

## STATEMENT OF BASIS

For the issuance of Draft Air Permit # 1185-AOP-R8 AFIN: 24-00071

1. PERMITTING AUTHORITY:

Arkansas Department of Environmental Quality  
5301 Northshore Drive  
North Little Rock, Arkansas 72118-5317

2. APPLICANT:

Black Hills Energy Arkansas, Inc. - Drake Compressor Station  
2204 Westview Road  
Ozark, Arkansas 72949

3. PERMIT WRITER:

Derrick Brown

4. NAICS DESCRIPTION AND CODE:

NAICS Description: Pipeline Transportation of Natural Gas  
NAICS Code: 486210

5. ALL SUBMITTALS:

Date of Application	Type of Application (New, Renewal, Modification, Deminimis/Minor Mod, or Administrative Amendment)	Short Description of Any Changes That Would Be Considered New or Modified Emissions
7/3/2018	Minor Modification	Replacement of two non-emergency spark ignition engines.

6. REVIEWER'S NOTES:

Black Hills Energy Arkansas, Inc. - Drake Compressor Station owns and operates a natural gas compressor station located near Ozark, Arkansas. This permitting action replaces two (SN-13 and SN-14) natural gas fired turbines. The replacement engines SN-93 (515 Hp) and SN-94 (1,480 Hp) will operate in the same manner (compression and dehydration of sweet natural gas). Also, this modification lowers the formaldehyde emissions limits for five existing natural gas-fired reciprocating engines (SN-15, SN-19, SN-87, SN-88, and SN-89). The emissions are being lowered to reflect emissions information obtained from the oxidation catalyst manufacturer. This modification decreases permitted emissions by 6.5 tpy of NO<sub>x</sub>, 32.7 tpy of CO, 12.1 tpy of VOC, 0.2

tpy of SO<sub>2</sub>, and 3.44 tpy of formaldehyde. PM/PM<sub>10</sub> emissions were increased by 0.4 tpy.

7. COMPLIANCE STATUS:

The following summarizes the current compliance of the facility including active/pending enforcement actions and recent compliance activities and issues.

This facility was last inspected on May 10, 2016 and was found to be in compliance.

8. PSD APPLICABILITY:

a) Did the facility undergo PSD review in this permit (i.e., BACT, Modeling, etc.)? N  
If yes, were GHG emission increases significant? N/A

b) Is the facility categorized as a major source for PSD? Y

- *Single pollutant  $\geq 100$  tpy and on the list of 28 or single pollutant  $\geq 250$  tpy and not on list*

If yes for 8(b), explain why this permit modification is not PSD.

No increase above thresholds for PSD review.

9. SOURCE AND POLLUTANT SPECIFIC REGULATORY APPLICABILITY:

Source	Pollutant	Regulation (NSPS, NESHAP or PSD)
SN-91 and SN-92	Benzene	NESHAP HH
SN-15, SN-18, SN-19, SN-87, SN-88, SN-89, SN-90, SN93, and SN-94	HAP	NESHAP ZZZZ

10. PERMIT SHIELD – TITLE V PERMITS ONLY:

Did the facility request a permit shield in this application? N

(Note - permit shields are not allowed to be added, but existing ones can remain, for minor modification applications or any Regulation 18 requirement.)

11. EMISSION CHANGES AND FEE CALCULATION:

See emission change and fee calculation spreadsheet in Appendix A.

12. AMBIENT AIR EVALUATIONS:

a) NAAQS

A NAAQS evaluation is not required under the Arkansas State Implementation Plan, National Ambient Air Quality Standards, Infrastructure SIPs and NAAQS SIP per Ark. Code Ann. § 8-4-318, dated March 2017 and the ADEQ Air Permit Screening Modeling Instructions.

b) Non-Criteria Pollutants:

The non-criteria pollutants listed below were evaluated in a previous permit. Based on Department procedures for review of non-criteria pollutants, emissions of all other non-criteria pollutants are below thresholds of concern.

1<sup>st</sup> Tier Screening (PAER)

Estimated hourly emissions from the following sources were compared to the Presumptively Acceptable Emission Rate (PAER) for each compound. The Department has deemed the PAER to be the product, in lb/hr, of 0.11 and the Threshold Limit Value ( $\text{mg}/\text{m}^3$ ), as listed by the American Conference of Governmental Industrial Hygienists (ACGIH).

Pollutant	TLV ( $\text{mg}/\text{m}^3$ )	PAER (lb/hr) = $0.11 \times \text{TLV}$	Proposed lb/hr	Pass?
Acetaldehyde	45.04	4.9544	0.49	Y
Acrolein	0.229	0.02519	0.33	N
1,3-Butadiene	4.424	0.48664	0.13	Y
Formaldehyde	1.5	0.165	2.50	N
POM	0.2	0.022	0.019	Y

The above information was obtained from the statement of basis for 1185-AOP-R6.

