discussed in Section 4.0 and Section 5.0 of this review.

DENR will make the changes to replace the references to the flare to reference the vapor combustion unit in the Title V air quality operating permit. In addition, Chapter 16.0 will be deleted since the flare has been removed. Valero is requesting the references to the flare in Chapter 11.0 be removed from the permit language. The permit conditions in Chapter 11.0 are not facility specific and are general template conditions; therefore, DENR will not remove the references to the flare in Chapter 11.0.

Valero is requesting the removal of the permit conditions for the connectors in Chapter 11.0 (40 CFR Part 60 Subpart VVa), which the requirements for connectors were stayed on June 2, 2008. However, the requirements for connectors may become applicable in the future. Therefore, DENR will put the permit conditions for the connectors in the permit, but Valero will not be applicable to the connector requirements since the requirements are stayed.

Valero is requesting the removal of the reference to grain cleaning in Unit # 3 in the permit condition 5.4 – Annual records, since grain cleaning is not occurring at the facility. Therefore, DENR will remove the reference to grain cleaning in permit condition 5.4 – Annual records.

DENR reviewed the current Title V air quality operating permit and determine Permit Condition 3.6 - Addition or replacement of equipment is covered in Chapter 11.0. Therefore, DENR will remove Permit Condition 3.6 - Addition or replacement of equipment and update the numbering in Chapter 3.0.

## **2.0 Air Quality Construction Permit #28.0502-06-05C**

### **2.1 Permit Conditions Satisfied**

The permit conditions in air quality construction permit #28.0502-06-05C that Valero already satisfied and will not be incorporated in the Title V air quality operating permit consist of the following:

1. Permit condition 2.1 requires Valero to commence construction within 18 months of the construction permit being issued. Glacial Lakes met this requirement by starting construction on June 22, 2015;
2. Permit condition 2.2 required Valero to submit an application to modify its Title V air quality operating permit within 12 months after initial startup. DENR received the application on May 31, 2016;
3. Permit condition 4.2 required Valero to notify DENR when construction commenced. DENR received this notification on June 22, 2015;
4. Permit condition 4.3 requires Valero to notify DENR of the initial startup. DENR

received the initial startup notification on July 2, 2015. Initial startup occurred on June 30, 2015; and

5. Permit condition 6.7 required Valero to conduct initial compliance. The initial compliance test was conducted on June 30, 2015, and DENR received the initial compliance report on August 27, 20145 which demonstrated Unit #9a is in compliance.

## 2.2 Permit Conditions Needing No Change

There are specific permit conditions in air quality construction permit #28.0502-06-05C that are already in the Title V air quality operating permit which will not be incorporated in the Title V air quality operating permit. Table 2-1 provides a list of those permit conditions along with where they are located in the Title V air quality operating permit.

*Table 2-1 – Permit Conditions Needing No Change*

<b>Construction Permit #</b>	<b>Description</b>	<b>Title V Permit #</b>
<b>1.2</b>	Duty to comply	<b>1.2</b>
<b>1.3</b>	Property rights or exclusive privileges	<b>1.3</b>
<b>1.4</b>	Penalty for violating a permit condition	<b>1.4</b>
<b>1.5</b>	Inspection and entry	<b>1.5</b>
<b>1.6</b>	Severability	<b>1.6</b>
<b>1.7</b>	Credible evidence	<b>1.8</b>
<b>3.1</b>	Administrative permit amendment	<b>3.2</b>
<b>4.1</b>	Recordkeeping and reporting	<b>5.1 and 6.1</b>
<b>4.8</b>	Certification statement	<b>6.3</b>
<b>4.9</b>	Reporting permit violations	<b>6.6</b>
<b>5.1</b>	Visibility limit	<b>7.1</b>
<b>5.2</b>	Visibility exceedances	<b>7.2</b>
<b>5.5</b>	Circumvention not allowed	<b>7.6</b>
<b>5.6</b>	Minimizing emissions	<b>7.7</b>
<b>6.1</b>	Performance test may be required	<b>9.1</b>
<b>6.2</b>	Test methods and procedures	<b>9.2</b>
<b>6.3</b>	Representative performance test	<b>9.3</b>
<b>6.4</b>	Submittal of test plan	<b>9.4</b>
<b>6.5</b>	Notification of test	<b>9.5</b>
<b>6.6</b>	Performance test report	<b>9.6</b>

Permit condition 3.2 (Reopening permit) deals only with the construction permit and will not be incorporated in the Title V air quality operating permit.

## 2.3 Permit Conditions Incorporated

The permit conditions in air quality construction permit #28.0502-06-05C that will be incorporated in the Title V air quality operating permit consist of the following:

1. Permit condition 1.1 – Identifies the new equipment located in 1.1;
2. Permit condition 4.4 – Monitoring Log located in 5.2
3. Permit condition 4.5 – Monthly records located in 5.3;
4. Permit condition 4.6 – Annual records located in 5.4
5. Permit condition 4.7 – Quarterly reporting located in 6.4;
6. Permit condition 5.3 – Total suspended particulate matter limits located in 7.3;
7. Permit condition 5.4 – Sulfur dioxide limits located in 7.4; and
8. Permit condition 8.1 – Unit #9a destruction efficiency limit located in permit condition 8.15.

### **3.0 Air Quality Construction Permit #28.0502-06-06C**

#### **3.1 Permit Conditions Satisfied**

The permit conditions in air quality construction permit #28.0502-06-06C that Valero already satisfied and will not be incorporated in the Title V air quality operating permit consist of the following:

1. Permit condition 2.1 requires Valero to commence construction within 18 months of the construction permit being issued. Glacial Lakes met this requirement by starting construction on June 22, 2015;
2. Permit condition 2.2 required Valero to submit an application to modify its Title V air quality operating permit within 12 months after initial startup. DENR received the application on May 31, 2016;
3. Permit condition 4.2 required Valero to notify DENR when construction commenced. DENR received this notification on June 22, 2015;
4. Permit condition 4.3 requires Valero to notify DENR of the initial startup. DENR received the initial startup notification on July 2, 2015. Initial startup occurred on June 30, 2015; and
5. Permit condition 6.7 required Valero to conduct initial compliance. The initial compliance test was conducted on June 30, 2015, and DENR received the initial compliance report on August 27, 2015 and demonstrated Unit #9a is in compliance.

#### **3.2 Permit Conditions Needing No Change**

There are specific permit conditions in air quality construction permit #28.0502-06-06C that are already in the Title V air quality operating permit which will not be incorporated in the Title V air quality operating permit. Table 3-1 provides a list of those permit conditions along with where they are located in the Title V air quality operating permit.

***Table 3-1 – Permit Conditions Needing No Change***

<b>Construction Permit #</b>	<b>Description</b>	<b>Title V Permit #</b>
<b>1.2</b>	Duty to comply	<b>1.2</b>
<b>1.3</b>	Property rights or exclusive privileges	<b>1.3</b>

<b>Construction Permit #</b>	<b>Description</b>	<b>Title V Permit #</b>
<b>1.4</b>	Penalty for violating a permit condition	<b>1.4</b>
<b>1.5</b>	Inspection and entry	<b>1.5</b>
<b>1.6</b>	Severability	<b>1.6</b>
<b>1.7</b>	Credible evidence	<b>1.8</b>
<b>3.1</b>	Administrative permit amendment	<b>3.2</b>
<b>4.1</b>	Recordkeeping and reporting	<b>5.1 and 6.1</b>
<b>4.8</b>	Certification statement	<b>6.3</b>
<b>4.9</b>	Reporting permit violations	<b>6.6</b>
<b>5.1</b>	Visibility limit	<b>7.1</b>
<b>5.2</b>	Visibility exceedances	<b>7.2</b>
<b>5.3</b>	Circumvention not allowed	<b>7.6</b>
<b>5.4</b>	Minimizing emissions	<b>7.7</b>
<b>6.2</b>	Plant wide volatile organic compound limits	<b>8.3</b>
<b>7.1</b>	Performance test may be required	<b>9.1</b>
<b>7.2</b>	Test methods and procedures	<b>9.2</b>
<b>7.3</b>	Representative performance test	<b>9.3</b>
<b>7.4</b>	Submittal of test plan	<b>9.4</b>
<b>7.5</b>	Notification of test	<b>9.5</b>
<b>7.6</b>	Performance test report	<b>9.6</b>

Permit condition 3.2 (Reopening permit) deals only with the construction permit and will not be incorporated in the Title V air quality operating permit.

### **3.3 Permit Conditions Incorporated**

The permit conditions in air quality construction permit #28.0502-06-06C that will be incorporated in the Title V air quality operating permit consist of the following:

1. Permit condition 1.1 – Identifies the new equipment located in 1.1;
2. Permit condition 4.4 – Monitoring log located in 5.2
3. Permit condition 4.5 – Monthly records located in 5.3;
4. Permit condition 4.6 – Annual records located in 5.4
5. Permit condition 4.7 – Quarterly reporting located in 6.4;
6. Permit condition 6.1 – Unit #9 operational report in 8.12; and
7. Chapter 8.0 – Synthetic organic chemical manufacturing requirements located in Chapter 11.0.

### **4.0 Prevention of Significant Deterioration**

Valero's current Title V air quality operating permit contains emission limits and operational limits to ensure the emissions stay below 238 tons per 12-month rolling period for volatile organic compound emissions and 190 tons per 12-month rolling period for particulate, sulfur

dioxide, nitrogen oxide, and carbon monoxide. In construction permits #28.0502-06-05C and #28.0502-06-06C, Valero did not request changes to the emission limits or operational limits. Therefore, the Title V air quality operating permit will contain the appropriate language to ensure the emission limits and operational limits are federally enforceable and those limits will remain unchanged.

During the Full Compliance Evaluation inspection on June 1, 2016, DENR discovered the Title V air quality operating permit did not contain monthly record or quarterly reporting requirements for some of the operational limits. Therefore, DENR will add the monthly record and quarterly reporting requirements with this modification for the following permit limits:

1. Permit condition 8.9 (DDGS or DDGS equivalent production limit),
2. Permit condition 8.11 (Unit #7 operational limit), and
3. Permit condition 8.12 (Unit #9 operational limit).

Valero requested the maximum operating rate of the fire pump (Unit #33) be increased from 265 horsepower to 375 horsepower. Valero submitted the calculations for the increase of the maximum operating rate of the fire pump and DENR agrees with calculations. The potential emissions for the fire pump and the entire facility are summarized in Table 4-1.

**Table 4-1 – Potential Emissions**

<b>Unit</b>	<b>PM<sub>10</sub> (tons/year)</b>	<b>PM<sub>2.5</sub> (tons/year)</b>	<b>SO<sub>2</sub> (tons/year)</b>	<b>NO<sub>x</sub> (tons/year)</b>	<b>VOC (tons/year)</b>	<b>CO (tons/year)</b>
#1	14.2	9.7	-	-	-	-
#2	8.8	8.8	-	-	-	-
#3	8.8	8.8	-	-	-	-
#4	-	-	-	-	153.3	-
#5	39.4	39.4	175.2	175	48.2	175.2
#7	0.9	0.9	-	-	3.5	-
#8	2.3	0.01	-	-	-	-
#9	-	-	-	-	9.3	-
#9A	-	-	0.0	2.8	1.4	2.3
#10	-	-	-	-	0.5	-
#11	-	-	-	-	0.5	-
#12	-	-	-	-	0.7	-
#13	-	-	-	-	4.1	-
#14	-	-	-	-	0.7	-
#33	0.2	0.2	0.2	2.9	0.2	0.6
<b>Total</b>	<b>75</b>	<b>68</b>	<b>175</b>	<b>181</b>	<b>222</b>	<b>178</b>

Based on Table 4-1, Valero is able to maintain the emissions below the plant wide limits for all criteria pollutants with the increase of the maximum operating rate of the fire pump.

## **5.0 Maximum Achievable Control Technology Standards**

Valero's Title V air quality operating permit currently contains the requirements for 40 CFR Part 63 Subpart ZZZZ which are applicable to the fire pump (Unit #33). Valero requested the maximum operating rate for the fire pump be increased from 265 horsepower to 375 horsepower. The change of the maximum operating rate of the fire pump does not change the applicable requirements for the fire pump. Therefore, the existing 40 CFR Part 63 Subpart ZZZZ requirements in Valero's Title V air quality operating permit are still applicable to the fire pump.

## **6.0 Title V Air Quality Operating Permit Requirements**

### **6.1 Compliance Assurance Monitoring**

Compliance assurance monitoring is applicable to permit applications received on or after April 20, 1998, from major sources applying for a Title V air quality operating permit. Valero's application was received after the applicable date; therefore, compliance assurance monitoring is applicable to any unit that meets the following criteria:

1. The unit is subject to an emission limit or standard for the applicable regulated air pollutant;
2. The unit uses a control device to achieve compliance with any such emission limit or standard; and
3. The unit has potential uncontrolled emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source.

Valero submitted its permit application after April 20, 1998. Valero already engages in compliance assurance monitoring in the current Title V air quality operating permit. No changes are necessary to incorporate construction permits #28.0502-06-05C and #28.0502-06-06C in the Title V air quality operating permit as long as the facility maintains all current monitoring activities.

### **6.2 Periodic Monitoring**

In accordance with ARSD 74:36:05:16.01(9)(b), periodic monitoring is required for each emission unit that is subject to an applicable requirement at a source subject to Title V of the federal Clean Air Act. Those units applicable to compliance assurance monitoring satisfy this requirement. In addition, the New Source Performance Standards and/or Maximum Achievable Control Technology also contain periodic monitoring requirements.

Periodic monitoring is required for each emission unit that is subject to an applicable requirement at a source subject to Title V of the federal Clean Air Act. Valero's existing permit requires periodic monitoring for particulate, sulfur dioxide, nitrogen oxide, volatile organic compound, and carbon monoxide emission limits. Therefore, additional periodic monitoring requirements are not needed.

## **7.0 Recommendation**

The proposed modifications consist of incorporating the requirements of air quality construction permits #28.0502-06-05C and 28.0502-06-06C in Valero's Title V air quality operating permit. Based on the information submitted in the air permit applications, DENR recommends conditional approval of a modification to Valero's existing Title V air quality operating permit to include the applicable requirements in the two air quality construction permits.

With the addition of the applicable requirements in air quality construction permits #28.0502-06-05C and 28.0502-06-06C, Valero is required to operate within the requirements stipulated in the following regulations:

1. ARSD 74:36:05 – Operating Permits for Part 70 Sources;
2. ARSD 74:36:06 – Regulated Air Pollutant Emissions;
3. ARSD 74:36:07 – New Source Performance Standards;
4. ARSD 74:36:08 – National Emission Standards for Hazardous Air Pollutants;
5. ARSD 74:36:11 – Stack Performance Testing;
6. ARSD 74:36:12 – Control of Visible Emissions;
7. ARSD 74:36:13 – Continuous emission monitoring systems; and
8. SDCL 34A-1-58.1 – Air pollution control program fees.

Any questions pertaining to this permit recommendation should be directed to Earl Berg, Engineer I.

## Appendix A Modifications to Title V Air Quality Operating Permit

The following changes to the existing permit represent changes that meet the definition of a permit modification. Additions to the existing permit are represented in blue, bold, and underlined and deletions are represented in red with overstrikes. In the case where permit conditions are deleted or added between permit conditions, the permit conditions will be renumbered appropriately when the permit is issued.

### 1.0 Standard Conditions

#### 1.1 Construction and operation of source

In accordance with the Administrative Rules of South Dakota (ARSD) 74:36:05:16.01(8), the owner or operator shall construct and operate the units, controls, and processes as described in Table 1-1 in accordance with the statements, representations, and supporting data contained in the complete permit application received April 23, 2012, ~~and August 27, 2013,~~ and May 31, 2016, unless modified by the conditions of this permit. The control equipment shall be operated in manner that achieves compliance with the conditions of this permit at all times. The application consists of the application forms, supporting data, and supplementary correspondence. If the owner or operator becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in an application, such information shall be promptly submitted.

