STATEMENT OF BASIS

For the issuance of Air Permit # 2011-AR-2 AFIN: 72-00026

1. PERMITTING AUTHORITY:

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

2. APPLICANT:

University of Arkansas - Central Utility Plant
845 West Dickson Street
Fayetteville, Arkansas 72701

3. PERMIT WRITER:

Ann Sudmeyer

4. PROCESS DESCRIPTION AND NAICS CODE:

NAICS Description: Colleges, Universities, and Professional Schools
NAICS Code: 611310

5. SUBMITTALS:

9/9/2008

6. REVIEWER'S NOTES:

The University of Arkansas - Fayetteville operates a central utility plant which houses eight boilers that provide steam for the utility system. This steam is primarily used for space heating during the winter months and air conditioning during the summer months. The campus also has several standby power generators that are utilized only during power failures. This permitting action is necessary to:

1. Permit two diesel fired generators (SN-21 and SN-22);
2. Permit a small boiler bubble (SN-23);
3. Permit natural gas generators (SN-24 through SN-77);
4. Add five tanks to the insignificant activities list; and
5. Add one wood-burning pottery kiln to the insignificant activities list.

The total permitted annual emission rate changes associated with this modification include: 1.5 tons per year (tpy) PM/PM_{10}, -0.1 tpy SO_2, 1.8 tpy VOC, 65.2 tpy CO, 53.5

tpy NO_X, 0.07 tpy acetaldehyde, 0.07 tpy acrolein, 0.08 tpy benzene, 0.01 tpy 1,3-butadiene, 0.02 tpy cadmium, 0.4 tpy formaldehyde, 2.07 tpy hexane, 0.04 tpy methanol, and 0.06 tpy POM.

SN-20 was manufactured in August 2003 and purchased as a used engine by the University of Arkansas and installed in 2008.

SN-22 was manufactured November 9, 2006 and installed in November 2006.

SN-21 is a 2004 model year engine but has been modified; therefore, it is subject to NSPS Subpart IIII unless a replacement engine is purchased that is not subject. The PM/PM_{10}, VOC, and NO_X limits of Specific Condition #1 relate to the NTE limits of NSPS IIII that are applicable to in use stack tested engines. The facility specifically requested that the CO limits not be increased to the NTE limits. These limits may not be applicable if a replacement engine is purchased.

Of the engines at SN-06, SN-07, SN-08, SN-10, SN-13, and SN-25 through SN-77; the most recently installed engine (25kW) was manufactured on March 20, 2008 which is prior to the applicability dates in NSPS JJJJ. Some engines may be subject to NESHAP ZZZZ but would only be required to comply with NSPS JJJJ which has no requirements for these engines due to engine size and manufacture date.

7. COMPLIANCE STATUS:

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

An inspection conducted on 12-11-07 revealed a violation of General Condition #16 since the facility installed six new natural gas fired boilers without first obtaining a permit. These boilers were added to Permit #2011-AR-1. A number of generators and small boilers were discovered and are being permitted with this modification. A CAO is currently being drafted.

8. PSD APPLICABILITY:

a. Did the facility undergo PSD review in this permit (i.e., BACT, Modeling, etc.)? N

b. Is the facility categorized as a major source for PSD? N
Single pollutant ≥ 100 tpy and on the list of 28 or single pollutant ≥ 250 tpy and not on list?

If yes, explain why this permit modification not PSD? N/A

9. SOURCE AND POLLUTANT SPECIFIC REGULATORY APPLICABILITY:

Source	Pollutant	Regulation (NSPS, NESHAP or PSD)
14, 15, 16, 17, 18, 19	N/A	NSPS Subpart Dc
21, 22	PM, VOC, CO, NO_X	NSPS Subpart IIII
24	VOC, CO, NO_X	NSPS Subpart JJJJ
Replacement 21 (potentially), 22, 24	HAP	NESHAP Subpart ZZZZ

10. EMISSION CHANGES AND FEE CALCULATION:

See emission change and fee calculation spreadsheet in Appendix A.

11. MODELING:

Criteria Pollutants

Examination of the source type, location, plot plan, land use, emission parameters, and other available information indicate that modeling is not warranted at this time.

