

STATEMENT OF BASIS

for the issuance of Draft Air Permit # 1936-AOP-RI

1. PERMITTING AUTHORITY:

Arkansas Department of Environmental Quality
8001 National Drive
Post Office Box 8913
Little Rock, Arkansas 72219-8913

2. APPLICANT:

Duke - Hot Spring Energy Facility
696 Black Branch Rd.
Malvern, AR 72104

3. PERMIT WRITER:

Bryan Leamons

4. PROCESS DESCRIPTION AND SIC CODE:

SIC Description: Gas-fired Combined cycle Electric Generating Plant
SIC Code: 4911

5. SUBMITTALS: 3/29/02; 4/12/02; 6/20/02; 6/24/02; 7/26/02

6. REVIEWER'S NOTES:

This permitting action incorporates the following three items approved as a minor-modification:

- Relocation of various stacks due to plant layout shift during construction and updates to applicable dispersion modeling contained in the PSD Air Quality Analysis;
- Increase in the maximum annual operating rates of the Auxiliary Boilers (SN-05 and SN-06) and an update to the PSD Air Quality Analysis for annually averaged pollutants;
- Clarification of Specific Condition 12 to state the allowable averaging period for VOC.

Also a modification is incorporated into this permitting action that establishes specific language regarding startup and shutdown of the Combustion Turbine/ Heat recovery Steam Generators/ Duct Burners (SN-01 through SN-04). See Specific Condition 39.

7. COMPLIANCE STATUS:

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A no penalty CAO was issued to allow the startup/ shutdown provisions incorporated into SC 39 of this permit revision. The CAO and SC 39 provide specific language outlining the definition of startup and shutdown procedures. This makes it possible for the facility to avoid submitting upset condition reports every time there is a startup or shutdown.

8. APPLICABLE REGULATIONS:

A. Applicability

Did the facility undergo PSD review in this permit (Y/N) N
Has this facility undergone PSD review in the past? (Y/N) _Y_ Permit # 1936-AOP-R0
Is this facility categorized as a major source for PSD? (Y/N) Y
\$ 100 tpy and on the list of 28 (100 tpy)? (Y/N) Y
\$ 250 tpy all other (Y/N) _N_

B. PSD Netting

Was netting performed to avoid PSD review in this permit? (Y/N) N

C. Source and Pollutant Specific Regulatory Applicability

Source	Pollutant	Regulation
SN-01 thru SN-04	SO ₂ , VOC, CO, NO _x , and PM10	NSPS Subpart GG (NO _x and SO ₂ only) PSD (all pollutants listed)

9. EMISSION CHANGES:

The following table summarizes plantwide emission changes associated with this permitting action.

Plantwide Permitted Emissions (ton/yr)			
Pollutant	Air Permit 1936-AOP-R0	Air Permit 1936-AOP-R1	Change
PM	524.6	525.7	1.1

Plantwide Permitted Emissions (ton/yr)			
Pollutant	Air Permit 1936-AOP-R0	Air Permit 1936-AOP-R1	Change
PM₁₀	490.0	491.1	1.1
SO₂	215.3	215.9	0.6
VOC	328.6	330.5	1.9
CO	1929.3	1949.1	19.8
NO_x	545.6	561.5	15.9
lead	0.01	0.01	0
NH₃	590.5	590.5	0
1,3-butadiene	0.02	0.02	
acetaldehyde	1.25	1.25	
acrolein	0.20	0.20	
ethylbenzene	1.00	1.00	
formaldehyde	9.00	9.00	
hexane	1.32	1.32	
propylene oxide	0.91	0.91	
toluene	2.19	2.19	
xylene	1.99	1.99	
POM	0.07	0.07	
arsenic	0.01	0.01	
cadmium	0.02	0.02	
chromium	0.02	0.02	
mercury	0.01	0.01	0

10. MODELING:

A. Criteria Pollutants

The Air Quality Analysis and Additional Impacts Analysis, was reviewed and updated during this permitting action due to slight relocation of stacks and changes at the Auxiliary Boilers (SN-05 and SN-06).

As part of the PSD permitting procedure a new source must perform an air quality analysis to assess impact to local NAAQS and to evaluate the increment consumption. The first step in this review is to evaluate the impact of pollutants that will increase by PSD significant levels. In this case, the pollutants evaluated are PM₁₀, NO₂, SO₂, and CO. SCREEN3 dispersion modeling was used in the case of each pollutant. For NO_x (annually averaged) and PM₁₀ (24-hour and annually averaged) ISCST3 modeling procedures were used because the SCREEN3 results exceeded or nearly exceeded PSD modeling significant impacts. The dispersion modeling shows that these pollutants do not exceeded significant impact levels; therefore, multi-source refined modeling is not necessary to satisfy PSD requirements. The following table summarizes the results of dispersion modeling.

Pollutant		PSD Modeling Significant Impact	Impact from HS Energy
PM10	annual	1	0.525
	24-hour	5	4.64
NO ₂	annual	1	0.746
SO ₂	annual	1	0.826
	24-hour	5	4.26
	3-hour	25	9.59
CO	8-hour	500	91.0
	1-hour	2000	130

Ozone formation near the facility could result from the emissions of NO_x and VOCs. Scheffe Screening Tables are often used in this case as an initial step to estimating levels of ozone formation.

In this case, the rural based ozone impact predicted by Scheffe tables is less than 0.02 ppm averaged annually. The local background ozone level in this area in nearby Montgomery County is 0.092 ppm; therefore, it can be assumed that the facility will have no noticeable impact.