*Table 1-1 – Description of Permitted Units, Operations, and Processes*

Unit	Description	Operating Rate	Control Device
#1	Enclosed truck and railcar grain handling system	40,000 bushels of grain per hour	Baghouse
	Elevator legs transport corn from receiving pits to one of four grain storage bins		
#2	Reclamation and conveyor system transports dried distiller grain and solubles (DDGS) from storage building and silos to enclosed truck and rail load out area	200 tons of DDGS per hour	Baghouse
	DDGS loading into trucks		
#3	Elevator legs transport corn from storage bins to a scalper, and hammer mill feed system	40,000 bushels of grain per hour	Baghouse
	Grain milling. Grain is milled in one of four hammer mills	2,000 bushels of grain per hour per hammer mill	
#4	Fermentation #1 – <del>Nine</del> <b><u>Eight</u></b> fermenters (807,000 gallons each) and one beer well (1,080,000 gallons)	130,000 gallons of slurry per hour	Wet scrubber
#5	Two DDGS dryer systems – Each dryer system consists of two dryers in series.	51 million Btus per hour per dryer. Each	#5a

Unit	Description	Operating Rate	Control Device
	Dryers A, B, C, and D are fired with natural gas and have a multi cyclone to collect product. Each dryer is equipped with a Low NOx burner.	dryer system capable of drying 32 tons of DDGS per hour	
	Distillation process consists of a mixer, <del>two</del> <b>one</b> slurry tanks, flash tank, two liquefaction tanks, two yeast tanks, beer column, side stripper, rectifier, molecular sieves, 190 proof condenser, and 200 proof condenser.	130,000 gallons of whole stillage per hour	
	Cooling drum system	See Unit #7	
	Fermentation #1	See Unit #4	
#5a	Two thermal oxidizer and heat recovery boiler systems. When the dryers are not in operation, the thermal oxidizers are fired solely with natural gas. Each thermal oxidizer is equipped with a Low NOx burner.	198 million Btus per hour heat input per thermal oxidizer and heat recovery boiler system	
#7	Cooling drum system	64 tons of DDGS per hour	Baghouse. The exhaust gases from the baghouse may be routed to Unit #5a
#8	<b><u>Industrial cooling Tower #1 with 4 cells</u></b>	<b><u>60,000 gallons per minute</u></b>	<b><u>Drift eliminator</u></b>
#9	Ethanol loading rack for trucks and railcar	156,000 gallons of denatured <b><u>or undenatured</u></b> ethanol per hour	Unit #9a
#9a	<del>Enclosed ground flare fired with natural gas</del> <b><u>2014 John Zink Company, Vapor Combustion Unit, Model #: ZCT-2-6-36-X-2/8, fired with natural gas</u></b>	<del>6.4 million Btus per hour heat input</del> <b><u>1.3 million Btus per hour heat input</u></b>	Flare <b><u>Not applicable</u></b>
#10	Tank #1 - Above ground storage tank – denatured <b><u>or undenatured</u></b> ethanol	1,500,000 gallons	Internal floating roof
#11	Tank #2 - Above ground storage tank. – denatured <b><u>or undenatured</u></b> ethanol	1,500,000 gallons	Internal floating roof
#12	Tank #3 - Above ground storage tank – 200 proof ethanol	200,000 gallons	Internal floating roof
#13	Tank #4 - Above ground storage tank – denaturant (natural gasoline)	200,000 gallons	Internal floating roof
#14	Tank #5- Above ground storage tank – 190 proof ethanol	200,000 gallons	Internal floating roof
#33	Fire pump #1	<del>265</del> <b><u>375</u></b> horsepower	Not applicable

## **3.0 Permit Amendment and Modification Conditions**

### **3.6 Addition or replacement of equipment**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.480(c), the addition or replacement of equipment subject to 40 CFR Part 60 Subpart VV for the purpose of process improvement which is accomplished without a capital expenditure shall not by itself be considered a modification but considered a minor permit amendment.~~

### **3.7 3.6 Testing new fuels or raw materials**

In accordance with ARSD 74:36:11:04, an owner or operator may request permission to test a new fuel or raw material to determine if it is compatible with existing equipment before requesting a permit amendment or modification. A complete test proposal shall consist of the following:

1. A written proposal that describes the new fuel or raw material, operating parameters, and parameters that will be monitored and any testing associated with air pollutant emissions during the test;
2. An estimate of the type and amount of regulated air pollutant emissions that will result from the proposed change; and
3. The proposed schedule for conducting the test. In most cases the owner or operator will be allowed to test for a maximum of one week. A request for a test period longer than one week will need additional justification. A test period shall not exceed 180 days.

The Secretary shall approve, conditionally approve, or deny in writing the test proposal within 45 days after receiving a complete proposal. Approval conditions may include changing the test schedule or pollutant sampling and analysis methods. Pollutant sampling and analysis methods may include, but are not limited to performance testing, visible emission evaluation, fuel analysis, dispersion modeling, and monitoring of raw material or fuel rates.

If the Secretary determines that the proposed change will result in an increase in the emission of a regulated air pollutant or result in the emission of an additional regulated air pollutant, the Secretary shall give public notice of the proposed test for 30 days. The Secretary shall consider all comments received during the 30-day public comment period before making a final decision on the test.

The Secretary will not approve a test if the test would cause or contribute to a violation of a national ambient air quality standard.

## **5.0 General Recordkeeping**

### **5.2 Monitoring log**

In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall maintain a monitoring log. The monitoring log shall contain the following information.

1. Maintenance schedule for the air pollution control equipment specified in Table 1-1. At a

minimum, the maintenance schedule shall meet the manufacturer's recommended schedule for maintenance. The following information shall be recorded for maintenance:

- a. Identify the unit;
  - b. The date and time maintenance was performed;
  - c. Description of the type of maintenance;
  - d. Reason for performing maintenance;
  - e. Signature of person performing maintenance;
2. The following information shall be recorded for each visible emission reading required in permit condition 10.1:
- a. Identify the unit;
  - b. The date and time the visible emission reading was performed;
  - c. If visible emissions were observed;
  - d. Description of maintenance performed to eliminate visible emissions;
  - e. Visible emission evaluation if visible emissions are not eliminated; and
  - f. Signature of person performing visible emission reading and/or visible emission evaluation;
3. The owner or operator shall maintain relevant records of the occurrence and duration of each startup, shutdown, or malfunction of process equipment and/or air pollution control equipment;
4. The following information shall be recorded within two days of each emergency exceedance:
- a. The date of the emergency exceedance and the date the emergency exceedance was reported to the Secretary;
  - b. The cause(s) of the emergency;
  - c. The reasonable steps taken to minimize the emissions during the emergency; and
  - d. A statement that the permitted equipment was at the time being properly operated;
4. The water flow rate for the wet scrubber associated with Unit #4 and the following information pertaining to water flow rates that deviate from the desired flow rates identified in permit condition 10.3:
- a. The date, time and duration the water flow rate fell below the desired water flow rate;
  - b. The reason the water flow rate fell below the desired value; and
  - c. The maintenance or procedures that were performed to bring the water flow rate back above the desired value;
6. Documentation on the accuracy of the temperature monitoring device for the thermal oxidizer associated with Unit #5;
7. The temperature records for the thermal oxidizer associated with Unit #5 And the following information pertaining to temperatures that deviate from the desired temperatures in permit condition 10.4:
- a. The date, time and duration the temperature fell below the desired temperature;
  - b. The reason the temperature fell below the desired value; and
  - c. The maintenance or procedures that were performed to bring the temperature back above the desired value; and
8. The number of gallons of denatured **and/or undenatured** ethanol that was loaded in trucks or railcars from Unit #9 during a malfunction ~~of the flare and/or the flare was not in operation and a description of the malfunction or reason for not using the flare~~ **of the vapor combustion unit and/or the vapor combustion unit was not in operation and a**

**description of the malfunction or reason for not using the vapor combustion unit.**

**5.3 Monthly records**

In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall calculate and record the following amounts each month:

1. The amount of particulate matter less than or equal to 10 microns in diameter (PM10), in tons, emitted into the ambient air from the permitted units during the month. A 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values. The amount of PM10 emitted to the ambient air from permitted units shall be calculated using the most recent performance test. If a performance test is not available, the amount of PM10 emitted to the ambient air from a permitted unit shall be based on the formulas, emission factors, and methods described in the statement of basis;
2. The amount of particulate matter less than or equal to 2.5 microns in diameter (PM2.5), in tons, emitted into the ambient air from the permitted units during the month. A 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values. The amount of PM2.5 emitted to the ambient air from permitted units shall be calculated using the most recent performance test. If a performance test is not available, the amount of PM2.5 emitted to the ambient air from a permitted unit shall be based on the formulas, emission factors, and methods described in the statement of basis;
3. The amount of sulfur dioxide, in tons, emitted into the ambient air from the permitted units during the month. A 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values. The amount of sulfur dioxide emitted to the ambient air from permitted units shall be calculated using formulas, emission factors, and methods described in the statement of basis. Once the required performance tests are conducted, the amount of sulfur dioxide emissions shall be calculated using the results of the most recent performance test;
4. The amount of nitrogen oxide, in tons, emitted into the ambient air from the permitted units during the month. A 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values. The amount of nitrogen oxide emitted to the ambient air from permitted units shall be calculated using the continuous emission monitoring system(s) or the most recent performance test. If a continuous emission monitoring system or performance test is not available, the amount of nitrogen oxide emitted to the ambient air from a permitted unit shall be based on the formulas, emission factors, and methods described in the statement of basis;
5. The amount of carbon monoxide, in tons, emitted into the ambient air from the permitted units during the month. A 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values. The amount of carbon monoxide emitted to the ambient air from permitted units shall be calculated using the continuous emission monitoring system(s) or the most recent performance test. If a continuous emission monitoring system or performance test is not available, the amount of carbon monoxide emitted to the ambient air from a permitted unit shall be based on the formulas, emission factors, and methods described in the statement of basis;
6. The amount of volatile organic compounds, in tons, emitted into the ambient air from the permitted units and fugitive operations during the month. A 12-month rolling total shall

be calculated every month using that month's value and the previous 11 months' values. The volatile organic compound emissions shall be based on the following:

- a. The amount of volatile organic compounds emitted to the ambient air from permitted units shall be calculated using the most recent performance test. If a performance test is not available, the amount of volatile organic compounds emitted to the ambient air from a permitted unit shall be based on the formulas, emission factors, and methods described in the statement of basis; and
  - b. The fugitive emissions from leaking equipment such as valves, pumps, compressors, etc., shall be calculated by using the emission factors from the Protocol for Equipment Leak Emissions Estimates, EPA-453/R-95-017 or another method approved by the Secretary. The amount of time a piece of equipment is considered leaking shall be the time between detecting the leak and the date the leak was fixed;
7. The amount of hazardous air pollutants, in tons, emitted into the ambient air from the permitted units during the month. A 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values. The amount of hazardous air pollutants emitted to the ambient air from permitted units shall be calculated using the most recent performance test. If a performance test is not available, the amount of hazardous air pollutants emitted to the ambient air from a permitted unit shall be based on the formulas, emission factors, and methods described in the statement of basis;
  8. The number of hours the Unit #33 was operated during the month. A 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values;
  9. The number of gallons of denatured and/or undenatured ethanol that was loaded in trucks or railcars from Unit #9 during a malfunction of the flare and/or the flare was not in operation and a description of the malfunction or reason for not using the flare **of the vapor combustion unit and/or the vapor combustion unit was not in operation and a description of the malfunction or reason for not using the vapor combustion unit.** A 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values; ~~and~~
  10. The number of gallons of undenatured ethanol produced during the month. A 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values.;
  11. **The quantity of dried distiller grain and solubles or dried distiller grain and solubles equivalent produced during month. A 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values;**
  12. **The number of hours Unit #7 bypassed Unit #5a during the month. A 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values; and**
  13. **The number of gallons of denatured and/or undenatured ethanol loaded out by truck during the month. A 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values.**

#### **5.4 Annual records**

In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall calculate and record the following amounts from January 1 to December 31 of each year:

1. The amount of undenatured ethanol produced in gallons;
2. The amount of natural gas consumed in Unit #9<sup>a</sup>;
3. The amount of grain received (Unit #1), in bushels or pounds;
4. ~~The amount of grain cleaned (Unit #3), in bushels or pounds;~~
5. The amount of grain milled (Unit #3), in bushels or pounds;
6. The amount of dried distillers grain and solubles transferred (Unit #2), in pounds;
7. The amount of wet distillers grain and solubles produced;
8. The amount of denatured **or undenatured** ethanol loaded out (Unit #9), in gallons;
9. The amount of distillate oil used in Unit #33 (fire pump);
10. The number of hours each unit in Table 1-1 operated; and
11. The number or hour each control device was bypassed while the equipment was in operation.

## 6.0 General Reporting

### 6.4 Quarterly reporting

In accordance with ARSD 74:36:06:16.01(9), the owner or operator shall submit a quarterly report to the Secretary by the end of each calendar quarter. The quarterly report shall contain the following information:

1. Name of facility, permit number, reference to this permit condition, identifying the submittal as a quarterly report, and calendar dates covered in the reporting period;
2. The quantity of particulate matter less than or equal to 10 microns in diameter, particulate matter 2.5 microns in diameter or less, nitrogen oxide, carbon monoxide, volatile organic compounds, and hazardous air pollutants emitted, in tons, in each month and the 12-month rolling total for each month in the reporting period and supporting documentation;
3. The number of gallons of denatured **and/or undenatured** ethanol loaded in trucks or railcars during a malfunction ~~of the flare and/or when the flare was not in each month~~ **of the vapor combustion unit and/or when the vapor combustion unit was not in operation each month** and the 12-month rolling total for each month in the reporting period and supporting documentation;
4. The volume of natural gas consumed in Unit #5, in terms of million cubic feet, per dryer for each month and the 12-month rolling total for each month in the reporting period and supporting documentation;
5. The number of hours Unit #7 was operated in each month and the 12-month rolling total for each month of the reporting period and supporting documentation; ~~and~~
6. The quantity of undenatured ethanol produced during the month. A 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values-;
7. Reduced operations' water flow rates, thermal oxidizer temperatures, time duration of reduced operation and date of performance test showing compliance with reduced operations-;
8. **The number of gallons of denatured ethanol loaded out by truck. A 12-month rolling total shall be calculated every month using that month's value and the**

- previous 11 months' values;
9. The number of hours Unit #7 bypassed Unit #5a. A 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values; and
  10. The quantity of dried distillers grain and solubles or dried distillers grain and solubles equivalent produced during the month. A 12-month rolling total shall be calculated every month using that month's value and the previous 11 months' values.

The quarterly reports must be postmarked no later than 30 days after the end of the reporting period (i.e., April 30<sup>th</sup>, July 30<sup>th</sup>, October 30<sup>th</sup>, and January 30<sup>th</sup>).

## 7.0 Control of Regulated Air Pollutants

### 7.3 Total suspended particulate matter limit

In accordance with ARSD 74:36:06:02(1) and/or 74:36:06:03(1), the owner or operator shall not allow the emission of total suspended particulate matter in excess of the emission limit specified in Table 7-1 for the appropriate permitted unit, operation, and process.

*Table 7-1 – Total Suspended Particulate Emission Limit*

Unit	Description	Emission Limit
#1	Grain Receiving	0.1 pounds per ton
#2	DDGS Storage	0.3 pounds per ton
#3	Grain Milling	0.4 pounds per ton
#5	Thermal Oxidizers/Boilers and DDGS dryers	40.2 pounds per hour
#7	Cooling drum bypass	0.8 pounds per ton
#9a	<b>2014 Vapor Combustion unit</b>	<b>0.6 pounds per million Btus heat input</b>

### 7.4 Sulfur dioxide limit

In accordance with ARSD 74:36:06:02(2) and 74:36:06:03(2), the owner or operator shall not allow the emission of sulfur dioxide in excess of the emission limit specified in Table 7-2 for the appropriate permitted unit, operations, and process.

*Table 7-2 – Sulfur Dioxide Emission Limit*

Unit	Description	Emission Limit
#5	Thermal oxidizers/boilers and dryers	3.0 pounds per million Btus heat input
#9a	<b>2014 Vapor Combustion unit</b>	<b>3.0 pounds per million Btus heat input</b>

Compliance with the sulfur dioxide emission limit is based on a three-hour rolling average, which is the arithmetic average of three contiguous one-hour periods.

## 8.0 PSD and Case-by-Case MACT Exemption

### **8.12 Unit #9 operational limit**

In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not load out by truck from Unit #9 greater than 17 million gallons of denatured **and/or undenatured** ethanol per 12-month rolling period.

### **8.15 Unit #9a destruction efficiency limit**

**In accordance with ARSD 74:36:20:15(9), the owner or operator shall maintain a volatile organic compound and hazardous air pollutant destruction efficiency of equal to or greater than 98% for the vapor combustion unit.**

## 11.0 Synthetic Organic Chemical Manufacturing Requirements

### **11.1 Addition or replacement of equipment.**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.480(c), the addition or replacement of equipment subject to 40 CFR Part 60 Subpart VV for the purpose of process improvement which is accomplished without a capital expenditure shall not by itself be considered a modification.~~

### **A. Pumps in Light Liquid Service**

### **11.2 Monitoring pumps in light liquid service**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-2(a), (b) and (c), each pump in light liquid service shall be monitored according to the following:~~

- ~~1. A visual inspection shall occur each calendar week for indications of liquids dripping from the pump seal. A leak is detected if there is an indication of liquids dripping from the pump seal. If there are indications of liquids dripping from the pump seal, the owner or operator shall meet the following requirements:
  - ~~a. Monitor the pump within five days as specified in permit condition 11.39. If an instrument reading of 10,000 parts per million or greater is measured, a leak is detected; and~~
  - ~~b. Designate the visual indications of liquids dripping as a leak and repair the leak within 15 days of detection by eliminating the visual indications of liquids dripping; This requirement does not apply to a pump that was monitored after a previous weekly inspection if the instrument reading for that monitoring event was less than 10,000 parts per million and the pump was not repaired since that monitoring event.~~~~
- ~~2. An inspection shall occur monthly to detect leaks by the method specified in permit condition 11.39. A pump that begins operation in light liquid service after the issuance of this permit must be monitored for the first time within 30 days of operating in light liquid service, except for a pump that replaces a leaking pump. A leak is detected if an instrument reading of 10,000 parts per million or greater is measured.~~

"In light liquid service" means the piece of equipment contains a liquid that meets the

specifications in permit condition 11.42.

