The Power To Make It Happen
Cholla Steam Electric Station
P.O. Box 188 • Joseph City, Arizona 86032 - 0188
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ADEQ
AIR QUALITY DIVISION
09 JUN 22 PM 1:23

CTS:175646

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

June 18, 2009

Mr. Trevor Baggiore
Manager, Air Quality Permits Section
Arizona Department of Environmental Quality
Air Quality Division
1110 W. Washington St.
Phoenix, Arizona 85007

RE: Request for Additional Information for BART Analysis of Cholla Units 2, 3, and 4

Dear Mr. Baggiore:

As requested, APS is submitting the following information in response to your request for additional information dated May 5, 2009 and received on May 11, 2009. The purpose of which is to support the Best Available Retrofit Technology (BART) analysis for APS Cholla Units 2, 3 and 4. The BART Analysis was originally submitted to Arizona Department of Environmental Quality (ADEQ) for review February 5, 2008.

Specifically, it is our understanding that you are requesting the following; All Appendix A supporting information for economic analysis including the choice of interest rate used in the analysis, documentation pertaining to actual quantity and coal type fuel data in support of the proposed 0.22 lb/MMBtu nitrogen oxides (NOx) emission limit, and justification for the proposed particulate matter less than 10 microns (PM_{10}) achievable emission limit of 0.015 lb/MMBtu from fabric filter bag houses.

Following a brief facility introduction, the requested information can be seen outlined in the following sections. If you have any questions concerning this material or require additional information please contact Pat Marz at 928-288-1542.

Sincerely,

Conrad Spencer
Cholla Plant Manager

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ATTACHMEMNTS

A. Appendix A Supporting Information for BART Program Economic Analysis
B. APS / Pacific Corp Fuel Contract Excerpts
C. Example Operating Unit NOx Data
D. Recently BART Permitted Units
E. EPA TTN RACT / BACT / LAER, PC - Unit PM-10 Limits
F. *EPRI Report - Status and Performance of Recently Permitted BACT/LAER Plants

Note: Prepared by Burns and McDonnell Engineering Company

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INTRODUCTION

The APS Cholla Facility is located approximately two miles east of the town of Joseph City on Interstate 40, in Navajo County, Arizona, and approximately 200 miles northeast of Phoenix at an elevation of 5019 feet above sea level.

A. Company Information

Facility Name:	Cholla Power Plant
Mailing Address:	P.O. Box 188 Mail Station 4451 Joseph City, Navajo County, AZ 86032
Facility Address:	I-40 Frontage Road Joseph City, Navajo County, AZ 86032

B. Background Information

The Cholla facility site is designated by the Environmental Protection Agency (EPA) as an attainment area for all criteria pollutants. The power plant consists of four coal-fired steam generating units, associated air pollution control devices, and auxiliary equipment necessary to produce electricity. The gross megawatt capacities are as follows: Unit 1 at 125, Unit 2 at 300, Unit 3 at 300, and Unit 4 at 425 megawatts. APS has previously decided to implement voluntary emissions reduction projects at Cholla, including retrofitting all four boilers with low NOx burners (LNBs) and new separated over-fire air systems. New or modified wet scrubbers for SO_2 removal and fabric filter bag houses for particulate matter control, have also been installed on Units 1, 3, and 4. In addition, a new fabric filter bag house will be installed on Unit 2 by 2016.

Request Item -1, Appendix (A) All Supporting Information used for Economic Analysis

A. Please find below and as an attachment, our response to the ADEQ request for all (Appendix A) economic analysis supporting information. The provided example information was used for analysis of Cholla Unit - 2 and was developed by CH2M Hill with input from APS and various technology vendors.