2<sup>nd</sup> Tier Screening (PAIL)

AERMOD air dispersion modeling was performed on the estimated hourly emissions from the following sources, in order to predict ambient concentrations beyond the property boundary. The Presumptively Acceptable Impact Level (PAIL) for each compound has been deemed by the Department to be one one-hundredth of the Threshold Limit Value as listed by the ACGIH.

Pollutant	PAIL ( $\mu\text{g}/\text{m}^3$ ) = $1/100$ of Threshold Limit Value	Modeled Concentration ( $\mu\text{g}/\text{m}^3$ )	Pass?
Acrolein	2.29	1.81	Y
Formaldehyde	15	10.5	Y

The above information was obtained from the statement of basis for 1185-AOP-R6.

c) H<sub>2</sub>S Modeling: N/A

A.C.A. §8-3-103 requires hydrogen sulfide emissions to meet specific ambient standards. Many sources are exempt from this regulation, refer to the Arkansas Code for details.

Is the facility exempt from the H<sub>2</sub>S Standards

N/A

If exempt, explain: \_\_\_\_\_

Pollutant	Threshold value	Modeled Concentration (ppb)	Pass?
H <sub>2</sub> S	20 parts per million (5-minute average*)	N/A	N/A
	80 parts per billion (8-hour average) residential area	N/A	N/A
	100 parts per billion (8-hour average) nonresidential area	N/A	N/A

\*To determine the 5-minute average use the following equation

$$C_p = C_m (t_m/t_p)^{0.2} \text{ where}$$

$C_p$  = 5-minute average concentration

$C_m$  = 1-hour average concentration

$t_m$  = 60 minutes

$t_p$  = 5 minutes

## 13. CALCULATIONS:

SN	Emission Factor Source (AP-42, testing, etc.)	Emission Factor (lb/ton, lb/hr, etc.)	Control Equipment	Control Equipment Efficiency	Comments
09 through 12	AP-42	PM/PM <sub>10</sub> : 6.6E-3 lb/MMBtu SO <sub>2</sub> : 3.4E-3 lb/MMBtu Acetaldehyde: 4.0E-5 lb/MMBtu Acrolein: 6.4E-6 lb/MMBtu 1,3-butadiene: 4.3E-7 lb/MMBtu Formaldehyde: 7.1E-4 lb/MMBtu POM: 3.5E-6 lb/MMBtu	None	N/A	
	Manufacturer's Specifications with safety	VOC: 1.1 g/hp-hr CO: 2.23 g/hp-hr NO <sub>x</sub> : 1.49 g/hp-hr			

SN	Emission Factor Source (AP-42, testing, etc.)	Emission Factor (lb/ton, lb/hr, etc.)	Control Equipment	Control Equipment Efficiency	Comments
	factors				
15 and 87	AP-42	PM/PM <sub>10</sub> : 9.9871E-3 lb/MMBtu SO <sub>2</sub> : 5.88E-4 lb/MMBtu Acetaldehyde: 8.36E-3 lb/MMBtu Acrolein: 5.14E-3 lb/MMBtu 1,3-butadiene: 2.67E-4 lb/MMBtu Formaldehyde: 5.28E-2 lb/MMBtu POM: 1.61508E-4 lb/MMBtu	Oxidation Catalyst	93%	Control efficiency not used in emission calculations.  Annual emissions based on 7,500 hr/yr each.
	Manufacturer's Specifications with safety factors	VOC: 1.0 g/hp-hr CO: 2.5 g/hp-hr NO <sub>x</sub> : 2.0 g/hp-hr			
18	AP-42	PM/PM <sub>10</sub> : 1.941E-2 lb/MMBtu SO <sub>2</sub> : 5.88E-4 lb/MMBtu Acetaldehyde: 2.79E-3 lb/MMBtu Acrolein: 2.63E-3 lb/MMBtu 1,3-butadiene: 6.63E-4 lb/MMBtu Formaldehyde: 2.05E-2 lb/MMBtu POM: 2.381E-4 lb/MMBtu	None	N/A	Annual emissions based on 100 hr/yr.
	Manufacturer's Specifications with safety factors	VOC: 1.56 g/hp-hr CO: 143.11 g/hp-hr NO <sub>x</sub> : 3.73 g/hp-hr			
19 and 89	AP-42	PM/PM <sub>10</sub> : 9.9871E-3 lb/MMBtu SO <sub>2</sub> : 5.88E-4 lb/MMBtu Acetaldehyde: 8.36E-3 lb/MMBtu Acrolein: 5.14E-3 lb/MMBtu 1,3-butadiene: 2.67E-4 lb/MMBtu Formaldehyde: 5.28E-2 lb/MMBtu POM: 1.61508E-4 lb/MMBtu	Oxidation Catalyst	93%	Control efficiency not used in emission calculations.
	Manufacturer's Specifications with safety factors	VOC: 1.3 g/hp-hr CO: 3.5 g/hp-hr NO <sub>x</sub> : 1.95 g/hp-hr			
88	AP-42	PM/PM <sub>10</sub> : 9.9871E-3 lb/MMBtu SO <sub>2</sub> : 5.88E-4 lb/MMBtu Acetaldehyde: 8.36E-3 lb/MMBtu Acrolein: 5.14E-3 lb/MMBtu 1,3-butadiene: 2.67E-4 lb/MMBtu	Oxidation Catalyst	93%	Control efficiency not used in emission calculations.