When a leak is detected, the first attempt at repairing the leak shall be made no later than five calendar days after the leak is detected. First attempts at repair include, but are not limited to tightening the packing land nuts and ensuring the seal flush is operating at design pressure and temperature where practicable. A leak shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition 11.27.

The owner or operator shall comply with this permit condition, except as provided in permit condition 11.3, 11.4, 11.5, 11.6, and 11.34.

### **11.3 Exemption for pumps equipped with a dual mechanical seal system**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-2(d), each pump in light liquid service equipped with a dual mechanical seal system that includes a barrier fluid system is exempt from permit condition 11.2 provided the following requirements are met:

1. Each dual mechanical seal system is:
  - a. Operated with the barrier fluid at a pressure that is at all times greater than the pump stuffing box pressure;
  - b. Equipment with a barrier fluid degassing reservoir that is connected by a closed vent system to a control device that complies with the requirements of permit condition 11.28 through 11.33, inclusive; or
  - c. Equipped with a system that purges the barrier fluid into a process stream with zero volatile organic compound emissions to the atmosphere;
2. The barrier fluid system is in heavy liquid service or is not in volatile organic compound service;
3. Each barrier fluid system is equipped with a sensor that will detect failure of the seal system, the barrier fluid system, or both. The owner or operator shall determine, based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system, or both. Each sensor shall be checked daily or equipped with an audible alarm. A leak is detected if the sensor indicates failure of the seal system, the barrier fluid system or both based on the criterion established by the owner or operator; and
4. Each pump is checked by visual inspection, each calendar week, for indications of liquids dripping from the pump seals. If there are indications of liquids dripping from the pump seal at the time of the weekly inspection, the owner or operator shall perform the following procedures:
  - a. Monitor the pump within five days as specified in permit condition 11.39 to determine if there is a leak of volatile organic compounds in the barrier fluid. If an instrument reading of 10,000 parts per million or greater is measured, a leak is detected; and
  - b. Designate the visual indications of liquids dripping as a leak.

When a leak is detected, the first attempt at repairing the leak shall be made no later than five calendar days after the leak is detected. First attempts at repair include, but are not limited to tightening the packing land nuts and ensuring the seal flush is operating at design pressure and

temperature where practicable. A leak shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition 11.27.

#### **11.4—Exemptions for pumps with no detectable emissions**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-2(e), any pump that is designated by subsection (1) and (2) of permit condition 11.49 for no detectable emission is exempt from permit conditions 11.2 and 11.3 if the pump:

1. Has no externally actuated shaft penetrating the pump housing;
2. Is demonstrated to be operating with no detectable emissions as indicated by an instrument reading of less than 500 parts per million above background as measured by the methods specified in permit condition 11.40; and
3. Is tested for compliance with subsection (2) of this permit condition initially upon designation, annually, and at other times requested by the Secretary.

#### **11.5—Exemption for pumps with a closed vent system**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-2(f), any pump equipped with a closed vent system capable of capturing and transporting any leakage from the seal or seals to a process, fuel gas system, or control device that complies with the requirements in permit condition 11.28 through 11.33, inclusive is exempt from permit condition 11.2, 11.3, and 11.4.

#### **11.6—Exemption for pumps designated unsafe-to-monitor**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-2(g), any pump that is designated, as described in subsection (1) of permit condition 11.50, as an unsafe-to-monitor pump is exempt from the monitoring and inspection requirements in permit condition 11.2 and 11.3 if:

1. The owner or operator of the pump demonstrates the pump is unsafe-to-monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying with permit condition 11.2; and
2. The owner or operator of the pump has a written plan that requires monitoring of the pump as frequently as practicable during safe-to-monitor times but not more frequently than the periodic monitoring schedule otherwise applicable. When a leak is detected, the first attempt at repairing the leak shall be made no later than five calendar days after the leak is detected. First attempts at repair include, but are not limited to tightening the packing land nuts and ensuring the seal flush is operating at design pressure and temperature where practicable. A leak shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition 11.27.

### **B. Compressors**

#### **11.7—Compressor seal system**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-3(a) through (g), inclusive, each compressor shall be equipped with a seal system that includes a barrier fluid system

and prevents leakage of volatile organic compounds to the atmosphere. Each compressor seal system and barrier fluid system shall meet the following requirements:

1. Each compressor seal system shall be:
  - a. Operated with the barrier fluid at a pressure that is greater than the compressor stuffing box pressure;
  - b. Equipped with a barrier fluid system that is connected by a closed vent system to a control device that complies with the requirements in permit condition 11.28 through 11.33, inclusive; or
  - c. Equipped with a system that purges the barrier fluid into a process stream with zero volatile organic compound emissions to the atmosphere;
2. The barrier fluid system shall be in heavy liquid service or shall not be in volatile organic compound service;
3. The barrier fluid system shall be equipped with a sensor that will detect failure of the seal system, barrier fluid system, or both;
4. Each sensor shall be checked daily or shall be equipped with an audible alarm;
5. The owner or operator shall determine, based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system, or both; and
6. A leak is detected if the sensor indicates failure of the seal system, the barrier system, or both based on the criterion determined in subsection (5) of this permit condition.
7. When a leak is detected, a first attempt at repairing a leak shall be made no later than five calendar days after each leak is detected. A leak shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition 11.27.

The owner or operator shall comply with this permit condition, except as provided in permit condition 11.8, 11.9, and 11.34.

#### **11.8 Exemption for compressors equipped with a closed vent system**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-3(h), a compressor equipped with a closed vent system capable of capturing and transporting leakage from the compressor drive shaft back to a process, fuel gas system, or control device that complies with the requirements in permit condition 11.28 through 11.33, inclusive, except as provided in permit condition 11.9, is exempt from permit condition 11.7.

#### **11.9 Exemption for compressors with no detectable emissions**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-3(i), a compressor that is designated, as described by subsection (1) and (2) of permit condition 11.49 for no detectable emissions is exempt from permit condition 11.7 and 11.8 if the compressor:

1. Is demonstrated to be operating with no detectable emissions as indicated by an instrument reading of less than 500 parts per million above background as measured by the methods specified in permit condition 11.40; and
2. Is tested for compliance with subsection (1) of this permit condition initially upon designation, annually, and at other times requested by the Secretary.

## **C. Pressure Relief Device in Gas/Vapor Service**

### **11.10 No detectable emissions from a pressure relief device in gas/vapor service**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-4(a) and (b), except during pressure releases, each pressure relief device in gas/vapor service shall be operated with no detectable emissions, as indicated by an instrument reading of less than 500 parts per million above background, as determined by the methods specified in permit condition 11.40. "In gas/vapor service" means that the piece of equipment contains process fluid that is in the gaseous state at operating conditions.~~

~~No later than five calendar days after each pressure release, except as provided in permit condition 11.27, the pressure relief device shall be returned to a condition of no detectable emissions and monitored to confirm the condition of no detectable emissions.~~

~~The owner or operator shall comply with this permit condition, except as provided in permit condition 11.11 and 11.12.~~

### **11.11 Exemption for pressure relief device equipped with closed vent system**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-4(e), any pressure relief device equipped with a closed vent system capable of capturing and transporting leakage through the pressure relief device to a control device is exempt from permit condition 11.10. The control device must comply with the requirements of permit condition 11.28 through 11.33, inclusive.~~

### **11.12 Exemption for pressure relief device equipped with rupture disk**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-4(d), any pressure relief device equipped with a rupture disk upstream of the pressure relief device is exempt from permit condition 11.10 provided the owner or operator installs a new rupture disk after each pressure release as soon as practicable, but no later than five calendar days after each pressure release, except as provide in permit condition 11.27.~~

## **D. Sampling Connection Systems**

### **11.13 Sampling connection system**

~~In accordance with ARSD 74:36:07:22 as referenced to 40 CFR § 60.482-5(a) and (b), each sampling connection system shall be equipped with a closed purged, closed loop, or closed vent system. Each closed purged, closed loop, or closed vent system shall comply with the following requirements:~~

- ~~1. Gases displaced during the filling of the sample container are not required to be collected or captured;~~
- ~~2. Containers that are part of the closed-purge system must be covered or closed when not being filled or emptied;~~
- ~~3. Gases remaining in the tubing or piping between the closed-purge system valve(s) and sample container valve(s) after the valves are closed and the sample container is disconnected are not required to be collected or captured;~~
- ~~4. Each closed-purge, closed loop, or closed-vent system shall be designed and operated to meet one of the following requirements:~~

5. ~~Return the purged process fluid directly to the process line;~~
6. ~~Collect and recycle the purged process fluid to a process;~~
7. ~~Capture and transport all of the purged process fluid to a control device that complies with the requirements of permit condition 11.28 through 11.33, inclusive; or~~
8. ~~Collect, store, and transport the purged process fluid to any of the following systems or facilities:~~
  - a. ~~A waste management unit as defined in 40 CFR §63.111, if the waste management unit is subject to and operated in compliance with the provisions of 40 CFR Part 63, Subpart G, applicable to Group 1 wastewater streams;~~
  - b. ~~A treatment, storage, or disposal facility subject to regulation under 40 CFR Part 262, 264, 265, or 266;~~
  - c. ~~A facility permitted, licensed, or registered by a state to manage municipal or industrial solid waste, if the process fluids are not hazardous waste as defined in 40 CFR Part 261;~~
  - d. ~~A waste management unit subject to and operated in compliance with the treatment requirements of 40 CFR § 61.348(a), provided all waste management units that collect, store, or transport the purged process fluid to the treatment unit are subject to and operated in compliance with the management requirements of 40 CFR §§ 61.343 through 61.347, inclusive; or~~
  - e. ~~A device used to burn off specification used oil for energy recovery in accordance with 40 CFR Part 279, Subpart G, provided the purged process fluid is not hazardous waste as defined in 40 CFR Part 261.~~

The owner or operator shall comply with this permit condition, except as provided in permit condition 11.14 and 11.34.

**11.14 Exemption for in situ sampling systems and sampling systems without purges**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-5(c), in situ sampling systems and sampling systems without purges are exempt from permit condition 11.13. "In situ sampling system" means non-extractive samplers or in-line samplers.~~

**E. Open-Ended Valves or Lines**

**11.15 Open-ended valves or lines**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-6(a) and (b), each open-ended valve or line shall be equipped with a cap, blind flange, plug, or a second valve. The cap, blind flange, plugs, or second valve shall seal the open end at all times except during operations requiring process fluid flow through the open-ended valve or line. Each open-ended valve or line equipped with a second valve shall be operated in a manner such that the valve on the process fluid end is closed before the second valve is closed.~~

The owner or operator shall comply with this permit condition, except as provided in permit condition 11.16, 11.17, 11.18, and 11.34.

**11.16 Exemption for double block and bleed system**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-6(c), when a double block and bleed system is being used, the bleed valve or line may remain open during operations~~

that require venting the line between the block valves but shall comply with permit condition 11.15 at all other times.

#### **11.17 Exemption for emergency shutdown**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-6(d), open-ended valves or lines in an emergency shutdown system which are designed to open automatically in the event of a process upset are exempt from permit condition 11.15 and 11.16.

#### **11.18 Exemption for safety hazards**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-6(e), open-ended valves or lines containing materials which would auto-catalytically polymerize or would present an explosion, serious overpressure, or other safety hazard if capped or equipped with a double block and bleed system are exempt from permit condition 11.15 and 11.16.

### **F. Valves in Gas/Vapor Service and Light Liquid Service**

#### **11.19 Monthly monitoring valves in gas/vapor and light liquid service**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-7(a) through (e), inclusive, each valve shall be monitored monthly to detect leaks by the methods specified in permit condition 11.39. A valve that begins operation in gas/vapor service or light liquid service after the initial startup of the facility must be monitored for the first time within 30 days after the valve begins operation in gas/vapor service or light liquid service. If the valve is monitored in accordance with permit condition 11.23 or 11.24, count the new valve as leaking when calculating the percentage of valves leaking as described in permit condition 11.45. If less than 2.0 percent of the valves are leaking for that process unit, the valve must be monitored for the first time during the next scheduled monitoring event for existing valves or within 90 days, whichever comes first. A leak is detected if an instrument reading of 10,000 parts per million or greater is measured.

Any valve for which a leak is not detected for two successive months may be monitored the first month of every quarter, beginning with the next quarter, until a leak is detected. Once a leak is detected, the valve shall be monitored monthly again until a leak is not detected for two successive months. As an alternative to monitoring all of the valves in the first month of a quarter, an owner or operator may elect to subdivide the process unit into 2 or 3 subgroups of valves and monitor each subgroup in a different month during the quarter, provided each subgroup is monitored every 3 months. The owner or operator must keep records of the valves assigned to each subgroup.

A first attempt at repairing a leak shall be made no later than five calendar days after the leak is detected. The leak shall be repaired as soon as practicable, but not later than 15 calendar days after the leak is detected, except as provided in permit condition 11.27. First attempts at repair include, but are not limited to, the following best practices where practicable:

1. Tightening of bonnet bolts;
2. Replacement of bonnet bolts;

3. ~~Tightening of packing gland nuts; and~~
4. ~~Injection of lubricant into lubricated packing.~~

The owner or operator shall comply with this permit condition, except as provided in permit condition 11.20, 11.21, 11.22, 11.23, 11.25, and 11.34.

#### **11.20 Exemption for monitoring valves with no detectable emissions**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-7(f), any valve that is designated by subsection (2) of permit condition 11.49 for no detectable emissions is exempt from permit condition 11.19 if the valve:

1. ~~Has no external actuating mechanism in contact with the process fluid;~~
2. ~~Is operated with emissions less than 500 parts per million above background as measured by the methods specified in permit condition 11.40; and~~
3. ~~Is tested for compliance with subsection (2) of this permit condition initially upon designation, annually, and at other times requested by the Secretary.~~

#### **11.21 Exemption for unsafe to monitor valves**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-7(g), any valve that is designated by subsection (1) of permit condition 11.50 as an unsafe to monitor valve is exempt from permit condition 11.19 if:

1. ~~The owner or operator of the valve demonstrates the valve is unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying with permit condition 11.19; and~~
2. ~~The owner or operator of the valve adheres to a written plan that requires monitoring of the valve as frequently as practicable during safe to monitor times.~~

#### **11.22 Exemption for difficult to monitor valves**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-7(h), any valve that is designated by subsection (2) of permit condition 11.50 as a difficult to monitor valve is exempt from permit condition 11.19 if:

1. ~~The owner or operator of the valve demonstrates the valve cannot be monitored without elevating the monitoring personnel more than two meters above a support surface;~~
2. ~~The process unit within which the valve is located either becomes an affected facility through a modification or reconstruction or the owner or operator designates less than 3.0 percent of the total number of valves as difficult to monitor; and~~
3. ~~The owner or operator of the valve follows a written plan that requires monitoring of the valve at least once per calendar year.~~

#### **11.23 Alternative standard for valves in gas/vapor and light liquid service**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.483-1(a), (b), and (d), the owner or operator may elect to comply with permit condition 11.19 with an allowable percentage of valves leaking of equal to or less than 2.0 percent. This can be accomplished by following the requirements listed below:

1. ~~The owner or operator must notify the Secretary that the owner or operator has elected to comply with the allowable percentage of valves leaking before implementing this alternative standard, as specified in permit condition 11.56;~~
2. ~~A performance test, as specified in permit condition 11.24, shall be conducted initially upon designation, annually, and at other times requested by the Secretary; and~~
3. ~~If a valve leak is detected, it shall be repaired in accordance with the time frame specified in permit condition 11.19.~~

~~The owner or operator who elects to comply with this permit condition shall not have a leak percentage greater than 2.0 percent, determined as described in permit condition 11.45. If the leak percentage is greater than 2.0 percent, the owner or operator shall comply with the requirements described in permit condition 11.19.~~

#### **11.24 Performance test for valves using alternative standard**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.483-1(c), if the owner or operator elects to use the alternative standard for valves in permit condition 11.23, a performance test shall be conducted in the following manner:~~

1. ~~All valves in gas/vapor and light liquid service within the ethanol plant shall be monitored within one week by the methods specified in permit condition 11.39;~~
2. ~~A leak is detected if an instrument reading of 10,000 parts per million or greater is measured; and~~
3. ~~The leak percentage shall be determined by dividing the number of valves for which leaks are detected by the number of valves in gas/vapor and light liquid service within the ethanol plant.~~

#### **11.25 Additional option for valves in gas/vapor and light liquid service**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.483-2, after complying initially with permit condition 11.19, an owner or operator may elect to comply with one of the alternative work practices listed below after notifying the Secretary in accordance with permit condition 11.56:~~

1. ~~After two consecutive quarterly leak detection periods with the percent of valves leaking equal to or less than 2.0, an owner or operator may begin to skip one of the quarterly leak detection periods for the valves in gas/vapor and light liquid service; or~~
2. ~~After five consecutive quarterly leak detection periods with the percent of valves leaking equal to or less than 2.0, an owner or operator may begin to skip three of the quarterly leak detection periods for the valves in gas/vapor and light liquid service.~~

~~The percent of valves leaking shall be determined by permit condition 11.45. If the percent of valves leaking is greater than 2.0, the owner or operator shall comply with permit condition 11.19 but can again elect to use this permit condition. The owner or operator shall keep a record of the percent of valves found leaking during each leak detection period.~~

~~A valve that begins operation in gas/vapor service or light liquid service after the initial startup of~~

this facility must be monitored in accordance with permit condition 11.19 before the provisions of this permit condition can be applied to that valve.