11. Non-Criteria Pollutants

HAPs and Ammonia

An analysis was conducted to determine if emission rates of non-criteria pollutants associated with the facility would trigger dispersion modeling requirements for any specific non-criteria pollutants. The analysis was conducted according to the Non-Criteria Pollutant Control Strategy. Contaminants with emission rates less than the Presumptively Acceptable Emission Rate (PAER) are exempt from dispersion modeling. Emission rates and PAER's for non-criteria pollutants associated with the facility are presented in the following table. As the table shows, all emission rates are below the respective PAER, precluding the need for dispersion modeling for any non-criteria pollutant emissions associated with the project.

HAP (or Ammonia)	Emission Rate (lb/hr)	TLV (mg/m ³)	PAER* (lb/hr)	Modeling Required**
Ammonia	94.0	17.4	1.91	Y
<u>VHAPS</u>				
1,3-butadiene	0.01	4.4	0.484	N
acetaldehyde	0.32	45	4.95	N
acrolein	0.05	0.23	0.025	Y
ethylbenzene	0.25	434	47.74	N
formaldehyde	2.24	1.5	0.165	Y
hexane	0.32	176	19.36	N
propylene oxide	0.23	48	5.28	N
toluene	0.55	188	20.68	N
xylene	0.50	434	47.74	N
POM***	0.02	52.4	5.76	N
<u>metals or metallic compounds</u>				
arsenic	4.68E-04	0.01	0.0011	N
cadmium	2.58E-03	0.01	0.0011	N
chromium	3.28E-03	0.01	0.0011	N
mercury	6.09E-04	0.01	0.0011	N

* PAER is the TLV of the HAP X 0.11

** If the proposed lb/hr is less than the PAER, then no further modeling is required.

*** Naphthalene used as representative POM

This analysis shows that most non-criteria pollutants passed the first level of modeling (except acetaldehyde, ammonia, and formaldehyde). These two species are modeled with ISCST3 dispersion methods to show compliance with the Presumptively Acceptable Impact Level (PAIL). PAIL is the maximum ambient 24-hour average concentration, for Hazardous Air Pollutants (HAPs) only, less than or equal to 1/100th of the Threshold Limit Value (TLV) or an acceptable concentration that has been established by the Department for each substance emitted. The ambient concentration resulting from the proposed emission rate of a substance is determined by using atmospheric dispersion models to obtain the maximum ambient, ground level concentration expressed as a 24-hour average.

HAP (or Ammonia)	Emission Rate (lb/hr)	TLV (mg/m ³)	PAIL (Fg/m ³)	ISCST3 Result	Pass
ammonia	94.0	17.3	173	1.33	Y
acrolein	0.05	45	450	0.00071	Y
formaldehyde	2.24	1.5	15	0.032	Y

12. CALCULATIONS:

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SN	Emission Factor Source	Emission Factor and Units	Control Equip. Type	Control Equipment Efficiency.	Comments
01-04	Vendor data for criteria, and AP-42 for HAPs. 10 ppm for ammonia slip.	emission factors can be found in the permit BACT determinations	SCR, and low-NO _x		
05-06	Vendor data for criteria, and AP-42 for HAPs.	emission factors can be found in the permit BACT determinations	low-NO _x		
07-30	AP-42	see application	drift eliminator		0.005 % drift 1280 ppmw TDS
32-33	Vendor data for criteria	see application	NA		

13. TESTING REQUIREMENTS:

This permit requires stack testing of the following sources.

SN	Pollutant	Test Method	Test Interval	Justification For Test Requirement
2 of SN-01 through 04	PM/PM ₁₀	5	Initial	Confirmation of BACT limit(s)
	VOC	25A	Initial	Confirmation of BACT limit(s)
2 of SN-01 through 04	CO	10	Initial	Confirmation of BACT limit(s)
	NO _x	7E	Initial	Confirmation of BACT limit(s)
01 through 04	NH ₃	206	once during permit period.	To assure facility accurately estimated emissions

SN	Pollutant	Test Method	Test Interval	Justification For Test Requirement
1 of 01 through 04	HAPs	18	once during permit period	assure accuracy and not triggering 112(g)

14. MONITORING OR CEMS

The following are parameters that must be monitored with CEMs or other monitoring equipment (temperature, pressure differential, etc), frequency of recording and whether records are needed to be included in any annual, semiannual or other reports.

SN	Parameter or Pollutant to be Monitored	Method of Monitoring	Frequency	Report
01-04	NO _x	CEMS	Continuously	Y
	CO	CEMS	Continuously	Y

15. RECORD KEEPING REQUIREMENTS

The following are items (such as throughput, fuel usage, VOC content of coating, etc) that must be tracked and recorded, frequency of recording and whether records are needed to be included in any annual, semiannual or other reports.

SN	Recorded Item	Limit	Frequency	Report
01-04	sulfur content of fuel	0.015% by volume at 15% oxygen on a dry basis	daily	Y
05-06	individual hours of boiler fire	5,000 hr/yr each	monthly	Y
07-30	TDS	1280 ppmw	monthly	Y
32-33	hours of engine fire	500 hrs per year each	monthly	Y

16. OPACITY

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SN	Opacity	Justification	Compliance Mechanism
01-06	5%	Dept. Standard while firing natural gas	Use of natural gas.
07-30	20%	Standard for cooling towers	TDS limit
32-33	20%	Standard for diesel	Use of diesel

17. DELETED CONDITIONS:

The following Specific Conditions were included in the previous permit, but deleted for the current permitting action.

Former SC	Justification for removal
No conditions were deleted.	

18. VOIDED, SUPERSEDED OR SUBSUMED PERMITS

List all active permits for this facility which are voided/superseded/subsumed by issuance of this permit.

Permit #
1936-AOP-R0

19. CONCURRENCE BY:

The following supervisor concurs with the permitting decision:

Phil Murphy, P.E.