SN	Emission Factor Source (AP-42, testing, etc.)	Emission Factor (lb/ton, lb/hr, etc.)	Control Equipment	Control Equipment Efficiency	Comments
		Formaldehyde: 5.28E-2 lb/MMBtu POM: 1.61508E-4 lb/MMBtu			
	Manufacturer's Specifications with safety factors	VOC: 1.2 g/hp-hr CO: 3.18 g/hp-hr NO <sub>x</sub> : 1.8 g/hp-hr			
90	AP-42	PM/PM <sub>10</sub> : 1.941E-2 lb/MMBtu SO <sub>2</sub> : 5.88E-4 lb/MMBtu Acetaldehyde: 2.79E-3 lb/MMBtu Acrolein: 2.63E-3 lb/MMBtu 1,3-butadiene: 6.63E-4 lb/MMBtu Formaldehyde: 2.05E-2 lb/MMBtu POM: 2.381E-4 lb/MMBtu	None	N/A	
	Manufacturer's Specifications with safety factors	VOC: 2.75 g/hp-hr CO: 49.5 g/hp-hr NO <sub>x</sub> : 12.1 g/hp-hr			
91 and 92	AP-42	PM/PM <sub>10</sub> : 7.6 lb/MMCF SO <sub>2</sub> : 0.6 lb/MMCF VOC: 5.5 lb/MMCF CO: 84 lb/MMCF NO <sub>x</sub> : 100 lb/MMCF Formaldehyde: 7.5E-2 lb/MMCF POM: 6.982E-4 lb/MMCF	None	N/A	
	GlyCalc 4.0	N/A			
93 and 94	AP-42 Table 3.2-3	PM/PM <sub>10</sub> : 0.01941 lb/MMBtu SO <sub>2</sub> : 0.000588 lb/MMBtu VOC: 0.7 g/hp-hr CO: 1.0 g/hp-hr NO <sub>x</sub> : 1.0 g/hp-hr Acetaldehyde: 2.79E-3 lb/MMBtu Acrolein: 2.63E-3 lb/MMBtu 1,3-Butadiene: 6.63E-4 lb/MMBtu Formaldehyde: 0.05 g/hp-hr	NSCR Catalyst		

## 14. TESTING REQUIREMENTS:

The permit requires testing of the following sources.

SN	Pollutants	Test Method	Test Interval	Justification
SN-09 through SN-15, SN-19, SN-87 through SN-90 (one of each model engine)	CO	10	Every 60 months	Demonstrate compliance with the CO limits.
SN-09 through SN-15, SN-19, SN-87 through SN-90 (one of each model engine)	NO <sub>x</sub>	7E	Every 60 months	Demonstrate compliance with the NO <sub>x</sub> limits.
One of SN-09 through SN-11, One of SN-15 or SN-87, One of SN-19 or SN-89, and SN-88	Formaldehyde	320, 323, or ASTM D6348-03	Initial	Demonstrate compliance with the formaldehyde limits. The facility is close to the major source threshold for this pollutant.
Plantwide	Total Sulfur (SO <sub>2</sub> )	Methods outlined in section 2.3.5 or 2.3.3.1.2 of 40 CFR Part 75, Appendix D	Every five years	Department Guidance

## 15. MONITORING OR CEMS:

The permittee must monitor the following parameters with CEMS or other monitoring equipment (temperature, pressure differential, etc.)

SN	Parameter or Pollutant to be Monitored	Method (CEM, Pressure Gauge, etc.)	Frequency	Report (Y/N)
N/A				

## 16. RECORDKEEPING REQUIREMENTS:

The following are items (such as throughput, fuel usage, VOC content, etc.) that must be tracked and recorded.