## **~~G. Other Pumps, Valves, Pressure Relief Devices, Flanges, and Connectors~~**

### **~~11.26 Monitoring pumps, valves, pressure relief devices, flanges, and other connectors~~**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-8, if evidence of a potential leak is found by visual, audible, olfactory, or any other detection method at pumps and valves in heavy liquid service, pressure relief devices in light liquid or heavy liquid service, and connectors, the owner or operator shall comply with one of the following procedures:~~

- ~~1. Monitor the equipment within five days by the method specified in permit condition 11.39. A leak is detected if a monitor reading of 10,000 parts per million or greater is measured. When a leak is detected, it shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition 11.27. A first attempt at repairing a leak shall be made no later than five calendar days after each leak is detected. First attempts at repair include, but are not limited to the following best practices where practicable:
  - a. Tightening of bonnet bolts;
  - b. Replacement of bonnet bolts;
  - c. Tightening of packing gland nuts; and
  - d. Injection of lubricant into lubricated packing; or~~
- ~~2. Eliminate the visual, audible, olfactory, or other indications of potential leak within five calendar days of detection.~~

## **~~H. Delay of Repair~~**

### **~~11.27 Repair delay~~**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-9, a delay of repair of equipment for which leaks have been detected will be allowed in the following circumstances:~~

- ~~1. Delay may occur if the repair within 15 days is technically infeasible without a process unit shutdown. Repair of this equipment shall occur before the end of the next process unit shutdown. Monitoring to verify repair must occur within 15 days after startup of the process unit;~~
- ~~2. Delay of repair of equipment will be allowed for equipment which is isolated from the process and which does not remain in volatile organic compound service;~~
- ~~3. Delay of repair for valves will be allowed if:
  - a. The owner or operator demonstrates that emissions of purged material resulting from immediate repair are greater than the fugitive emissions likely to result from delay of repair; and
  - b. When repair procedures are effected, the purged material is collected and destroyed or recovered using a control device complying with permit condition 11.28 through 11.33, inclusive;~~
- ~~4. Delay of repair for pumps will be allowed if:~~

- a. ~~Repair requires the use of a dual mechanical seal system that includes a barrier fluid system; and~~
  - b. ~~Repair is completed as soon as practicable, but not later than six months after the leak was detected; and~~
5. ~~Delay of repair beyond a process unit shutdown will be allowed for a valve, if valve assembly replacement is necessary during the process unit shutdown, and valve assembly supplies had been sufficiently stocked and have been depleted. Delay of repair beyond the next process unit shutdown will not be allowed unless the next process unit shutdown occurs sooner than six months after the first process unit shutdown.~~

~~When delay of repair is allowed for a leaking pump or valve that remains in service, the pump or valve may be considered to be repaired and no longer subject to this chapter if two consecutive monthly monitoring instrument readings are below the leak definition.~~

## **I. Closed Vent Systems and Control Devices**

### **11.28 Standard for a closed vent system and control device**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-10(a), (b), (c), (d), (e), (f), (g), and (m), the owner or operator of a closed vent system and control device used to comply with chapter 11.0 of this permit shall comply with the following:~~

- 1. ~~Vapor recovery systems such as a condenser or adsorber shall be designed and operated to recover the volatile organic compound emissions vented to them with an efficiency of 95 percent or greater or to an exit concentration of 20 parts per million by volume, whichever is less stringent;~~
- 2. ~~An enclosed combustion device shall be designed and operated to reduce volatile organic compound emissions vented to them with an efficiency of 95 percent or greater or to an exit concentration of 20 parts per million by volume, on a dry basis, corrected to 3 percent oxygen, whichever is less stringent or provide a minimum residence time of 0.75 seconds at a minimum temperature of 816 degrees Celsius (1,500 degrees Fahrenheit);~~
- 3. ~~A flare shall comply with the requirements in 40 CFR § 60.18;~~
- 4. ~~The control device shall be monitored to ensure that the control device is operated and maintained in conformance with its design; and~~
- 5. ~~Except as provided in permit condition 11.30, 11.31, and 11.32, each closed vent system shall be inspected according to the following procedures:~~
  - a. ~~If the vapor collection system or closed vent system is constructed of hard piping, the owner or operator shall conduct an initial inspection according to permit condition 11.39 and conduct an annual visual inspections for visible, audible, or olfactory indications of leaks; and~~
  - b. ~~If the vapor collection system or closed vent system is constructed of ductwork, the owner or operator shall conduct an initial and annual inspection according to permit condition 11.39.~~

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~~Leaks as indicated by an instrument reading greater than 500 parts per million by volume above background or by visual inspections, shall be repaired as soon as practicable except as provided in~~

permit condition 11.29. A first attempt at repair shall be made no later than five calendar days after the leak is detected. Repair shall be completed no later than 15 calendar days after the leak is detected.

A closed vent system and control device used to comply with this permit condition shall be operated at all times when emissions may be vented to them.

#### **11.29 Delay in repairing leaks**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-10(h), the owner or operator may delay the repair of a closed vent system for which leaks have been detected. The delay may occur if the repair is technically infeasible without a process unit shutdown or if the owner or operator determines that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. The leak shall be repaired by the end of the next process unit shutdown.

#### **11.30 Exemption for vapor collection system or closed vent system under vacuum**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-10(i), the owner or operator of a vapor collection system or closed vent system that is operated under a vacuum is exempt from subsection (5) of permit condition 11.28.

#### **11.31 Exemption for unsafe to inspect closed vent system**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-10(j), the owner or operator is exempt from subsection (3) of permit condition 11.28 for any part of the closed vent system that is designated, as described in permit condition 11.33, as unsafe to inspect if the owner or operator complies with the following:

1. The owner or operator determines the equipment is unsafe to inspect because inspection personnel would be exposed to an imminent or potential danger as a consequence of complying with subsection (5) of permit condition 11.28; and
2. The owner or operator has a written plan that requires inspection of the equipment as frequently as practicable during safe to inspect times.

#### **11.32 Exemption for difficult to inspect closed vent system**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-10(k), the owner or operator is exempt from inspecting any part of the closed vent system that is designated, as described in permit condition 11.33, as difficult to inspect if the owner or operator complies with the following:

1. The owner or operator determines the equipment cannot be inspected without elevating the inspection personnel more than two meters above a support surface;
2. The process unit within which the closed vent system is located becomes an affected facility through modification or reconstruction or the owner or operator designates less than 3.0 percent of the total number of closed vent system equipment as difficult to inspect; and
3. The owner or operator has a written plan that requires inspection of the equipment at least once every five years.

### **11.33 Identification of unsafe equipment**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-10(l), the owner or operator shall record the following information to identify equipment unsafe to inspect:

1. Identification of all parts of the closed vent system that are designated as unsafe to inspect, an explanation of why the equipment is unsafe to inspect, and the plan for inspecting the equipment;
2. Identification of all parts of the closed vent system that are designated as difficult to inspect, an explanation of why the equipment is difficult to inspect, and the plan for inspecting the equipment;
3. For each inspection during which a leak is detected, a record of the information specified in permit condition 11.47;
4. For each inspection conducted in accordance with permit condition 11.39 during which no leaks are detected, a record that the inspection was performed, the date of the inspection, and a statement that no leaks were detected; and
5. For each annual visual inspection required in subsection (5)(b) of permit condition 11.28 during which no leaks are detected, a record that the inspection was performed, the date of the inspection, and a statement that no leaks were detected.

## **J. Equivalent Limits and Exemptions**

### **11.34 Emission limit equivalence**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR §§ 60.482-1(e) and 60.484(a) and (d), the owner or operator may apply to the Administrator of EPA through the Secretary for determination of emission limit equivalence. Emission limit equivalence means the owner or operator shall achieve a reduction in emissions of volatile organic compounds at least equivalent to the reduction in emissions of volatile organic compounds achieved by the controls required in permit condition 11.2 through 11.9, 11.13 through 11.26, and 11.28 through 11.33, inclusive. An owner or operator may offer a unique approach to demonstrate the equivalence of any equivalent means of emission limit. If the Administrator of EPA approves the determination of emission limit equivalence, the owner or operator shall comply with the requirements of that determination.

### **11.35 Determination of equivalence to equipment design and operation requirements**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.484(b), determination of equivalence to the equipment design and operations requirements will be evaluated by the following guidelines:

1. Each owner or operator applying for an equivalence determination shall be responsible for collecting and verifying test data to demonstrate equivalence of means of emission limitation;
2. The Administrator of EPA will compare test data for the means of emission limitation to test data for the equipment, design, and operational requirements; and
3. The Administrator of EPA may condition the approval of equivalence on requirements that

may be necessary to assure operation and maintenance to achieve the same emission reduction as the equipment, design, and operational requirements.

### **11.36 Determination of equivalence to work practices**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.484(c), determination of equivalence to the required work practices will be evaluated by the following guidelines:

1. Each owner or operator applying for an equivalence determination shall be responsible for collecting and verifying test data to demonstrate equivalence of means of emission limitation;
2. The emission reduction achieved by the required work practice shall be demonstrated;
3. The emission reduction achieved by the equivalent means of emission limitation shall be demonstrated;
4. The owner or operator shall commit in writing to work practices that provide for emission reductions equal to or greater than the emission reductions achieved by the required work practice;
5. The Administrator of EPA will compare the demonstrated emission reduction for the equivalent means of emission limitation to the demonstrated emission reduction for the required work practices and will consider the commitment by the owner or operator; and
6. The Administrator of EPA may condition the approval of equivalence on requirement that may be necessary to assure operation and maintenance to achieve the same emission reduction as the required work practice.

### **11.37 In vacuum service equipment exemption**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR §§ 60.482-1(d), equipment in vacuum service is exempt from the requirements in of permit condition 11.2 through 11.33, inclusive, if the equipment is identified in accordance subsection (5) of permit condition 11.49. "In vacuum service" means equipment is operating at an internal pressure which is at least five kilo Pascal below ambient pressure.

### **11.38 Temporarily in VOC service exemption**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.482-1(e), equipment an owner or operator designates as being in volatile organic compound service less than 300 hours per year is excluded from the requirements of permit condition 11.2 through 11.33, inclusive, if it is identified as required in subsection (6) of permit condition 11.49 and it meets any of the following specifications:

1. The equipment is in volatile organic compound service only during startup and shutdown, excluding startup and shutdown between batches of the same campaign for a batch process;
2. The equipment is in volatile organic compound service only during process malfunctions or other emergencies; or
3. The equipment is backup equipment that is in volatile organic compound service only when the primary equipment is out of service.

## **K. Test Methods and Procedures for 40 CFR Part 60, Subpart VV**

### **11.39 Compliance with pumps, compressors, pressure relief devices, and valves**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.485(b), the owner or operator shall demonstrate compliance with permit condition 11.2 through 11.33, inclusive, by using 40 CFR Part 60, Appendix A, Method 21. Method 21 shall be used to determine the presence of leaking equipment. The instrument shall be calibrated by the procedures specified in Method 21 prior to each day's use. The following calibration gases shall be used:~~

- ~~1. Zero air (less than 10 parts per million of hydrocarbon in air); and~~
- ~~2. A mixture of methane or n-hexane and air at a concentration of about, but less than, 10,000 parts per million methane or n-hexane.~~

### **11.40 Compliance with no detectable emission standards**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.485(e), the owner or operator shall demonstrate compliance with no detectable emission standard in permit condition 11.4, 11.9, 11.10, 11.20, and 11.28 using 40 CFR Part 60, Appendix A, Method 21. Method 21 shall be used to determine the background level and the presence of leaking equipment. The instrument shall be calibrated by the procedures specified in Method 21 prior to each day's use. The following calibration gases shall be used:~~

- ~~1. Zero air (less than 10 parts per million of hydrocarbon in air); and~~
- ~~2. A mixture of methane or n-hexane and air at a concentration of about, but less than, 10,000 parts per million methane or n-hexane.~~

~~All potential leak interfaces shall be traversed as close to the interface as possible. The arithmetic difference between the maximum concentration indicated by the instrument and the background level is compared with 500 parts per million for determining compliance.~~

### **11.41 Demonstrating a process unit is not in volatile organic compound service**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.485(d), the owner or operator shall test each piece of equipment unless it is demonstrated that a process unit is not in volatile organic compound service. "Not in volatile organic compound service" would occur if the volatile organic compound content would never be reasonably expected to exceed 10 percent by weight. The following methods shall be followed to demonstrate a process unit is not in volatile organic compound service:~~

- ~~1. Procedures that conform to the general methods in ASTM E260 73, 91, or 96, E168 67, 77, or 92, E169 63, 77 or 93 shall be used to determine the percent volatile organic compound content in the process fluid that is contained in or contacts a piece of equipment;~~
- ~~2. Organic compounds that are considered to have negligible photochemical reactivity may be excluded from the total quantity of organic compounds in determining the volatile organic compound content of the process fluid; or~~
- ~~3. Engineering judgment may be used to estimate the volatile organic compound content, if a piece of equipment had not been shown previously to be in service. If the Secretary disagrees with the judgment, subsections (1) and (2) of this permit condition shall be used to resolve the disagreement.~~

#### **11.42 Demonstrating equipment is light liquid service.**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.485(e), the owner or operator shall demonstrate equipment is in light liquid service by showing that all of the following conditions apply:

1. The vapor pressure of one or more of the components is greater than 0.3 kilo Pascal at 20 degrees Celsius (1.2 inches of water at 68 degrees Fahrenheit). Standard reference texts or ASTM D-2879-83, 96, or 97 shall be used to determine the vapor pressures;
2. The total concentration of the pure organic components having a vapor pressure greater than 0.3 kilo Pascal at 20 degrees Celsius (1.2 inches of water at 68 degrees Fahrenheit) is equal to or greater than 20 percent by weight; and
3. The fluid is a liquid at operating conditions.

#### **11.43 Testing representative samples**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.485(f), the samples used in conjunction with permit condition 11.41, 11.42, and 11.44 shall be representative of the process fluid that is contained in or contacts the equipment or the gas being combusted in a flare.

#### **11.44 Determining compliance with standards for flares**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.485(g), the owner or operator shall determine compliance with the standards of flares as follows:

1. 40 CFR Part 60, Appendix A, Method 22 shall be used to determine visible emissions;
2. A thermocouple or any other equivalent device shall be used to monitor the presence of a pilot flame in the flare;
3. The maximum permitted velocity for air assisted flares shall be computed using Equation V-1;
4. The net heat value ( $H_T$ ) of the gas being combusted in a flare shall be computed using Equation V-2;
5. 40 CFR Part 60, Appendix A, Method 18 or ASTM D6420-99 (2004) (where the target compound(s) are those listed in Section 1.1 of ASTM D6420-99, and the target concentration is between 150 parts per billion by volume and 100 parts per million by volume) and ASTM D2504-67, 77 or 88 (Reapproved 1993) shall be used to determine the concentration of sample component "i";
6. ASTM D2382-76 or 88 or D4809 shall be used to determine the net heat of combustion of component "i" if published values are not available or cannot be calculated; and
7. 40 CFR Part 60, Appendix A, Method 2, 2A, 2C, or 2D, as appropriate, shall be used to determine the actual exit velocity of a flare. If needed, the unobstructed (free) cross-section area of the flare tip shall be used

#### ***Equation V-1—Maximum permitted velocity for air assisted flares***

$$V_{\max} = K_1 + K_2 \times H_T$$

Where:

- $V_{\max}$  = Maximum permitted velocity, meters per second (feet per second);
- $H_T$  = Net heating value of the gas being combusted, mega Joules per standard cubic meter

- (Btus per standard cubic foot);
- $K_1 = 8.706$  meters per second (28.56 feet per second); and
- $K_2 = 0.7084 \text{ m}^4/\text{mega Joules-seconds}$  ( $0.087 \text{ ft}^4$  per Btus-second).