Pollutant	Emission Rate (lb/hr)	NAAQS Standard ($\mu g/m^3$)	Averaging Time	Highest Concentration ($\mu g/m^3$)	% of NAAQS
PM_{10}	N/A	50	Annual	N/A	N/A
		150	24-Hour	N/A	N/A
SO_2	N/A	80	Annual	N/A	N/A
		1300	3-Hour	N/A	N/A
		365	24-Hour	N/A	N/A
VOC	N/A	0.12	1-Hour (ppm)	N/A	N/A
CO	N/A	10,000	8-Hour	N/A	N/A
		40,000	1-Hour	N/A	N/A
NO_x	N/A	100	Annual	N/A	N/A
Pb	N/A	0.15	Rolling 3-month Period over 3 years (not to be exceeded in any 3 month period)	N/A	N/A

Non-Criteria Pollutants:

1st 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 (mg/m^3), as listed by the American Conference of Governmental Industrial Hygienists (ACGIH).

Pollutant	TLV (mg/m^3)	PAER (lb/hr) = 0.11 × TLV	Proposed lb/hr	Pass?
Acetaldehyde	45.04	4.95	0.2587	Y
Acrolein	0.229	0.0251	0.2185	N
Benzene	1.597	0.175	0.2502	N
1,3-Butadiene	4.42	0.486	0.0566	Y
Cadmium	0.002	0.00022	0.00034	N
Formaldehyde	0.368	0.0404	1.6855	N
Hexane	176.23	19.38	0.54	Y
Methanol	262.08	28.82	0.2496	Y
POM	0.2	0.022	0.0297	N

2nd 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 ($\mu g/m^3$) = 1/100 of Threshold Limit Value	Modeled Concentration ($\mu g/m^3$)	Pass?
Acrolein	2.29	1.8	Y
Benzene	15.97	4.6	Y
Cadmium	0.02	0.004	Y

Pollutant	PAIL ($\mu g/m^3$) = 1/100 of Threshold Limit Value	Modeled Concentration ($\mu g/m^3$)	Pass?
Formaldehyde	15.0	13.9	Y
POM	2.0	0.5	Y

Other Modeling: N/A

Odor: N/A

Odor modeling for sources emitting styrene.

Pollutant	Threshold value 1-hour average	Modeled Concentration ($\mu g/m^3$)	Pass?
Styrene	1361 $\mu g/m^3$	N/A	N/A

H_2S Modeling:

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_2S Standards N/A
If exempt, explain:_____

Pollutant	Threshold value	Modeled Concentration (ppb)	Pass?
H_2S	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

$Cp = Cm\ (t_m/t_p)^{0.2}$ where

Cp = 5-minute average concentration
Cm = 1-hour average concentration
t_m = 60 minutes
t_p = 5 minutes

12. CALCULATIONS:

SN	Emission Factor Source (AP-42, testing, etc.)	Emission Factor (lb/ton, lb/hr, etc.)	Control Equipment	Control Equipment Efficiency	Comments
04, 05, 14, 15, 16, 17, 18, 19	AP-42 HAPs: AP-42 Tables 1.4-3 and 1.4-4	7.6 lb PM/PM_{10}/MMscf 0.6 lb SO_2/MMscf 5.5 lb VOC/MMscf 84 lb CO/MMscf 100 lb NO_X/MMscf 0.0021 lb benzene/MMscf 0.0011 lb cadmium/MMscf 0.0752 lb formaldehyde/MMsf 1.8 lb hexane/MMscf 0.0000882 lb POM/MMscf	N/A	N/A	Annual emissions based on 607 MMSCF/yr
20	Manufacturer Data	0.274 g PM/PM_{10}/bhp-hr 0.26 g VOC/bhp-hr 1.65 g CO/bhp-hr 7.15 g NO_X/bhp-hr	N/A	N/A	Annual emissions are based on 500 hours/yr.
20	AP-42 HAPs: AP-42 Tables 3.4-3 and 3.4-4	1.84 g SO_2/bhp-hr 2.52E-5 lb acetaldehyde/MMBtu 7.88E-6 lb acrolein/MMBtu 7.76E-4 lb benzene/MMBtu 7.89E-5 lb formaldehyde/MMBtu 2.12E-4 lb POM/MMBtu			
21	Manufacturer Data SO_2 from AP-42 Table 3.4-1 HAPs: AP-42 Tables 3.4-3 and 3.4-4	0.5 g PM/PM_{10}/bhp-hr 0.184 g SO_2/bhp-hr 1.2 g VOC/bhp-hr 8.5 g CO/bhp-hr 8.6 g NO_X/bhp-hr 2.52E-5 lb acetaldehyde/MMBtu 7.88E-6 lb acrolein/MMBtu 7.76E-4 lb benzene/MMBtu 7.89E-5 lb formaldehyde/MMBtu 2.12E-4 lb POM/MMBtu	N/A	N/A	Sulfur = 0.05% Annual emissions based on 500 hr/yr