SN	Recorded Item	Permit Limit	Frequency	Report (Y/N)
SN-15 and SN-87	Hours of Operation	15,000 hours per 12-months	Monthly	Y
SN-18	Hours of Operation	100 hours per 12-months; also must comply with 63, Subpart ZZZZ hour limits and document how many hours are for emergency operation and how many hours for non-emergency operation	Monthly	Y
SN-91 and SN-92	Natural Gas Throughput [§63.760(a)(1)(ii)]	N/A	Annually	N, unless requested by Administrator
Facility	If more than 5 tpy single HAP or 12.4 tpy combination HAP: HAP Major Source Determination [§63.760(c)]	10 tpy single HAP; 25 tpy combination HAP	Annually	N
SN-91 and SN-92	Benzene Emissions [§63.764(e)(1)(ii)]	0.90 megagram per year	As required by 63, Subpart HH	N
Engines and Turbines	Fuel Used	Pipeline Quality Natural Gas Only	Continuously	N
SN-15, SN-19, SN-93, SN-94, SN-87, SN-88, and SN-89	Remote Engine Evaluation	See Definition of Remote Stationary RICE in 63, Subpart ZZZZ	Annually	N
Engines	Oil Analysis Records [§63.6625(j)]	See §63.6625(j)	Same frequency as specified for changing the oil	N
Engines	Records described	N/A	As Needed	Maybe



SN	Recorded Item	Permit Limit	Frequency	Report (Y/N)
	in §63.6655(a)(1) through (a)(5), (b)(1) through (b)(3) and (c)			
Engines	Records of Maintenance Conducted	Per Maintenance Plan and Table 2d of 40 CFR Part 63, Subpart <i>ZZZZ</i>	As Needed	Y, when did not meet limitation

## 17. OPACITY:

SN	Opacity	Justification for limit	Compliance Mechanism
09 through 15, 18, 19, 87 through 92	5%	Department Guidance	Natural Gas Fuel Only

## 18. DELETED CONDITIONS:

Former SC	Justification for removal
N/A	

## 19. GROUP A INSIGNIFICANT ACTIVITIES:

Source Name	Group A Category	Emissions (tpy)						
		PM/PM <sub>10</sub>	SO <sub>2</sub>	VOC	CO	NO <sub>x</sub>	HAPs	
							Single	Total
Four 550 Gallon Lube Oil Storage Tanks	A-3			0.000066			0.000066	0.000066
Non-Point Source Fugitive Emissions	A-13			0.11				
Blowdowns	A-13			0.18				
Parts Washer	A-13			0.64				
A-13 Totals				0.93				

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20. VOIDED, SUPERSEDED, OR SUBSUMED PERMITS:

List all active permits voided/superseded/subsumed by the issuance of this permit.

Permit #
1185-AOP-R7

## APPENDIX A – EMISSION CHANGES AND FEE CALCULATION

## Fee Calculation for Major Source

Revised 03-11-16

Facility Name: BHE (Drake Compressor Station)  
 Permit Number: 1185-AOP-R8  
 AFIN: 24-00071

\$/ton factor	23.93	Annual Chargeable Emissions (tpy)	346.1
Permit Type	Minor Mod	Permit Fee \$	500

Minor Modification Fee \$	500
Minimum Modification Fee \$	1000
Renewal with Minor Modification \$	500

Check if Facility Holds an Active Minor Source or Minor Source General Permit ☐

If Hold Active Permit, Amt of Last Annual Air Permit Invoice \$ 0

Total Permit Fee Chargeable Emissions (tpy) -18.4

Initial Title V Permit Fee Chargeable Emissions (tpy)

*HAPs not included in VOC or PM:*

*Chlorine, Hydrazine, HCl, HF, Methyl Chloroform, Methylene Chloride, Phosphine, Tetrachloroethylene, Titanium Tetrachloride*

*Air Contaminants:*

*All air contaminants are chargeable unless they are included in other totals (e.g., H2SO4 in condensible PM, H2S in TRS, etc.)*

Pollutant (tpy)	Check if Chargeable Emission	Old Permit	New Permit	Change in Emissions	Permit Fee Chargeable Emissions	Annual Chargeable Emissions
PM		4.9	5.3	0.4		
PM <sub>10</sub>		4.9	5.3	0.4	0.4	5.3
PM <sub>2.5</sub>		0	0	0		
SO <sub>2</sub>		2.1	1.9	-0.2	-0.2	1.9
VOC		140.4	128.3	-12.1	-12.1	128.3
CO		349	316.3	-32.7		
NO <sub>x</sub>		217.1	210.6	-6.5	-6.5	210.6
Acetaldehyde	<input type="checkbox"/>	1.61	1.78	0.17		

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