**Equation V-2—Net heating value of gas combusted in flare**

$$HT = K \sum_{i=1}^n C_i H_i$$

Where:

- $H_i$  = Net heating value of the gas being combusted, mega Joules per standard cubic meter (Btus per standard cubic foot);
- $K$  = Conversion constant,  $1.740 \times 10^{-7}$  (gram-mole)(mega Joules)/parts per million-standard cubic meter-keal ( $4.674 \times 10^{-6}$  (gram-mole)(Btu)/parts per million-standard cubic feet-keal)); and
- $C_i$  = Concentration of sample component “i”, parts per million; and
- $H_i$  = Net heat of combustion of sample component “i” at 25 degrees Celsius and 760 millimeters Mercury (77 degrees Fahrenheit and 14.7 pounds per square inch), keal/gram-mole.

**11.45—Demonstrating compliance with alternative standards for valves**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.485(h), the owner or operator shall determine compliance with permit condition 11.23 and 11.25 as follows:

1. The percent of valves leaking shall be determined using Equation V-3;
2. The total number of valves monitored shall include difficult to monitor and unsafe to monitor valves only during the monitoring period in which those valves are monitored;
3. The number of valves leaking shall include valves for which repair has been delayed;
4. Any new valve that is not monitored within 30 days of being placed in service shall be included in the number of valves leaking and the total number of valves monitored for the monitoring period in which the valve is placed in service;
5. If the process unit has been subdivided in accordance with permit condition 11.19 related to alternative valve monitoring on a quarterly basis, the sum of valves found leaking during a monitoring period includes all subgroups; and
6. The total number of valves monitored does not include a valve monitored to verify repair.

**Equation V-3—Percent of valves leaking**

$$\%V_L = (V_L/V_T) \times 100$$

Where:

- $\%V_L$  = Percent leaking valves;
- $V_L$  = Number of valves found leaking; and
- $V_T$  = The sum of the total number of valves monitored.

**L. Recordkeeping for 40 CFR Part 60, Subpart VV**

#### **11.46 Labeling leaky equipment**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.486(b), if a leak is detected as specified in permit condition 11.2 through 11.9 and 11.19 through 11.26, inclusive, the owner or operator shall attach a weatherproof and readily visible identification tag on the leaking equipment. The identification tag shall be marked with the equipment identification number. The identification tag for a valve may be removed after the valve has been monitored for two successive months, as specified in permit condition 11.19, and no leak has been detected during those two months. The identification tag for equipment other than valves may be removed after the equipment has been repaired.

#### **11.47 Maintaining a log of equipment leaks**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.486(c), if a leak is detected as specified in permit condition 11.2 through 11.9 and 11.19 through 11.26, inclusive, the owner or operator shall record the following information in a log and shall be kept for two years in a readily accessible location:

1. The instrument and operator identification numbers and the equipment identification number;
2. The date the leak was detected and the dates of each attempt to repair the leak;
3. The repair methods applied in each attempt to repair the leak;
4. Record "Above 10,000", if the maximum instrument reading, measured by 40 CFR Part 60, Appendix A, Method 21, after each repair attempt is equal to or greater than 10,000 parts per million;
5. Record "Repair delayed" and the reason for the delay if the leak is not repaired within 15 calendar days after discovery of the leak;
6. The signature of the person whose decision it was that repair could not be completed without a process shutdown;
7. The expected date of successful repair of the leak if the leak is not repaired within 15 calendar days;
8. The dates of process unit shutdown that occur while the equipment is unrepaired; and
9. The date of successful repair of the leak.

#### **11.48 Records for closed vents and control devices**

In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.486(d), the owner or operator shall maintain the following information pertaining to the design requirements for closed vent systems and control devices described in permit condition 11.28 through 11.33, inclusive. The records shall be kept in a readily accessible location:

1. Detailed schematics, design specifications, and piping and instrumentation diagrams;
2. The dates and descriptions of any change in the design specifications;
3. A description of the parameter or parameters monitored, as required in permit condition 11.28 to ensure that control devices are operated and maintained in conformance with their design and an explanation of why that parameter or parameters was selected for the monitoring;
4. Periods when the closed vent systems and control devices required in permit condition 11.2

through 11.14, inclusive, are not operated as designed, including periods when a flare pilot light does not have a flame; and

5. ~~Dates of startups and shutdowns of the closed vent systems and control devices required in permit condition 11.2 through 11.14, inclusive.~~

#### **11.49 Equipment log**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.486(e), the owner or operator shall record the following information for equipment subject to the requirements in permit condition 11.2 through 11.33, inclusive. The records shall be kept in a readily accessible location:~~

1. ~~A list of identification numbers for equipment subject to the requirements in permit condition 11.2 through 11.33, inclusive;~~
2. ~~A list of identification numbers for equipment that are designated for no detectable emissions under the provisions of permit condition 11.4, 11.9, and 11.20. The designation of equipment for no detectable emissions shall be signed by the responsible official;~~
3. ~~A list of equipment identification numbers for pressure relief devices required to comply with permit condition 11.10 through 11.12, inclusive;~~
4. ~~The date of each compliance test as required in permit condition 11.4, 11.9, and 11.20. The background level measured during each compliance test and the maximum instrument reading measured at the equipment during the compliance test shall also be recorded;~~
5. ~~A list of identification numbers for equipment in vacuum service; and~~
6. ~~A list of identification numbers for equipment the owner or operator designates as operating in volatile organic compound service less than 300 hours per year in accordance with permit condition 11.38, a description of the conditions under which the equipment is in volatile organic compound service, and rationale supporting the designation that it is in volatile organic compound service less than 300 hours per year.~~

#### **11.50 Exempt valve and pump log**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.486(f), the owner or operator shall maintain a log readily accessible of the following information pertaining to all valves subject to the requirements in permit condition 11.21 and 11.22 and all pumps subject to the requirements of permit condition 11.6:~~

1. ~~A list of identification numbers for valves and pumps that are designated as unsafe to monitor, an explanation for each valve or pump stating why the valve or pump is unsafe to monitor, and the plan for monitoring each valve or pump; and~~
2. ~~A list of identification numbers for valves that are designated as difficult to monitor, an explanation for each valve stating why the valve is difficult to monitor, and the plan for monitoring each valve.~~

#### **11.51 Valve log – alternative standards**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.486(g), the owner or operator shall maintain the following information for valves complying with permit condition 11.25:~~

1. ~~A schedule of monitoring; and~~
2. ~~The percent of valves found leaking during each monitoring period.~~

**11.52 Design criterion for determining leaks**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.486(h), the owner or operator shall maintain the following information in a log:~~

- ~~1. Design criterion required in subsection (5) of permit condition 11.3 and subsection (5) of permit condition 11.7 and explanation of the design criterion; and~~
- ~~2. Any changes to this criterion and the reasons for the changes.~~

**11.53 Log for equipment in VOC service**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.486(j), the owner or operator shall maintain the information and data used to demonstrate that a piece of equipment is not in volatile organic compound service in a log.~~

**M. Reporting for Pumps, Valves, and Compressors**

**11.54 Initial report for pumps, valves, and compressors**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.487(a) and (b), the owner or operator shall submit an initial report to the Secretary within 180 days of the initial startup of the facility. The initial report shall include a summary of the following information:~~

- ~~1. Name of facility, permit number, reference to this permit condition, and identifying the submittal as the initial report;~~
- ~~2. The number of valves subject to the requirements of permit condition 11.19 through 11.22, inclusive, excluding those valves designated for no detectable emissions under permit condition 11.20;~~
- ~~3. The number of pumps subject to the requirements of permit condition 11.2 through 11.6, inclusive, excluding those pumps designated for no detectable emissions under permit condition 11.4 and those pumps complying with permit condition 11.5; and~~
- ~~4. The number of compressors subject to the requirements of permit condition 11.7 through 11.9, inclusive, excluding those compressors designated for no detectable emission under permit condition 11.9 and those compressors complying with permit condition 11.8.~~

**11.55 Semiannual report for pumps, valves, and compressors**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.487(a) and (c), the owner or operator shall submit a semiannual report to the Secretary. The semiannual reports shall include a summary of the following information:~~

- ~~1. Name of facility, permit number, reference to this permit condition, identifying the submittal as a semiannual report, and calendar dates covered in the reporting period;~~
- ~~2. The number of valves for which leaks were detected as described in permit condition V19 or 11.25 and the number of valves for which leaks were not repaired as required in permit condition 11.19;~~
- ~~3. The number of pumps for which leaks were detected as described in permit condition 11.2~~

and 11.3 and the number of pumps for which leaks were not repaired as required in permit condition 11.2 and 11.3;

4. ~~The number of compressors for which leaks were detected as described in permit condition 11.7 and the number of compressors for which leaks were not repaired as required in permit condition 11.7;~~
5. ~~The facts which explain each delay of repair and where appropriate, why the fermenter shutdown was technically infeasible;~~
6. ~~Dates the fermenter was shut down during the semiannual reporting period; and~~
7. ~~Any changes which have occurred since the initial report or subsequent revisions to the initial report;~~

The semiannual reports must be postmarked no later than 30 days after the end of the reporting period (e.g., July 30<sup>th</sup> and January 30<sup>th</sup>).

#### **11.56 Notification of alternative standards for valves**

~~In accordance with ARSD 74:36:07:22, as referenced to 40 CFR § 60.487(d), the owner or operator shall notify the Secretary 90 days in advance of electing to implement permit condition 11.23 and/or 11.25.~~

#### **11.1 Addition or replacement of equipment**

**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.480a(c), the addition or replacement of equipment subject to 40 CFR Part 60 Subpart VVa for the purpose of process improvement which is accomplished without a capital expenditure shall not by itself be considered a modification.**

### **A. PUMPS IN LIGHT LIQUID SERVICE**

#### **11.2 Monitoring pumps in light liquid service**

**In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-2a(a), (b) and (c), each pump in light liquid service shall be monitored according to the following:**

1. **A visual inspection shall occur each calendar week for indications of liquids dripping from the pump seal. A leak is detected if there is an indication of liquids dripping from the pump seal. If there are indications of liquids dripping from the pump seal, the owner or operator shall meet the following requirements:**
  - a. **Monitor the pump within five days as specified in permit condition 11.39. If an instrument reading of 2,000 parts per million or greater is measured; a leak is detected; or**
  - b. **Designate the visual indications of liquids dripping as a leak and repair the leak within 15 days of detection by eliminating the visual indications of liquids dripping;**
2. **An inspection shall occur monthly to detect leaks by the method specified in permit condition 11.39. A pump that begins operation in light liquid service after the initial startup date of the affected facility must be monitored for the first time within 30 days of operating in light liquid service, except for a pump that replaces a leaking pump. A leak is detected if an instrument reading of 2,000 parts per million or greater is measured.**

**"In light liquid service" means the piece of equipment contains a liquid that meets the conditions specified in permit condition 11.42.**

**When a leak is detected, the first attempt at repairing a leak shall be made no later than five calendar days after each leak is detected. First attempts at repair include, but are not limited to tightening the packing gland nuts and ensuring the seal flush is operating at design pressure and temperature where practicable. A leak shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition 11.27.**

**The owner or operator shall comply with this permit condition, except as provided in permit condition 11.3, 11.4, 11.5, 11.6, and 11.34.**

### **11.3 Exemption for pumps equipped with a dual mechanical seal system**

**In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-2a(d), each pump in light liquid service equipped with a dual mechanical seal system that includes a barrier fluid system is exempt from permit condition 11.2 provided the following requirements are met:**

1. **Each dual mechanical seal system is:**
  - a. **Operated with the barrier fluid at a pressure that is at all times greater than the pump stuffing box pressure;**
  - b. **Equipped with a barrier fluid degassing reservoir that is connected by a closed vent system to a control device that complies with the requirements of permit condition 11.28 through 11.33, inclusive; or**
  - c. **Equipped with a system that purges the barrier fluid into a process stream with zero volatile organic compound emissions to the atmosphere;**
2. **The barrier fluid system is in heavy liquid service or is not in volatile organic compound service;**
3. **Each barrier fluid system is equipped with a sensor that will detect failure of the seal system, the barrier fluid system, or both.**
4. **Each pump is checked by visual inspection, each calendar week, for indications of liquids dripping from the pump seals. If there are indications of liquids dripping from the pump seal, the owner or operator shall follow the procedures specified below prior to the next required inspection:**
  - a. **Monitor the pump within five days as specified in permit condition 11.39 to determine if there is a leak of volatile organic compounds in the barrier fluid. If an instrument reading of 2,000 parts per million or greater is measured, a leak is detected. If a leak is detected, the first attempt at repairing a leak shall be made no later than five calendar days after detecting a leak. First attempts at repair include, but are not limited to tightening the packing gland nuts and ensuring the seal flush is operating at design pressure and temperature where practicable. The leak shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition 11.27; or**
  - b. **Designate the visual indications of liquids dripping as a leak. If the owner or operator designates a leak, the leak shall be repaired with 15 days of detection**

- by eliminating visual indications of liquids dripping; and
5. The owner or operator determines, based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system, or both. Each sensor described in subsection (3) of this permit condition shall be checked daily or equipped with an audible alarm. If a leak is detected, the owner or operator shall eliminate the conditions that activated the sensor within 15 days of detection.

#### 11.4 Exemptions for pumps with no detectable emissions

In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-2a(e), any pump in light liquid service that is designated by permit condition 11.50 for no detectable emissions, as indicated by an instrument reading of less than 500 parts per million above background, is exempt from permit condition 11.2 and 11.3 if the pump:

1. Has no externally actuated shaft penetrating the pump housing;
2. Is demonstrated to be operating with no detectable emissions as indicated by an instrument reading of less than 500 parts per million above background as measured by the methods specified in permit condition 11.40; and
3. Is tested for compliance with subsection (2) of this permit condition initially upon designation, annually, and at other times requested by the Secretary.

#### 11.5 Exemption for pumps with a closed vent system

In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-2a(f), any pump in light liquid service equipped with a closed vent system capable of capturing and transporting any leakage from the seal or seals to a process, fuel gas system, or control device that complies with the requirements in permit condition 11.28 through 11.33, inclusive, is exempt from permit condition 11.2, 11.3, and 11.4.

#### 11.6 Exemption for pumps designated unsafe-to-monitor

In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-2a(g), any pump in light liquid service that is designated, as described in permit condition 11.51 as an unsafe-to-monitor pump is exempt from the monitoring and inspection requirements in permit condition 11.2 and 11.3 if:

1. The owner or operator of the pump demonstrates the pump is unsafe-to-monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying with permit condition 11.2; and
2. The owner or operator of the pump has a written plan that requires monitoring of the pump as frequently as practicable during safe-to-monitor times but not more frequently than the periodic monitoring schedule otherwise applicable. When a leak is detected, the first attempt at repairing the leak shall be made no later than five calendar days after the leak is detected. First attempts at repair include, but are not limited to tightening the packing land nuts and ensuring the seal flush is operating at design pressure and temperature where practicable. A leak shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided

in permit condition 11.27.

## **B. COMPRESSORS**

### **11.7 Compressor seal system**

**In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-3a(a) through (g), inclusive, each compressor shall be equipped with a seal system that includes a barrier fluid system and prevents leakage of volatile organic compounds to the atmosphere. Each compressor seal system and barrier fluid system shall meet the following requirements:**

- 1. Each compressor seal system shall be:**
  - d. Operated with the barrier fluid at a pressure that is greater than the compressor stuffing box pressure;**
  - e. Equipped with a barrier fluid system degassing reservoir that is routed to a process or fuel gas system or connected by a closed vent system to a control device that complies with the requirements in permit condition 11.28 through 11.33, inclusive; or**
  - f. Equipped with a system that purges the barrier fluid into a process stream with zero volatile organic compound emissions to the atmosphere;**
- 2. The barrier fluid system shall be in heavy liquid service or shall not be in volatile organic compound service;**
- 3. The barrier fluid system shall be equipped with a sensor that will detect failure of the seal system, barrier fluid system, or both;**
- 4. Each sensor shall be checked daily or shall be equipped with an audible alarm;**
- 5. The owner or operator shall determine, based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system, or both;**
- 6. A leak is detected if the sensor indicates failure of the seal system, the barrier system, or both based on the criterion determined in subsection (5) of this permit condition;**
- 7. When a leak is detected, a first attempt at repairing a leak shall be made no later than five calendar days after each leak is detected. A leak shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition 11.27.**

**The owner or operator shall comply with this permit condition, except as provided in permit condition 11.8, 11.9, and 11.34.**

### **11.8 Exemption for compressors equipped with a closed vent system**

**In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-3a(h), a compressor equipped with a closed vent system capable of capturing and transporting leakage from the compressor drive shaft back to a process, fuel gas system, or control device that complies with the requirements in permit condition 11.28 through 11.33, inclusive, except as provided in permit condition 11.9, is exempt from permit condition 11.7.**

### 11.9 Exemption for compressors with no detectable emissions

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-3a(i), a compressor that is designated, as described by permit condition 11.50 for no detectable emissions is exempt from permit condition 11.7 and 11.8 if the compressor:

1. Is demonstrated to be operating with no detectable emissions, as indicated by an instrument reading of less than 500 parts per million above background, as measured by the methods specified in permit condition 11.40; and
2. Is tested for compliance with subsection (1) of this permit condition initially upon designation, annually, and at other times requested by the Secretary.