1.) Total First Year Cost = Total Fixed Cost + Total Variable Cost + Debt Service
$9,624,979 = $300,000 + $1,446,683 + $7,878,296

2.) Total Fixed Cost = Total Fixed O&M Cost * (1 + escalation rate)^year
$300,000 = $300,000 * (1 + 2.0%)^0

3.) Total Fixed O&M Cost = Operating Labor + Maintenance Material + Maintenance Labor + Administrative Labor: $300,000 = $75,000 + $150,000 + $75,000 + $0

4.) Total Variable Cost = Reagent Cost + SCR Catalyst Cost + Electric Power Cost
$1,446,683 = $398,813 + $450,000 + $597,870

5.) Reagent Cost = First Year Reagent Cost * (1 + escalation rate)^year
$398,813 = $398,813 * (1 + 2.0%)^0

- First Year Reagent Cost = (Reagent Usage/2000) * Annual Operation * Unit Cost
  $398,813 = 250 lb/hr * 1 ton/2000 lb * 7972 hr * $400/1 ton

- Reagent Usage = Molar Stoichiometry * (NOx Removal Rate LNB w/SOFA & SCR – NOx Removal Rate LNB w/SOFA) * 17.034/Reagent Purity
  250 lb/hr = 1.0 * (42.39 - 27.71) lbmoles/hr * 17.034 lbs/lbmoles * 1/100

6.) SCR Catalyst Cost = First Year Catalyst Cost * (1 + escalation rate)^year
$450,000 = $450,000 * (1 + 2.0%)^0

- First Year Catalyst Cost = Annual SCR Catalyst * SCR Catalyst Cost
  $450,000 = 150 m^3 * $3000/$m^3$

7.) Electric Power Cost = First Year Auxiliary Power Cost * (1 + escalation rate)^year
$597,870 = $597,870 * (1 + 2.0%)^0

- First Year Auxiliary Power Cost = Auxiliary Power Requirement * Unit Cost * Annual Operation: $597,870 = 1.5 MW * $50/MW-hr * 7972 hr

8.) Debt Service = PMT(Interest Rate, Plant Life, Installed Capital Cost)

- Definition: PMT calculates the payment for a loan based on constant payments and a constant interest rate.
- PMT(rate,nper,pv)
- Rate - is the interest rate for the loan.
- Nper - is the total number of payments for the loan.
- Pv - is the present value, or the total amount that a series of future payments is worth now; also known as the principal.

$7,878,296 = PMT(7.10%, 20 yrs, $82,818,000)

Request Item – 2, NOx Limit Justification Supporting Information

A. Fuel Quantity: The coal fuel contract agreement in effect between the APS / PacifiCorp and the Lee Ranch / El Segundo Mines begin with initial delivery shipments in calendar year 2006 ending in 2024. The contract calls for annual rail delivery of (2,300,000 to 2,500,000) tons increasing to a maximum rail delivery rate beginning 2010 -2024 of (3,700,000 to 4,300,000) tons annually. With actual year forward delivery amounts to be nominated by July 1 of each contract year by APS/PacifiCorp. The annual delivery amounts from the mine are to be made in approximate equal monthly quantities. Excerpts from the contractual agreement between APS/PacifiCorp and Lee Ranch Mine / El Segundo Mines are contained in attachment B.

B. Coal Type: ASTM D 388 Evaluation of the Lee Ranch / El Segundo Mines to determine coal rank and properties was performed by Commercial Testing & Engineering Company, Grants, New Mexico and analyzed by SGS Laboratory, Lombard, Illinois. The core sample analysis documents an approximate 60 / 40 % Sub-Bituminous - Bituminous split. The analytical documentation can be found in attachment B.

1.) Low NOX burner (LNB) performance emission data – The four CE-designed tangential fired boilers have all been retrofitted with a Foster Wheeler Low NOx technology application beginning with Unit 1 in fall 2007 and completed with Unit 3 spring 2009. The combustion modification project consisted of low NOx burners TLN2 – Unit 1 and TLN3 on Units 2, 3, & 4 and separated over fire air ducts (SOFA) for all four boilers. The Foster Wheeler package was added to the existing close coupled over fired air ducts (COFA) installed on Units 2, 3, and 4. To date Units 1 and 4 have successfully met their guarantee performance limits, with Unit 2 continuing to be analyzed for resolution of opacity issues associated with low NOx operation. Unit 3 performance guarantee tests are currently in the scheduling phase. Summarized Unit NOx performance data at full load operation with low NOx burners can be seen shown in the following table with CEMS operating data available in attachment C.