SN	Emission Factor Source (AP-42, testing, etc.)	Emission Factor (lb/ton, lb/hr, etc.)	Control Equipment	Control Equipment Efficiency	Comments
22	Manufacturer Data SO_2 from AP-42 Table 3.4-1 HAPs: AP-42 Tables 3.4-3 and 3.4-4	0.14 g PM/PM_{10}/bhp-hr 0.184 g SO_2/bhp-hr 0.5 g VOC/bhp-hr 0.5 g CO/bhp-hr 6.3 g NO_X/bhp-hr 2.52E-5 lb acetaldehyde/MMBtu 7.88E-6 lb acrolein/MMBtu 7.76E-4 lb benzene/MMBtu 7.89E-5 lb formaldehyde/MMBtu 2.12E-4 lb POM/MMBtu	N/A	N/A	Sulfur = 0.05% Annual emissions based on 500 hr/yr
23	AP-42 Tables 1.4-1 and 1.4-2 HAPs: Table 1.4-3 and 1.4-4	7.6 lb PM/PM_{10}/MMscf 0.6 lb SO_2/MMscf 5.5 lb VOC/MMscf 84 lb CO/MMscf 100 lb NO_X/MMscf 2.1E-3 lb benzene/MMscf 1.1E-3 lb cadmium/MMscf 7.52E-2 lb formaldehyde/MMscf 1.8 lb hexane/MMscf 8.82E-5 lb POM/MMscf	N/A	N/A	Annual emissions based on 8760 hr/yr.
06, 07, 08, 10, 13, 24-77	AP-42 Table 3.2-3 for 4 stroke rich burn engines HAPs: AP-42 Table 3.2-3	0.01941 lb PM/PM_{10}/MMBtu 5.88E-4 lb SO_2/MMBtu 0.0296 lb VOC/MMBtu 3.72 lb CO/MMBtu 2.27 lb NO_X/MMBtu 2.79E-3 lb acetaldehyde/MMBtu 2.63E-3 lb acrolein/MMBtu 1.58E-3 lb benzene/MMBtu 6.63E-4 lb 1,3-butadiene/MMBtu 2.05E-2 lb formaldehyde/MMBtu 3.06E-3 lb methanol/MMBtu 1.41E-4 lb POM/MMBtu	N/A	N/A	Annual emissions based on 25,500,000 scf/yr.

13. TESTING REQUIREMENTS:

The permit requires testing of the following sources.

SN	Pollutants	Test Method	Test Interval	Justification
21	PM, VOC, CO, NO_X	See 40 CFR §60.4212	Initial Performance Test	NSPS IIII

14. 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				

15. 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)
04, 05, 14 through 19	Natural Gas Usage	607 MMscf/yr	Monthly	N
20, 21, 22	Hours Operated	500 hr/yr	Monthly	N
20	Sulfur Content of Fuel Oil	0.5% by weight	Monthly	N
21	Sulfur Content of Fuel Oil	0.05% by weight	Monthly	N
23	List of natural gas small boilers included in SN-23 and their individual and combined total heat input capacities; stack height; stack gas temperature; stack diameter;	40.0 MMBtu/hr, combined total 9.5 MMBtu/hr, individual	As Needed	N