### C. PRESSURE RELIEF DEVICE IN GAS/VAPOR SERVICE

#### 11.10 No detectable emissions from a pressure relief device in gas/vapor service

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-4a(a) and (b), except during pressure releases, each pressure relief device in gas/vapor service shall be operated with no detectable emissions, as indicated by an instrument reading of less than 500 parts per million above background, as determined by the methods specified in permit condition 11.40. "In gas/vapor service" means the piece of equipment contains process fluid that is in the gaseous state at operating conditions.

No later than five calendar days after each pressure release, except as provided in permit condition 11.27, the pressure relief device shall be returned to a condition of no detectable emissions and monitored to confirm the condition of no detectable emissions.

The owner or operator shall comply with this permit condition, except as provided in permit condition 11.11 and 11.12.

#### 11.11 Exemption for pressure relief device equipped with closed vent system

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-4a(c), any pressure relief device that is routed to a process or fuel gas system or equipped with a closed vent system capable of capturing and transporting leakage through the pressure relief device to a control device is exempt from permit condition 11.10. The control device must comply with the requirements of permit condition 11.28 through 11.33, inclusive.

#### 11.12 Exemption for pressure relief device equipped with rupture disk

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-4a(d), any pressure relief device equipped with a rupture disk upstream of the pressure relief device is exempt from permit condition 11.10 provided the owner or operator installs a new rupture disk after each pressure release as soon as practicable, but no later than five calendar days after each pressure release, except as provide in permit condition 11.27.

### D. SAMPLING CONNECTION SYSTEMS

### **11.13 Sampling connection system**

**In accordance with ARSD 74:36:07:22:01 as referenced to 40 CFR § 60.482-5a(a) and (b), each sampling connection system shall be equipped with a closed purged, closed loop, or closed vent system. Each closed-purged, closed-loop, or closed vent system shall comply with the following requirements:**

- 1. Gases displaced during the filling of the sample container are not required to be collected or captured;**
- 2. Containers that are part of the closed-purge system must be covered or closed when not being filled or emptied;**
- 3. Gases remaining in the tubing or piping between the closed-purge system valve(s) and sample container valve(s) after the valves are closed and the sample container is disconnected are not required to be collected or captured;**
- 4. Each closed-purge, closed-loop, or closed-vent system shall be designed and operated to meet one of the following requirements:**
  - a. Return the purged process fluid directly to the process line;**
  - b. Collect and recycle the purged process fluid to a process;**
  - c. Capture and transport all of the purged process fluid to a control device that complies with the requirements of permit condition 11.28 through 11.33, inclusive; or**
  - d. Collect, store, and transport the purged process fluid to any of the following systems or facilities:**
    - i. A waste management unit as defined in 40 CFR § 63.111, if the waste management unit is subject to and operated in compliance with the provisions of 40 CFR Part 63, Subpart G, applicable to Group 1 wastewater streams;**
    - ii. A treatment, storage, or disposal facility subject to regulation under 40 CFR Part 262, 264, 265, or 266;**
    - iii. A facility permitted, licensed, or registered by a state to manage municipal or industrial solid waste, if the process fluids are not hazardous waste as defined in 40 CFR Part 261;**
    - iv. A waste management unit subject to and operated in compliance with the treatment requirements of 40 CFR § 61.348(a), provided all waste management units that collect, store, or transport the purged process fluid to the treatment unit are subject to and operated in compliance with the management requirements of 40 CFR §§ 61.343 through 61.347, inclusive; or**
    - v. A device used to burn off-specification used oil for energy recovery in accordance with 40 CFR Part 279, Subpart G, provided the purged process fluid is not hazardous waste as defined in 40 CFR Part 261.**

**The owner or operator shall comply with this permit condition, except as provided in permit condition 11.14 and 11.34.**

### **11.14 Exemption for in situ sampling systems and sampling systems without purges**

**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-5a(c), in situ sampling systems and sampling systems without purges are exempt from permit condition**

**11.13. "In-situ sampling system" means non-extractive samplers or in-line samplers.**

#### **E. OPEN-ENDED VALVES OR LINES**

##### **11.15 Open-ended valves or lines**

**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-6a(a) and (b), each open-ended valve or line shall be equipped with a cap, blind flange, plug, or a second valve. The cap, blind flange, plugs, or second valve shall seal the open end at all times except during operations requiring process fluid flow through the open-ended valve or line. Each open-ended valve or line equipped with a second valve shall be operated in a manner such that the valve on the process fluid end is closed before the second valve is closed.**

**The owner or operator shall comply with this permit condition, except as provided in permit condition 11.16, 11.17, 11.18, and 11.34.**

##### **11.16 Exemption for double block-and-bleed system**

**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-6a(c), when a double block-and-bleed system is being used, the bleed valve or line may remain open during operations that require venting the line between the block valves but shall comply with permit condition 11.15 at all other times.**

##### **11.17 Exemption for emergency shutdown**

**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-6a(d), open-ended valves or lines in an emergency shutdown system which are designed to open automatically in the event of a process upset are exempt from permit condition 11.15 and 11.16.**

##### **11.18 Exemption for safety hazards**

**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-6a(e), open-ended valves or lines containing materials which would auto catalytically polymerize or would present an explosion, serious overpressure, or other safety hazard if capped or equipped with a double block and bleed system are exempt from permit condition 11.15 and 11.16.**

#### **F. VALVES IN GAS/VAPOR SERVICE AND LIGHT LIQUID SERVICE**

##### **11.19 Monthly monitoring valves in gas/vapor and light liquid service**

**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-7a(a) through (e), inclusive, each valve shall be monitored monthly to detect leaks by the methods specified in permit condition 11.39. A valve that begins operation in gas/vapor service or light liquid service after the initial startup date for the affected facility must be monitored for the first time within 30 days after the valve begins operation in gas/vapor service or light liquid service, except for a valve that replaces a leaking valve. If the existing valves in the process unit are monitored in accordance with permit condition 11.23 or 11.24, count**

the new valve as leaking when calculating the percentage of valves leaking as described in permit condition 11.45. If less than 2.0 percent of the valves are leaking for that process unit, the valve must be monitored for the first time during the next scheduled monitoring event for existing valves in the process unit or within 90 days, whichever comes first. A leak is detected if an instrument reading of 500 parts per million or greater is measured.

Any valve for which a leak is not detected for two successive months may be monitored the first month of every quarter, beginning with the next quarter, until a leak is detected. Once a leak is detected, the valve shall be monitored monthly again until a leak is not detected for two successive months. As an alternative to monitoring all of the valves in the first month of a quarter, an owner or operator may elect to subdivide the process unit into 2 or 3 subgroups of valves and monitor each subgroup in a different month during the quarter, provided each subgroup is monitored every 3 months. The owner or operator must keep records of the valves assigned to each subgroup.

A first attempt at repairing a leak shall be made no later than five calendar days after the leak is detected. The leak shall be repaired as soon as practicable, but not later than 15 calendar days after the leak is detected, except as provided in permit condition 11.27. First attempts at repair include, but are not limited to, the following best practices where practicable:

1. Tightening of bonnet bolts;
2. Replacement of bonnet bolts;
3. Tightening of packing gland nuts; and
4. Injection of lubricant into lubricated packing.

The owner or operator shall comply with this permit condition, except as provided in permit condition 11.20, 11.21, 11.22, 11.23, 11.25, and 11.34.

#### 11.20 Exemption for monitoring valves with no detectable emissions

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-7a(f), any valve that is designated by permit condition 11.50 for no detectable emissions, as indicated by an instrument reading of less than 500 parts per million above background, is exempt from permit condition 11.19 if the valve:

1. Has no external actuating mechanism in contact with the process fluid;
2. Is operated with emissions less than 500 parts per million above background as measured by the methods specified in permit condition 11.40; and
3. Is tested for compliance with subsection (2) of this permit condition initially upon designation, annually, and at other times requested by the Secretary.

#### 11.21 Exemption for unsafe-to-monitor valves

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-7a(g), any valve that is designated by permit condition 11.51 as an unsafe-to-monitor valve is exempt from permit condition 11.19 if:

1. The owner or operator of the valve demonstrates the valve is unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying with permit condition 11.19; and
2. The owner or operator of the valve adheres to a written plan that requires monitoring of the valve as frequently as practicable during safe-to-monitor times.

#### 11.22 Exemption for difficult-to-monitor valves

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-7a(h), any valve that is designated by permit condition 11.51 as a difficult-to-monitor valve is exempt from permit condition 11.19 if:

1. The owner or operator of the valve demonstrates that the valve cannot be monitored without elevating the monitoring personnel more than two meters above a support surface;
2. The process unit within which the valve is located either becomes an affected facility through a modification or reconstruction or the owner or operator designates less than 3.0 percent of the total number of valves as difficult-to-monitor; and
3. The owner or operator of the valve follows a written plan that requires monitoring of the valve at least once per calendar year.

#### 11.23 Alternative standard for valves in gas/vapor and light liquid service

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.483-1a(a), (b), and (d), the owner or operator may elect to comply with permit condition 11.19 with an allowable percentage of valves leaking of equal to or less than 2.0 percent. This can be accomplished by following the requirements:

1. The owner or operator must notify the Secretary that the owner or operator has elected to comply with the allowable percentage of valves leaking before implementing this alternative standard, as specified in permit condition 11.57;
2. A performance test, as specified in permit condition 11.24, shall be conducted initially upon designation, annually, and at other times requested by the Secretary; and
3. If a valve leak is detected, it shall be repaired in accordance with the time frame specified in permit condition 11.19.

The owner or operator who elects to comply with this permit condition shall not have a leak percentage greater than 2.0 percent, determined as described in permit condition 11.45.

#### 11.24 Performance test for valves using alternative standard

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.483-1a(c), if the owner or operator elects to use the alternative standard for valves in permit condition 11.23, a performance test shall be conducted in the following manner

1. All valves in gas/vapor and light liquid service within the ethanol plant shall be

- monitored within one week by the methods specified in permit condition 11.39;
2. A leak is detected if an instrument reading of 500 parts per million or greater is measured; and
  3. The leak percentage shall be determined by dividing the number of valves for which leaks are detected by the number of valves in gas/vapor and light liquid service.

#### 11.25 Additional option for valves in gas/vapor and light liquid service

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.483-2a, after complying initially with permit condition 11.19, an owner or operator may elect to comply with one of the alternative work practices listed below after notifying the Secretary in accordance with permit condition 11.57:

1. After two consecutive quarterly leak detection periods with the percent of valves leaking equal to or less than 2.0, an owner or operator may begin to skip one of the quarterly leak detection periods for the valves in gas/vapor and light liquid service; or
2. After five consecutive quarterly leak detection periods with the percent of valves leaking equal to or less than 2.0, an owner or operator may begin to skip three of the quarterly leak detection periods for the valves in gas/vapor and light liquid service.

The percent of valves leaking shall be determined by permit condition 11.45. If the percent of valves leaking is greater than 2.0, the owner or operator shall comply with permit condition 11.19 but can again elect to use this permit condition. The owner or operator shall keep a record of the percent of valves found leaking during each leak detection period.

A valve that begins operation in gas/vapor service or light liquid service after the initial startup of this facility must be monitored in accordance with permit condition 11.19 before the provisions of this permit condition can be applied to that valve.

### G. OTHER PUMPS, VALVES, PRESSURE RELIEF DEVICES, AND CONNECTORS

#### 11.26 Monitoring pumps, valves, pressure relief devices, and other connectors

In accordance with ARSD 74:36:07:22.01, as referenced to 40 CFR § 60.482-8a, if evidence of a potential leak is found by visual, audible, olfactory, or any other detection method at pumps, valves, and connectors in heavy liquid service and pressure relief devices in light liquid or heavy liquid service, the owner or operator shall comply with one of the following procedures:

1. Monitor the equipment within five days by the method specified in permit condition 11.39. A leak is detected if a monitor reading of 10,000 parts per million or greater is measured. When a leak is detected, it shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in permit condition 11.27. A first attempt at repairing a leak shall be made no later than five calendar days after each leak is detected. First attempts at repair include, but are not limited to the following best practices where practicable:
  - a. Tightening of bonnet bolts;

- b. Replacement of bonnet bolts;
  - c. Tightening of packing gland nuts;
  - d. Ensuring the seal flush is operating at design pressure and temperature; and
  - e. Injection of lubricant into lubricated packing; or
3. Eliminate the visual, audible, olfactory, or other indications of potential leak within five calendar days of detection.

## H. DELAY OF REPAIR

### 11.27 Repair delay

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-9a, a delay of repair of equipment for which leaks have been detected will be allowed in the following circumstances:

1. Delay may occur if the repair within 15 days is technically infeasible without a process unit shutdown. Repair of this equipment shall occur before the end of the next process unit shutdown. Monitoring to verify repair must occur within 15 days after startup of the process unit;
2. Delay of repair of equipment will be allowed for equipment which is isolated from the process and which does not remain in volatile organic compound service;
3. Delay of repair for valves and connectors will be allowed if:
  - c. The owner or operator demonstrates that emissions of purged material resulting from immediate repair are greater than the fugitive emissions likely to result from delay of repair; and
  - d. When repair procedures are effected, the purged material is collected and destroyed or recovered using a control device complying with permit condition 11.28 through 11.33, inclusive;
4. Delay of repair for pumps will be allowed if:
  - c. Repair requires the use of a dual mechanical seal system that includes a barrier fluid system; and
  - d. Repair is completed as soon as practicable, but not later than six months after the leak was detected; and
6. Delay of repair beyond a process unit shutdown will be allowed for a valve, if valve assembly replacement is necessary during the process unit shutdown and valve assembly supplies had been sufficiently stocked and have been depleted. Delay of repair beyond the next process unit shutdown will not be allowed unless the next process unit shutdown occurs sooner than six months after the first process unit shutdown.

When delay of repair is allowed for a leaking pump, valve, or connector that remains in service, the pump, valve, or connector may be considered to be repaired and no longer subject to this chapter if two consecutive monthly monitoring instrument readings are below the leak definition.

## I. CLOSED VENT SYSTEMS AND CONTROL DEVICES

### 11.28 Standard for a closed vent system and control device

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-10a (a), (b), (c), (d), (e), (f), (g), and (m), the owner or operator of a closed vent system and control device used to comply with chapter 11.0 of this permit shall comply with the following:

1. Vapor recovery systems such as a condenser or adsorber shall be designed and operated to recover the volatile organic compound emissions vented to them with an efficiency of 95 percent or greater or to an exit concentration of 20 parts per million by volume, whichever is less stringent;
2. An enclosed combustion device shall be designed and operated to reduce volatile organic compound emissions vented to them with an efficiency of 95 percent or greater or to an exit concentration of 20 parts per million by volume, on a dry basis, corrected to 3 percent oxygen, whichever is less stringent or provide a minimum residence time of 0.75 seconds at a minimum temperature of 816 degrees Celsius (1,500 degrees Fahrenheit);
3. A flare shall comply with the requirements in 40 CFR § 60.18;
4. The control device shall be monitored to ensure the control device is operated and maintained in conformance with its design; and
5. Except as provided in permit condition 11.30, 11.31, and 11.32, each closed vent system shall be inspected according to the following procedures:
  - a. If the vapor collection system or closed vent system is constructed of hard piping, the owner or operator shall conduct an initial inspection according to permit condition 11.39 and conduct an annual visual inspections for visible, audible, or olfactory indications of leaks; and
  - b. If the vapor collection system or closed vent system is constructed of ductwork, the owner or operator shall conduct an initial and annual inspection according to permit condition 11.39.

Leaks as indicated by an instrument reading greater than 500 parts per million by volume above background or by visual inspections, shall be repaired as soon as practicable except as provided in permit condition 11.29. A first attempt at repair shall be made no later than five calendar days after the leak is detected. Repair shall be completed no later than 15 calendar days after the leak is detected.

A closed vent system and control device used to comply with this permit condition shall be operated at all times when emissions may be vented to them.

### 11.29 Delay in repairing leaks

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-10a(h), the owner or operator may delay the repair of a closed vent system for which leaks have been detected. The delay may occur if the repair is technically infeasible without a process unit shutdown or if the owner or operator determines that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. The leak shall be repaired by the end of the next process unit shutdown.

