

STATEMENT OF BASIS

For the issuance of Draft Air Permit # 1936-AOP-R2 AFIN: 30-00229

1. PERMITTING AUTHORITY:

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

2. APPLICANT:

KGen Hot Spring
696 Black Branch Road
Malvern, Arkansas 72104

3. PERMIT WRITER:

Bryan Leamons

4. PROCESS DESCRIPTION AND NAICS CODE:

NAICS Description: Electric Power Generation
NAICS Code: 221112

5. SUBMITTALS:

6/27/05

6. REVIEWER'S NOTES:

KGen Hot Spring is a 1240-MW gas turbine/ steam turbine combined-cycle electric power plant in Hot Spring County. The facility is located on a 100-acre plot approximately one mile off of Highway 67 due west of Malvern, Arkansas.

This permit action serves to complete the renewal requirements of Arkansas Regulation 26 and 40 CFR Part 70. This permit action also serves as an extension to the approved BACT analysis and permit to construct and operate Turbine/ Duct Burner Units 3 and 4, Auxiliary Boiler 2, and Cooling Tower 2 (SN-03, SN-04, SN-06, and SN-19 through 30). The extension is valid for 18 months from the issue date of this permit. See Plantwide Condition 2. A summary of the BACT analysis for these sources can be found in the permit history. No modifications are occurring with this permit action.

40 CFR Part 64, Compliance Assurance Monitoring (CAM) is addressed for applicable units. There are no CAM affected units at the facility at this time. The combustion turbines/ duct burners are subject to Federal Acid Rain Requirements and are therefore

exempted. The Auxiliary Boilers utilize low NO_x burner design and the cooling towers utilize drift eliminating baffle design for minimizing emissions. Equipment found on the Auxiliary Boilers and Cooling Towers are passive emissions reducing devices and are not considered “add-on” pollution control devices for the purposes of CAM. These units are therefore not subject to CAM.

7. COMPLIANCE STATUS:

The following summarizes the current compliance of the facility including active/pending enforcement actions and recent compliance activities and issues: No issues are pending.

8. APPLICABLE REGULATIONS:

PSD Applicability

Did the facility undergo PSD review in this permit (i.e., BACT, Modeling, etc.)? N
 Has the facility undergone PSD review in the past? Y
 Is the facility categorized as a major source for PSD? Y
 ≥ 100 tpy and on the list of 28? Y
 ≥ 250 tpy all other? N

PSD Netting

Was netting performed to avoid PSD review in this permit? N

Source and Pollutant Specific Regulatory Applicability

Source	Pollutant	Regulation
SN-01 through SN-04	SO ₂ , VOC, CO, NO _x , and PM/PM10	NSPS Subpart GG (NO _x and SO ₂ only) PSD (all pollutants listed)
SN-01 through 04	PM/PM10, SO ₂ , NO _x	NSPS Subpart Da
SN-05 and 06	records only	NSPS Subpart Da

9. EMISSION CHANGES:

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

Plantwide Permitted Emissions (tpy)			
Pollutant	Permit # 1936-AOP-R1	Permit #1936-AOP-R2	Change
PM	525.7	524.2	-1.5
PM ₁₀	491.1	489.6	-1.5

Plantwide Permitted Emissions (tpy)			
Pollutant	Permit # 1936-AOP-R1	Permit #1936-AOP-R2	Change
SO ₂	215.9	214.8	-1.1
VOC	330.5	328.2	-2.3
CO	1949.1	1928	-21.1
NO _x	561.5	539.2	-22.3
NH ₃	590.5	590.4	-0.1
lead	0.01	0.06	0.05
1,3-butadiene	0.02	0.04	0.02
acetaldehyde	1.25	1.28	0.03
acrolein	0.20	0.20	0
benzene	0	0.42	0.42
ethylbenzene	1.00	1.00	0
formaldehyde	9.00	8.38	-0.62
hexane	1.32	1.34	0.02
propylene oxide	0.91	0.92	0.01
toluene	2.19	4.10	1.91
xylene	1.99	2.00	0.01
POM	0.07	0.08	0.1
arsenic	0.01	0.06	0.05
cadmium	0.02	0.06	0.04
chromium	0.02	0.06	0.04
mercury	0.01	0.06	0.04

* Small emission changes result from differences in rounding conventions or totaling method. Benzene was omitted from the previous permit. Formaldehyde and toluene experienced an update to emission factors. CO and NO_x changes as well as other smaller reductions in the criteria pollutants result from a mistake in the previous permits where the auxiliary boilers were calculated to run 10,000 hours per year each.

10. MODELING:

Air Quality Analysis

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.

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	17.3	1.91	Y

HAP (or Ammonia)	Emission Rate (lb/hr)	TLV (mg/m ³)	PAER* (lb/hr)	Modeling Required**
<u>VHAPS</u>				
1,3-butadiene	0.04	4.4	0.484	N
acetaldehyde	0.32	45	4.95	N
acrolein	0.08	0.23	0.025	Y
benzene	0.14	32	3.52	N
ethylbenzene	0.28	434	47.74	N
formaldehyde	2.10	1.5	0.165	Y
hexane	0.34	176	19.36	N
propylene oxide	0.24	48	5.28	N
toluene	1.06	188	20.68	N
xylene	0.52	434	47.74	N
POM***	0.04	52.4	5.76	N
<u>metals or metallic compounds</u>				
arsenic	5.19E-05	0.01	0.0011	N
cadmium	2.58E-03	0.01	0.0011	N
chromium	3.29E-03	0.01	0.0011	N
mercury	6.10E-04	0.01	0.0011	N
lead	0.01	1.5	0.165	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 (μg/m ³)	ISCST3 Result	Pass
ammonia	269.2	17.3	173	1.79	Y
acrolein	0.08	45	450	0.01	Y
formaldehyde	2.10	1.5	15	0.03	Y

11. CALCULATIONS:

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 elimination design		0.005 % drift 1280 ppmw TDS
32-33	Vendor data for criteria	see application	NA		

12. TESTING REQUIREMENTS:

The permit requires testing of the following sources.

SN	Pollutant	Test Method	Test Interval	Justification For Test Requirement
2 of SN-01 through 04 and 03 and 04 if built	PM/PM ₁₀	5 and 202 and/or 201A&202	5 yrs	Confirmation of BACT limit(s)
	VOC	25A	5 yrs	Confirmation of BACT limit(s)
03 and 04 if built	CO	10	Initial	Confirmation of BACT limit(s)
	NO _x	7E	Initial	Confirmation of BACT limit(s)
01 through 04	NH ₃	206	5 yrs	To assure facility accurately estimated emissions

13. 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 of Monitoring	Frequency	Report
01-04	NO _x	CEMS	Continuously	Y
	CO	CEMS	Continuously	Y

14. RECORD KEEPING REQUIREMENTS:

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

SN	Recorded Item	Limit	Frequency	Report
01-04	natural gas only	NA	verify per inspection	Y
05-06	individual hours of boiler fire	2,000 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

15. OPACITY:

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

16. DELETED CONDITIONS:

Former SC	Justification for removal
29	This was the initial performance test for HAPs

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17. VOIDED, SUPERCEDED, OR SUBSUMED PERMITS:

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

Permit #
1936-AOP-R1

18. CONCURRENCE BY:

The following supervisor concurs with the permitting decision.

Phillip Murphy, P.E.