SN	Recorded Item	Permit Limit	Frequency	Report (Y/N)
	and stack gas flowrate			
24	List of natural gas fired generators included in SN-24 and their installation location, rated engine power, maximum individual and total fuel burning rate, method of determining fuel burning rate, date of installation of engine, whether NSPS Subpart JJJJ is applicable, and whether NESHAP ZZZZ is applicable; stack height, stack gas temperature; stack diameter; and stack gas flowrate	3,120 scf/hour	As Needed	N
24	Documentation of maximum fuel burning rate for each natural gas fired generator included in SN-24	N/A	As Needed	N
06, 07, 08, 10, 13, 24-77	Amount of natural gas combusted	25,500,000 scf/yr	Monthly	N
14, 15, 16, 17, 18, 19	Fuel Delivered per NSPS	N/A	Monthly	N

SN	Recorded Item	Permit Limit	Frequency	Report (Y/N)
Replacement 21	Dates of manufacture, installation, and construction	N/A	As Needed	N
22	Performance test records, engine manufacturer data, or control device vendor data per 60.4211(b), if applicable	N/A	As Needed	N
24	Maintenance plan and records of conducted maintenance	N/A	As Needed	N
24	Hours of propane use	100 hr/yr	As Needed	N
24	Records required by 60.4245(a)	N/A	As Needed	N
24	Records of hours of operation of engine, document how many hours are spent for emergency operation and how many hours spent for non-emergency operation	See regulation	As Needed	N

16. OPACITY:

SN	Opacity	Justification for limit	Compliance Mechanism
04, 05, 06, 07, 08, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 23, 24-77	5%	Department Guidance	Natural Gas Usage
20, 21, 22	20%	Department Guidance	---

17. DELETED CONDITIONS:

Former SC	Justification for removal
N/A	

18. GROUP A INSIGNIFICANT ACTIVITIES

Source Name	Group A Category	Emissions (tpy)						
		PM/PM_{10}	SO_2	VOC	CO	NO_x	HAPs	
							Single	Total
2,000 gallon diesel fuel tank, Heating Plant	A-3			0.0005			0.0005	0.0005
400 gallon diesel fuel tank, Heating Plant	A-3			0.0005			0.0005	0.0005
1,200 gallon diesel fuel tank, JB Hunt Building	A-3			0.00054			0.00054	0.00054
250 gallon used oil tank, Main Chiller Plant	A-3			0.0005			0.0005	0.0005
250 gallon used oil tank, SW Chiller Plant	A-3			0.0005			0.0005	0.0005
Wood-Fired Pottery Kiln	A-13	0.42	0.005	2.78	3.06	0.04	0.0002	0.0002

19. VOIDED, SUPERSEDED, OR SUBSUMED PERMITS:

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

Permit #
2011-AR-1

20. CONCURRENCE BY:

The following supervisor concurs with the permitting decision.

Karen Cerney, P.E.

APPENDIX A – EMISSION CHANGES AND FEE CALCULATION

Fee Calculation for Minor Source

Revised 07-27-09

University of Arkansas - Central Utility Plant

Permit #: 2011-AR-2

AFIN: 72-00026

			Old Permit	New Permit
$/ton factor	22.07	Permit Predominant Air Contaminant	37.3	90.8
Minimum Fee $	400	Net Chargable Emission Increase	53.5	
Minimum Initial Fee $	500	Permit Modification Fee $	1180.745	
		Initial Permit Fee $	0	
Check if Administrative Amendment	☐	Annual Chargeable Emissions (tpy)	90.8	

Pollutant (tpy)	Old Permit	New Permit	Change
PM	3.3	4.8	1.5
PM_{10}	3.3	4.8	1.5
SO_2	2.2	2.1	-0.1
VOC	2.6	4.4	1.8
CO	30.2	95.4	65.2
NO_X	37.3	90.8	53.5
Acetaldehyde	0	0.07	0.07
Acrolein	0	0.07	0.07
Benzene	0	0.08	0.08
1,3-Butadiene	0	0.01	0.01
Cadmium	0	0.02	0.02
Formaldehdye	0	0.4	0.4
Hexane	0	2.07	2.07
Methanol	0	0.04	0.04
POM	0	0.06	0.06