**11.30 Exemption for vapor collection system or closed vent system under vacuum**  
**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-10a(i), the owner or operator of a vapor collection system or closed vent system that is operated under a vacuum is exempt from subsection (5) of permit condition 11.28.**

**11.31 Exemption for unsafe to inspect closed vent system**  
**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-10a(j), the owner or operator is exempt from subsection (5) of permit condition 11.28 for any part of the closed vent system that is designated as unsafe to inspect, as described in permit condition 11.33, if the owner or operator complies with the following:**

- 1. The owner or operator determines the equipment is unsafe to inspect because inspection personnel would be exposed to an imminent or potential danger as a consequence of complying with subsection (5) of permit condition 11.28; and**
- 2. The owner or operator has a written plan that requires inspection of the equipment as frequently as practicable during safe-to-inspect times.**

**11.32 Exemption for difficult to inspect closed vent system**  
**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-10a(k), the owner or operator is exempt from inspecting any part of the closed vent system that is designated as difficult to inspect, as described in permit condition 11.33, if the owner or operator complies with the following:**

- 1. The owner or operator determines the equipment cannot be inspected without elevating the inspection personnel more than two meters above a support surface;**
- 2. The process unit within which the closed vent system is located becomes an affected facility through modification or reconstruction or the owner or operator designates less than 3.0 percent of the total number of closed vent system equipment as difficult to inspect; and**
- 3. The owner or operator has a written plan that requires inspection of the equipment at least once every five years.**

**11.33 Identification of unsafe and difficult to inspect equipment**  
**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-10a(l), the owner or operator shall record the following information to identify equipment unsafe or difficult to inspect:**

- 1. Identification of all parts of the closed vent system that are designated as unsafe to inspect, an explanation of why the equipment is unsafe to inspect, and the plan for inspecting the equipment;**
- 2. Identification of all parts of the closed vent system that are designated as difficult to inspect, an explanation of why the equipment is difficult to inspect, and the plan for inspecting the equipment;**
- 3. For each inspection during which a leak is detected, a record of the information**

- specified in permit condition 11.48;
4. For each inspection conducted in accordance with permit condition 11.39 during which no leaks are detected, a record that the inspection was performed, the date of the inspection, and a statement that no leaks were detected; and
  5. For each annual visual inspection required in subsection (5)(b) of permit condition 11.28 during which no leaks are detected, a record that the inspection was performed, the date of the inspection, and a statement that no leaks were detected.

## J. EQUIVALENT LIMITS AND EXEMPTIONS

### 11.34 Emission limit equivalence

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR §§ 60.482-1a(c) and 60.484a(a) and (d), the owner or operator may apply to the Administrator of EPA through the Secretary for determination of emission limit equivalence. Emission limit equivalence means the owner or operator shall achieve a reduction in emissions of volatile organic compounds at least equivalent to the reduction in emissions of volatile organic compounds achieved by the controls required in permit condition 11.2 through 11.9, 11.13 through 11.26 and 11.28 through 11.33, inclusive. An owner or operator may offer a unique approach to demonstrate the equivalence of any equivalent means of emission limit. If the Administrator of EPA approves the determination of emission limit equivalence, the owner or operator shall comply with the requirements of that determination.

### 11.35 Determination of equivalence to equipment design and operation requirements

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.484a(b), determination of equivalence to the equipment, design, and operational requirements will be evaluated by the following guidelines:

1. Each owner or operator applying for an equivalence determination shall be responsible for collecting and verifying test data to demonstrate equivalence of means of emission limitation;
2. The Administrator of EPA will compare test data for the means of emission limitation to test data for the equipment, design, and operational requirements; and
3. The Administrator of EPA may condition the approval of equivalence on requirements that may be necessary to assure operation and maintenance to achieve the same emission reduction as the equipment, design, and operational requirements.

### 11.36 Determination of equivalence to work practices

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.484a(c), determination of equivalence to the required work practices will be evaluated by the following guidelines:

1. Each owner or operator applying for an equivalence determination shall be responsible for collecting and verifying test data to demonstrate equivalence of means of emission limitation;
2. The emission reduction achieved by the required work practice shall be demonstrated;

3. The emission reduction achieved by the equivalent means of emission limitation shall be demonstrated;
4. The owner or operator shall commit in writing to work practices that provide for emission reductions equal to or greater than the emission reductions achieved by the required work practice;
5. The Administrator of EPA will compare the demonstrated emission reduction for the equivalent means of emission limitation to the demonstrated emission reduction for the required work practices and will consider the commitment by the owner or operator; and
6. The Administrator of EPA may condition the approval of equivalence on requirement that may be necessary to assure operation and maintenance to achieve the same emission reduction as the required work practice.

#### 11.37 In vacuum service equipment exemption

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR §§ 60.482-1a(d), equipment in vacuum service is exempt from the requirements of permit condition 11.28 through 11.33, inclusive, if the equipment is identified in accordance with subsection (5) of permit condition 11.50. "In vacuum service" means equipment is operating at an internal pressure which is at least five kilo Pascal below ambient pressure.

#### 11.38 Temporarily in VOC service exemption

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-1a(e), equipment an owner or operator designates as being in volatile organic compound service less than 300 hours per year is excluded from the requirements of permit condition 11.2 through 11.33, inclusive, if it is identified as required in permit condition 11.50(6) and it meets any of the following specifications:

1. The equipment is in volatile organic compound service only during startup and shutdown, excluding startup and shutdown between batches of the same campaign for a batch process;
2. The equipment is in volatile organic compound service only during process malfunctions or other emergencies; or
3. The equipment is backup equipment that is in volatile organic compound service only when the primary equipment is out of service.

### K. TEST METHODS FOR 40 CFR PART 60, SUBPART VVa

#### 11.39 Determining presence of leaking equipment

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.485a(b), the owner or operator shall demonstrate compliance with permit condition 11.2 through 11.33, inclusive, by using 40 CFR Part 60, Appendix A, Method 21. Method 21 shall be used to determine the presence of leaking equipment. The instrument shall be calibrated by the procedures specified in Method 21 prior to each day's use. The following calibration gases shall be used:

1. Zero air (less than 10 parts per million of hydrocarbon in air); and
2. A mixture of methane or n-hexane and air at a concentration no more than 2,000 parts per million greater than the leak definition concentration of the equipment monitored. If the monitoring instrument's design allows for multiple calibration scales, then the lower scale shall be calibrated with a calibration gas that is no higher than 2,000 parts per million above the concentration specified as a leak, and the highest scale shall be calibrated with a calibration gas that is approximately equal to 10,000 parts per million. If only one scale on an instrument will be used during monitoring, the owner or operator need not calibrate the scales that will not be used during that day's monitoring.

A calibration drift assessment shall be performed, at a minimum, at the end of each monitoring day. Check the instrument using the same calibration gas or gases used to calibrate the instrument before use. Follow the procedures specified in 40 CFR Part 60, Appendix A, Method 21, except do not adjust the meter readout to correspond to the calibration gas value. Record the instrument reading for each scale used as specified in permit condition 11.50(7). Calculate the average algebraic difference between the three meter readings and the most recent calibration value. Divide this algebraic difference by the initial calibration value and multiply by 100 to express the calibration drift as a percentage. If any calibration drift assessment shows a negative drift of more than 10 percent from the initial calibration value, then all equipment monitored since the last calibration with instrument readings below the appropriate leak definition and above the leak definition multiplied by (100 minus the percent of negative drift/divided by 100) must be re-monitored. If any calibration drift assessment shows a positive drift of more than 10 percent from the initial calibration value, then, at the owner's or operator's discretion, all equipment since the last calibration with instrument readings above the appropriate leak definition and below the leak definition multiplied by (100 plus the percent of positive drift/divided by 100) may be re-monitored.

#### 11.40 Compliance with no detectable emission standards

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.485a(c), the owner or operator shall demonstrate compliance with the no detectable emission standard in permit condition 11.3, 11.9, 11.10, 11.20, and 11.28 using 40 CFR Part 60, Appendix A, Method 21. Method 21 shall be used to determine the background level and the presence of leaking equipment. The instrument shall be calibrated by the procedures specified in permit condition 11.39. All potential leak interfaces shall be traversed as close to the interface as possible. The arithmetic difference between the maximum concentration indicated by the instrument and the background level is compared with 500 parts per million for determining compliance.

#### 11.41 Demonstrating a process unit is not in volatile organic compound service

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.485a(d), the owner or operator shall test each piece of equipment unless it is demonstrated that a process unit is not in volatile organic compound service. "Not in volatile organic compound service" would occur if the volatile organic compound content would never be reasonably expected to exceed 10 percent by weight. The following methods shall be followed to demonstrate a process unit

is not in volatile organic compound service:

1. Procedures that conform to the general methods in ASTM E260-73, 91, or 96, E168-67, 77, or 92, E169-63, 77 or 93 shall be used to determine the percent volatile organic compound content in the process fluid that is contained in or contacts a piece of equipment;
2. Organic compounds that are considered to have negligible photochemical reactivity may be excluded from the total quantity of organic compounds in determining the volatile organic compound content of the process fluid; or
3. Engineering judgment may be used to estimate the volatile organic compound content, if a piece of equipment had not been shown previously to be in service. If the Secretary disagrees with the judgment, subsections (1) and (2) of this permit condition shall be used to resolve the disagreement.

#### 11.42 Demonstrating equipment is light liquid service

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.485a(e), the owner or operator shall demonstrate equipment is in light liquid service by showing that all of the following conditions apply:

1. The vapor pressure of one or more of the components is greater than 0.3 kilo Pascal at 20 degrees Celsius (1.2 inches of water at 68 degrees Fahrenheit). Standard reference texts or ASTM D-2879-83, 96, or 97 shall be used to determine the vapor pressures;
2. The total concentration of the pure organic components having a vapor pressure greater than 0.3 kilo Pascal at 20 degrees Celsius (1.2 inches of water at 68 degrees Fahrenheit) is equal to or greater than 20 percent by weight; and
3. The fluid is a liquid at operating conditions.

#### 11.43 Testing representative samples

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.485a(f), the samples used in conjunction with permit condition 11.41, 11.42, and 11.44 shall be representative of the process fluid that is contained in or contacts the equipment or the gas being combusted in a flare.

#### 11.44 Determining compliance with standards for flares

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.485a(g), the owner or operator shall determine compliance with the standards of flares as follows:

1. 40 CFR Part 60, Appendix A, Method 22 shall be used to determine visible emissions;
2. A thermocouple or any other equivalent device shall be used to monitor the presence of a pilot flame in the flare;
3. The maximum permitted velocity for air assisted flares shall be computed using Equation 11-1;
4. The net heat value ( $H_T$ ) of the gas being combusted in a flare shall be computed using Equation 11-2;
5. 40 CFR Part 60, Appendix A, Method 18 or ASTM D6420-99 (2004) (where the target compound(s) are those listed in Section 1.1 of ASTM D6420-99, and the target

concentration is between 150 parts per billion by volume and 100 parts per million by volume) and ASTM D2504–67, 77 or 88 (Reapproved 1993) shall be used to determine the concentration of sample component “i”;

6. ASTM D2382–76 or 88 or D4809 shall be used to determine the net heat of combustion of component “i” if published values are not available or cannot be calculated; and
7. 40 CFR Part 60, Appendix A, Method 2, 2A, 2C, or 2D, as appropriate, shall be used to determine the actual exit velocity of a flare. If needed, the unobstructed (free) cross-section area of the flare tip shall be used

Equation 11-1 – Maximum permitted velocity for air assisted flares

$$V_{max} = K_1 + K_2 H_T$$

Where:

- $V_{max}$  = Maximum permitted velocity, meters per second (feet per second);
- $H_T$  = Net heating value of the gas being combusted, mega Joules per standard cubic meter (Btus per standard cubic foot);
- $K_1$  = 8.706 meters per second (28.56 feet per second); and
- $K_2$  = 0.7084 m<sup>4</sup>/mega Joules-seconds (0.087 ft<sup>4</sup> per Btus-second).

Equation 11-2 – Net heating value of gas combusted in flare

$$H_T = K \sum_{i=1}^n C_i H_i$$

Where:

- $H_T$  = Net heating value of the gas being combusted, mega Joules per standard cubic meter (Btus per standard cubic foot);
- $K$  = Conversion constant, 1.740 x 10<sup>-7</sup> (gram-mole)(mega Joules)/parts per million-standard cubic meter-kcal) (4.674 x 10<sup>-6</sup> (gram-mole)(Btu)/parts per million-standard cubic feet-kcal)); and
- $C_i$  = Concentration of sample component “i”, parts per million; and
- $H_i$  = Net heat of combustion of sample component “i” at 25 degrees Celsius and 760 millimeters Mercury (77 degrees Fahrenheit and 14.7 pounds per square inch), kcal/gram-mole.

11.45 Demonstrating compliance with alternative standards for valves

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.485a(h), the owner or operator shall determine compliance with permit condition 11.23 and 11.25 as follows:

1. The percent of valves leaking shall be determined using Equation 11-3;
2. The total number of valves monitored shall include difficult-to-monitor and unsafe-to-monitor valves only during the monitoring period in which those valves are monitored;
3. The number of valves leaking shall include valves for which repair has been delayed;
4. Any new valve that is not monitored within 30 days of being placed in service shall be included in the number of valves leaking and the total number of valves monitored for the monitoring period in which the valve is placed in service;

5. If the process unit has been subdivided in accordance with permit condition 11.19 related to alternative valve monitoring on a quarterly basis, the sum of valves found leaking during a monitoring period includes all subgroups; and
6. The total number of valves monitored does not include a valve monitored to verify repair.

Equation 11-3 – Percent of valves leaking

$$\%V_L = (V_L \div V_T) \times 100$$

Where:

- %V<sub>L</sub> = Percent leaking valves;
- V<sub>L</sub> = Number of valves found leaking; and
- V<sub>T</sub> = The sum of the total number of valves monitored.

L. RECORDKEEPING FOR 40 CFR PART 60, SUBPART VVa

11.46 Monitoring event

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(a)(3), the owner or operator shall record the following information for each monitoring event required in permit condition 11.2 through 11.9 and 11.19 through 11.26, inclusive:

1. Monitoring instrument identification;
2. Operator identification;
3. Equipment identification;
4. Date of monitoring; and
5. Instrument reading.

11.47 Labeling leaky equipment

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(b), if a leak is detected as specified in permit condition 11.2 through 11.9 and 11.19 through 11.26, inclusive, the owner or operator shall attach a weatherproof and readily visible identification tag on the leaking equipment. The identification tag shall be marked with the equipment identification number. The identification tag for a valve may be removed after the valve has been monitored for two successive months, as specified in permit condition 11.19, and no leak has been detected during those two months. The identification on a connector may be removed after is as been monitored within 90 days after a repair is completed to confirm the connector is no longer leaking. The identification tag for equipment other than valves may be removed after the equipment has been repaired.

11.48 Maintaining a log of equipment leaks

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(c), if a leak is detected as specified in permit condition 11.2 through 11.9 and 11.19 through 11.26, inclusive, the owner or operator shall record the following information in a log and shall be kept for two years in a readily accessible location:

1. The instrument and operator identification numbers and the equipment identification

number, except when indications of liquids dripping from a pump are designated as a leak;

2. The date the leak was detected and the dates of each attempt to repair the leak;
3. The repair methods applied in each attempt to repair the leak;
4. Maximum instrument reading measured by 40 CFR Part 60, Appendix A, Method 21 at the time the leak is successfully repaired or determined to be non-repairable, except when a pump is repaired by eliminating indications of liquids dripping;
5. Record "Repair delayed" and the reason for the delay if the leak is not repaired within 15 calendar days after discovery of the leak;
6. The signature of the person whose decision it was that repair could not be completed without a process shutdown;
7. The expected date of successful repair of the leak if the leak is not repaired within 15 calendar days;
8. The dates of process unit shutdown that occur while the equipment is unrepaired; and
9. The date of successful repair of the leak.

#### 11.49 Records for closed vents and control devices

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(d), the owner or operator shall maintain the following information pertaining to the design requirements for closed vent systems and control devices described in permit condition 11.28 through 11.33, inclusive. The records shall be kept in a readily accessible location:

1. Detailed schematics, design specifications, and piping and instrumentation diagrams;
2. The dates and descriptions of any change in the design specifications;
3. A description of the parameter or parameters monitored, as required in permit condition 11.28 to ensure that control devices are operated and maintained in conformance with their design and an explanation of why that parameter or parameters was selected for the monitoring;
4. Periods when the closed vent systems and control devices required in permit condition 11.2 through 11.14, inclusive, are not operated as designed, including periods when a flare pilot light does not have a flame; and
5. Dates of startups and shutdowns of the closed vent systems and control devices required in permit condition 11.2 through 11.14, inclusive.