Table 1.

Units 1 - 4 Example Full Load NOx Emission Data

Unit	GMW Full Load Basis	GMW Load / avg	Avg / NOx lb/MMBtu	Data Time Frame
Unit 1	>100.0 MW	118.3 MW	0.161	1/01/08 – 1/21/08
Unit 2	>244.0 MW	286.1 MW	0.303	4/01/08 – 4/23/08
Unit 3	>244.0 MW	291.0 MW	TBD	TBD
Unit 4	>340.0 MW	395.4 MW	0.182	06/01/08 – 06/30/08

Request Item – 3, PM_{10} Emission Limit Supporting Information

Achievable PM-10 emission limits: As proposed by APS Cholla, the Fabric Filter Bag House Operation is capable of supporting a continuous operating PM-10 emission allowable limit of 0.015 lb/MMBtu. This is the vendor's stated contractual performance guarantee and the standardized BACT limit for similar pulverized coal units operating like kind emission control equipment as shown in Table 4. The BACT limit as shown in the EPRI sponsored report dated December 6, 2006, "Status and Performance of Recently Permitted BACT/LAER Plants*" can also be seen in the attachments. We have also provided as attachments for your review, the pertinent EPRI published table and the USEPA Technology Transfer Network Clean Air Technology Center RACT / BACT/LAER Clearinghouse project listings which document recent permit limits for similar coal fired units.

APS Cholla believes consideration of a lowered (< 0.015 lb/MMBtu) achievable emission limit would be difficult to support in terms of operation due to the inherent demands of continuous power generation and our lack of installed run time performance experience. Inherent issues can include in-service maintenance limitations and costs associated with high maintenance labor and fabric replacement costs. Bag houses can be difficult to maintain due to the difficulty in finding and replacing even a single leaking bag. Also, as a general rule on average 25% of the bags will need replacement annually.

Additional operating limits are imposed by high ash concentrations, high carrier gas temperatures, high humidity and moisture related to soot blowing and contractual provisions for maximum allowed hot, warm, and cold basis startups. Therefore, APS Cholla believes a lowered emission limit could jeopardize our ability to compliantly operate the Units. As requested, please see test data below for available Unit 4 Bag House performance and compliance with particulate mass emission rate limits.

Table 2

Performance Test Unit 4 Bag House
Date Oct 2, 2008

Inlet Grain Loading gr/dscf	Outlet Grain Loading gr/dscf	Fabric Filter PM Efficiency % Removal
4.87	0.0073	99.85%

Request Item – 3, PM_{10} Emission Limit Supporting Information - Continued

Table 3

Unit 4 Particulate Compliance Test
Date Oct 15 -16, 2008

	Run 1	Run 2	Run 3	3 Run Average
PM Concentration (gr/dscf)	0.01037	0.00333	0.00407	0.01
PM Emission Rate (lbs/hr)	85.91	29.53	34.92	50.12
PM Emission Rate (lbs/mmbtu)	0.02258	0.00776	0.00918	0.0137

Table 4

Comparison of Similar Operating Unit PM-10 Limits

Plant	APS Cholla 2	APS Cholla 3	APS Cholla 4	Pacific Corp Dave Johnston 4	Pacific Corp Naughton	Pacific Corp Wyodak
Proposed Controls	New Fabric Filter	Replacement fabric filter	Replacement fabric filter	New Fabric Filter	New Fabric Filter	Upgraded Dry FGD & FF
Boiler Type	Tangential	Tangential	Tangential	Tangential	Tangential	Tangential
Fuel	Bituminous	Bituminous	Bituminous	Sub-bituminous	Sub-bituminous	Sub-bituminous
MW - Gross	300	300	425	230	330	330
Proposed BART Limit	0.015	0.015	0.015	0.015	0.015	0.015