#### 11.50 Equipment log

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(e), the owner or operator shall record the following information for equipment subject to the requirements in permit condition 11.2 through 11.33 and 11.58 through 11.62, inclusive. The records shall be kept in a readily accessible location:

1. A list of identification numbers for equipment subject to the requirements in permit condition 11.2 through 11.33, inclusive;
2. A list of identification numbers for equipment that are designated for no detectable emissions under the provisions of permit condition 11.3, 11.9, and 11.20. The designation of equipment for no detectable emissions shall be signed by the responsible official;

3. A list of equipment identification numbers for pressure relief devices required to comply with permit condition 11.10 through 11.12, inclusive;
4. The date of each compliance test as required in permit condition 11.3, 11.9, and 11.20. The background level measured during each compliance test and the maximum instrument reading measured at the equipment during the compliance test shall also be recorded;
5. A list of identification numbers for equipment in vacuum service;
6. A list of identification numbers for equipment the owner or operator designates as operating in volatile organic compound service less than 300 hours per year in accordance with permit condition 11.38, a description of the conditions under which the equipment is in volatile organic compound service, and rationale supporting the designation that it is in volatile organic compound service less than 300 hours per year;
7. The date and results of the weekly visual inspection for indications of liquids dripping from pumps in light liquid service;
8. Records of the following information for monitoring instrument calibrations conducted according to permit condition 11.39:
  - a. Date of calibration and initials of operator performing calibrations;
  - b. Calibration gas cylinder identification, certification date, and certified concentration;
  - c. Instrument scale or scales used;
  - d. A description of any corrective action taken if the meter readout could not be adjusted to correspond to the calibration gas value in accordance with 40 CFR Part 60, Appendix A, Method 21;
  - e. Results of each calibration drift assessment required by permit condition 11.39 (e.g., instrument reading for calibration at end of monitoring day and the calculated percent difference from the initial calibration value);
  - f. If an owner or operator makes their own calibration gas, a description of the procedures used; and
9. Records of each release from a pressure relief device subject to permit condition 11.7 through 11.9, inclusive; and
10. The connector monitoring schedule as noted in permit condition 11.59.

#### 11.51 Exempt valve and pump log

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(f), the owner or operator shall maintain a log readily accessible of the following information pertaining to all valves subject to the requirements in permit condition 11.21 and 11.22, all connectors subject to requirements of permit condition 11.61 and all pumps subject to the requirements of permit condition 11.6:

1. A list of identification numbers for valves and pumps that are designated as unsafe-to-monitor, an explanation for each valve or pump stating why the valve or pump is unsafe-to-monitor, and the plan for monitoring each valve or pump; and
2. A list of identification numbers for valves that are designated as difficult-to-monitor, an explanation for each valve stating why the valve is difficult-to-monitor, and the

plan for monitoring each valve.

**11.52 Valve log - alternative standards**

**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(g), the owner or operator shall maintain the following information for valves complying with permit condition 11.25:**

1. **A schedule of monitoring; and**
2. **The percent of valves found leaking during each monitoring period.**

**11.53 Design criterion for determining leaks**

**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(h), the owner or operator shall maintain the following information in a log that is kept in a readily accessible location:**

1. **Design criterion required in permit condition 11.2(5) and 11.7(5) and explanation of the design criterion; and**
2. **Any changes to this criterion and the reasons for the changes.**

**11.54 Log for equipment in VOC service**

**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.486a(j), the owner or operator shall maintain the information and data used to demonstrate that a piece of equipment is not in volatile organic compound service in a log that is kept in a readily accessible location.**

**M. REPORTING FOR PUMPS, VALVES, AND COMPRESSORS**

**11.55 Initial report for pumps, valves, and compressors**

**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.487a(a) and (b), the owner or operator shall submit an initial report to the Secretary within 180 days of the initial startup date of the affected facility. The initial report shall include a summary of the following information:**

1. **Name of facility, permit number, reference to this permit condition, and identifying the submittal as the initial report;**
2. **The number of valves subject to the requirements of permit condition 11.19 through 11.25, inclusive, excluding those valves designated for no detectable emissions under permit condition 11.20;**
3. **The number of pumps subject to the requirements of permit condition 11.2 through 11.6, inclusive, excluding those pumps designated for no detectable emissions under permit condition 11.4 and those pumps complying with permit condition 11.5;**
4. **The number of connectors subject to the requirements of permit conditions 11.58 and 11.59; and**
5. **The number of compressors subject to the requirements of permit condition 11.7 through 11.9, inclusive, excluding those compressors designated for no detectable**

emissions under permit condition 11.9 and those compressors complying with permit condition 11.8.

**11.56 Semiannual report for pumps, valves, and compressors**

**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.487a(a) and (c), the owner or operator shall submit a semiannual report to the Secretary. The semiannual reports shall include a summary of the following information:**

- 1. Name of facility, permit number, reference to this permit condition, identifying the submittal as a semiannual report, and calendar dates covered in the reporting period;**
- 2. The number of valves for which leaks were detected as described in permit condition 11.19 or 11.25 and the number of valves for which leaks were not repaired as required in permit condition 11.19;**
- 3. The number of pumps for which leaks were detected as described in permit condition 11.2 and 11.3 and the number of pumps for which leaks were not repaired as required in permit condition 11.2 and 11.3;**
- 4. The number of compressors for which leaks were detected as described in permit condition 11.7 and the number of compressors for which leaks were not repaired as required in permit condition 11.7;**
- 5. The number of connectors for which leaks were detected as described in permit condition 11.59 and the number of connectors for which leaks were not repaired as required in permit condition 11.59;**
- 6. The facts which explain each delay of repair and where appropriate, why the fermenter shutdown was technically infeasible;**
- 7. Dates the process unit(s) was shut down during the semiannual reporting period; and**
- 8. Any changes which have occurred since the initial report or subsequent revisions to the initial report;**

**The semiannual reports must be postmarked no later than 30 days after the end of the reporting period (e.g., July 30<sup>th</sup> and January 30<sup>th</sup>).**

**11.57 Notification of alternative standards for valves**

**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.487a(d), the owner or operator shall notify the Secretary 90 days in advance of electing to implement permit condition 11.23 and/or 11.25.**

**N. CONNECTORS IN GAS/VAPOR SERVICE AND IN LIGHT LIQUID SERVICE**

**11.58 Initial monitoring for connectors**

**In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-11a(a), (b), and (d) each connector shall be monitored within 12 months after initial startup date to detect leaks by the methods specified in permit conditions 11.39 and 11.40. A leak is detected if an instrument reading of 500 parts per million or greater is measured.**

**A first attempt at repairing a leak shall be made no later than five calendar days after the**

leak is detected. The leak shall be repaired as soon as practicable, but not later than 15 calendar days after the leak is detected, except as provided in permit condition 11.27. The leaking connector shall be re-monitored within 90 days after a repair is completed to confirm the connector is no longer leaking.

The owner or operator shall comply with this permit condition, except as provided in permit condition 11.28, 11.34, 11.61, or 11.62.

#### 11.59 Subsequent monitoring for connectors

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-11a(b) and (d) each connector shall be monitored periodically according the following schedule:

1. If the percent of leaking connectors monitored during the current monitoring periods was greater than or equal to 0.5 percent, the owner or operator shall monitor each connector within one year from the end of the current monitoring period;
2. If the percent of leaking connectors monitored during the current monitoring period was greater than or equal to 0.25 percent but less than 0.5 percent, the owner or operator shall monitor each connector within four years from the end of the current monitoring period. An owner or operator may comply with this requirement by monitoring 40 percent of the connectors within two years from the end of the current monitoring period provided all connectors have been monitored within the four year period; or
3. If the percent of leaking connectors monitored during the current monitoring period was less than 0.25 percent, then monitor at least 50 percent of the connectors within four years from the end of the current monitoring period and follow one of the following schedules:
  - a. If the percent of leaking connectors monitored during the current monitoring period was greater than or equal to 0.35 percent, then monitor the connectors that have not been monitored during this current monitoring period within the next six months; or
  - b. If the percent of leaking connectors monitored during the current monitoring period was less than 0.35 percent, then monitor the connectors that have not been monitored within the next four years (i.e. within eight years from the beginning of the current monitoring period).

At the end of the current monitoring period, the percent of leaking connectors shall be determined by permit condition 11.60. The percent leaking connectors determine the timeline for the subsequent monitoring period. A leak is detected if an instrument reading of 500 parts per million or greater is measured.

A first attempt at repairing a leak shall be made no later than five calendar days after the leak is detected. The leak shall be repaired as soon as practicable, but not later than 15 calendar days after the leak is detected, except as provided in permit condition 11.27. The leaking connector shall be re-monitored within 90 days after a repair is completed to confirm the connector is no longer leaking.

The owner or operator shall comply with this permit condition, except as provided in permit

condition 11.28, 11.34, 11.61, or 11.62.

#### 11.60 Percent Leaking Connectors

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-11a(c), the owner or operator shall determine the percent leaking connectors for the current monitoring period by the equation 11-4.

Equation 11-4 – Percent of connectors leaking

$$\%C_L = (C_L \div C_T) \times 100$$

Where:

- %C<sub>L</sub> = Percent leaking connectors;
- C<sub>L</sub> = Number of connectors found leaking; and
- C<sub>T</sub> = The sum of the total number of valves monitored during the monitoring period.

#### 11.61 Exemption for unsafe-to-monitor connectors

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-11a(e), any connector that is designated by permit condition 11.51 as an unsafe-to-monitor valve is exempt from permit condition 11.58 and/or 11.59 if:

1. The owner or operator of the connector demonstrates the connector is unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying with permit condition 11.58 and/or 11.59; and
2. The owner or operator of the connector adheres to a written plan that requires monitoring of the connector as frequently as practicable during safe-to-monitor times.

#### 11.62 Exemption for inaccessible, ceramic, or ceramic-lined connectors

In accordance with ARSD 74:36:07:22:01, as referenced to 40 CFR § 60.482-11a(f), any connector that is inaccessible or that is ceramic or ceramic-lined (e.g. porcelain, glass, or glass-line) is exempt from permit condition 11.58 and/or 11.59. An inaccessible connector is on that meets one of the following conditions:

1. Buried;
2. Insulated in a matter that prevents access to the connector by a monitor probe;
3. Obstructed by equipment or piping that prevents access to the connector by a monitor probe;
4. Unable to be reached from a wheeled scissor-lift or hydraulic-type scaffold that would allow access to connectors up to 7.6 meters (25 feet) above the ground;
5. Inaccessible because it would require elevating the monitoring personnel more than 2 meters (7 feet) above a permanent support surface or would require the erection of scaffold; or
6. Not able to be accessed at any time in a safe manner to perform monitoring. Unsafe access includes, but is not limited to, the use of a wheeled scissor-lift on unstable or uneven terrain, the use of a motorized man-lift basket in areas where an ignition potential exists, or access would require near proximity to hazards such as electrical lines, or would risk damage to equipment.

**If an inaccessible, ceramic, or ceramic-lined connector is observed by visual, audible, olfactory, or other means to be leaking, the visual, audible, olfactory, or other indications of a leak to the atmosphere shall be eliminated as soon as practical.**

## **16.0—Flare Operational Requirements**

### **16.1—Flare operational limits**

In accordance with ARSD 74:36:07:01, as reference to 40 CFR §§ 60.18(c) and 60.18(e), the owner or operator shall maintain and operate the flares associated with Unit #9a in accordance with the following:

1. Operate with no visible emissions as determine by permit condition 16.2, except for periods not to exceed 5 minutes during any 2 consecutive hours;
2. Operate with a flame present at all times as determined by permit condition 16.3 when air emissions may be vented to the flare;
3. For a non-assisted flare, the flare shall have a diameter of 3 inches or greater, have a hydrogen content of 8.0 percent (by volume) or greater, and are designed with an actual exit velocity less than 37.2 meters per second (122 feet per second) and less than the maximum permitted velocity as determined by Equation 16-1. The actual exit velocity is determined by permit condition 16.5;

#### ***Equation 16-1—Calculating maximum permitted velocity for a non-assisted flare***

$$V_{max} = (X_{H_2} - K_1) \times K_2$$

Where:

- $V_{max}$  = Maximum permitted velocity, in meters per second;
  - $K_1$  = Constant, 6.0 volume percent hydrogen;
  - $K_2$  = Constant, 3.9 (meters per second)/volume percent hydrogen; and
  - $X_{H_2}$  = The volume percent of hydrogen, on a wet basis, as calculated by using the American Society for Testing and Materials (ASTM) Method D1946-77.
4. For a non-assisted flare, the net heating value of the gas being combusted shall be 7.45 mega joules per standard cubic meter (200 Btus per standard cubic foot) or greater. The net heating value shall be determined by permit condition 17.4;
  5. For a steam-assisted or air-assisted flare, the net heating value of the gas being combusted shall be 11.2 mega joules per standard cubic meter (300 Btus per standard cubic foot) or greater;
  6. For a non-assisted or steam-assisted flare, operate with an actual exit velocity of less than 18.3 meters per second (60 feet per second) with the following two exceptions:
    - a. Flares designed for and operated with an actual exit velocity equal to or greater than 18.3 meters per second (60 feet per second) but less than 122 meters per second (400 feet per second) are allowed if the net heating value of the gas being combusted is greater than 37.3 mega joules per standard cubic meter (1,000 Btus per standard cubic foot); or
    - b. Flares designed for and operated with an actual exit velocity less than the

maximum permitted velocity, as determined by Equation 17-2, and less than 122 meters per second are allowed.

**Equation 16-2—Calculating maximum permitted velocity for exception**

$$\text{Log}_{10}(V_{\text{max}}) = (H_T + 28.8) \div 31.7$$

Where:

- $V_{\text{max}}$  = Maximum permitted velocity, meters per second;
- 28.8 = Constant;
- 31.7 = Constant; and
- $H_T$  = Net heating value of gas.

7. For an air-assisted flare, operate with an actual exit velocity less than the maximum permitted velocity as determined by permit condition 16.6.

**16.2—Monitoring visible emissions from a flare**

In accordance with ARSD 74:36:07:01, as reference to 40 CFR § 60.18(f)(1), the owner or operator shall monitor the visible emissions from a flare in accordance with 40 CFR Part 60, Appendix A, Method 22. The observation period shall be 2 hours.

**16.3—Monitoring presence of a pilot flame**

In accordance with ARSD 74:36:07:01, as reference to 40 CFR § 60.18(f)(2), the owner or operator shall monitor the presence of a pilot flame using a thermocouple or any other equivalent device to detect the presence of a flame.

**16.4—Calculating net heating value of gas**

In accordance with ARSD 74:36:07:01, as reference to 40 CFR § 60.18(f)(3), the owner or operator shall calculate the net heating value of the gas being combusted in a flare using Equation 16-3.

**Equation 16-3—Calculating net heating value of gas**

$$H_T = K \sum_{i=1}^n C_i H_i$$

Where:

- $H_T$  = Net heating value of the sample, in mega joules per standard cubic meter, where the net enthalpy per mole of off gas is based on combustion at 25 degrees Celsius and 760 millimeters of mercury, but the standard temperature for determining the volume corresponding to one mole is 20 degrees Celsius;
- $K$  = Constant,  $1.74 \times 10^{-7}$  gram mole mega joules per part per million standard cubic meters kilocalorie, where the standard temperature for gram mole per standard cubic meter is 20 degrees Celsius;
- $C_i$  = Concentration of sample component “i” in parts per million on a wet basis, as measured for organics by 40 CFR Part 60, Appendix A, Reference Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946-77 or 90 (Reapproved

1994); and

- $H_i$  = Net heat of combustion of sample component “i” in kilocalories per gram mole at 25 degrees Celsius and 760 millimeters of mercury. The heat of combustion may be determined using ASTM D2382-76 or 88 or D4809-95 if published values are not available or cannot be calculated.

### **16.5—Calculating actual exit velocity of a flare**

In accordance with ARSD 74:36:07:01, as reference to 40 CFR § 60.18(f)(4), the owner or operator shall calculate the actual exit velocity by dividing the volumetric flow rate (in units of standard temperature and pressure), as determined by 40 CFR Part 60, Appendix A, Reference Methods 2, 2A, 2C or 2D, as appropriate, by the unobstructed (free) cross sectional area of the flare tip.

### **16.6—Calculating maximum permitted velocity for an air-assisted flare**

In accordance with ARSD 74:36:07:01, as reference to 40 CFR § 60.18(f)(6), the owner or operator shall calculate the maximum permitted velocity for an air-assisted flare using Equation 16-4.

#### ***Equation 16-4—Calculating maximum permit velocity for an air-assisted flare***

$$V_{\max} = 8.706 + (0.7084 \times H_T)$$

Where:

- $V_{\max}$  = Maximum permitted velocity, meters per second;
- 8.706 = Constant;
- 0.7084 = Constant; and
- $H_T$  = Net heating value of gas.