List of Attachments

A. Appendix A supporting information used for economic analysis

B. APS / PacifiCorp Fuel Contract Excerpts

C. NOx Operating Data – Cholla Units 1, 2, 3 & 4

D. Permitted PM-10 BACT Emission Limits

E. EPA Technology Transfer RACT/BACT Clearinghouse PM-10 Permit Listings

F. EPRI Report - Status and Performance of Recently Permitted BACT/LAER Plants,
Note: Prepared by Burns and McDonnell Engineering Company
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Attachment – A

Appendix A Economic Analysis Information

Economic Analysis
Example Calculation
Cholla Unit 2
LNB w/SOFA & SCR

Total First Year Cost = Total Fixed Cost + Total Variable Cost + Debt Service

$9,624,979 = $300,000 + $1,446,683 + $7,878,296

Total Fixed Cost = Total Fixed O&M Cost * (1 + escalation rate)^year

$300,000 = $300,000 * (1 + 2.0%)^0

- Total Fixed O&M Cost = Operating Labor + Maintenance Material + Maintenance Labor + Administrative Labor

  $300,000 = $75,000 + $150,000 + $75,000 + $0

Total Variable Cost = Reagent Cost + SCR Catalyst Cost + Electric Power Cost

$1,446,683 = $398,813 + $450,000 + $597,870

- Reagent Cost = First Year Reagent Cost * (1 + escalation rate)^year

  $398,813 = $398,813 * (1 + 2.0%)^0

  - First Year Reagent Cost = (Reagent Usage/2000) * Annual Operation * Unit Cost

    $398,813 = 250 lb/hr * 1 ton/2000 lb * 7972 hr * $400/1 ton

  - Reagent Usage = Molar Stoichiometry * (NOx Removal Rate LNB w/SOFA & SCR – NOx Removal Rate LNB w/SOFA) * 17.034/Reagent Purity

    250 lb/hr = 1.0 * (42.39 - 27.71) lbmoles/hr * 17.034 lbs/lbmoles * 1/100

- SCR Catalyst Cost = First Year Catalyst Cost * (1 + escalation rate)^year

  $450,000 = $450,000 * (1 + 2.0%)^0

  - First Year Catalyst Cost = Annual SCR Catalyst * SCR Catalyst Cost

    $450,000 = 150 m^3 * $3000/$m^3$

- Electric Power Cost = First Year Auxiliary Power Cost * (1 + escalation rate)^year

  $597,870 = $597,870 * (1 + 2.0%)^0

  - First Year Auxiliary Power Cost = Auxiliary Power Requirement * Unit Cost * Annual Operation

    $597,870 = 1.5 MW * $50/MW-hr * 7972 hr

Debt Service = PMT(Interest Rate, Plant Life, Installed Capital Cost)

- Definition: PMT calculates the payment for a loan based on constant payments and a constant interest rate.
  - PMT(rate,nper,pv)
    - Rate - is the interest rate for the loan.
    - Nper - is the total number of payments for the loan.
    - Pv - is the present value, or the total amount that a series of future payments is worth now; also known as the principal.

$7,878,296 = PMT(7.10%, 20 yrs, $82,818,000)

- Installed Capital Cost – A build up of the design cost usually provided by a vendor. Built up using the following categories, then a contingency is added:
  - Construction
  - Balance of Plant
  - Electrical (Allowance)
  - Owner's Costs
  - Surcharge
  - AFUDC – Allowance for Funding During Construction

Economic Analysis Assumptions:

Unit Design	Provided by APS
Coal Characteristics	Provided by APS
Economic Factors	Per CH2M HILL assumptions
Installed Capital Cost	Combination of CH2M HILL database and vendor information
Fixed O&M Costs	CH2M HILL database based on size of unit
Variable O&M	CH2M HILL database

Attachment – B

APS / Pacific Corp Fuel Contract Excerpts

COAL SUPPLY AGREEMENT

THIS COAL SUPPLY AGREEMENT ("Agreement"), made and entered into as of the 21st day of December, 2005 ("Agreement Date") by and among **Arizona Public Service Company** (on its own behalf with respect to Units 1, 2, 3 of the Cholla Generating Station, and as Operating Agent on behalf of PacifiCorp with respect to Cholla Unit 4), **PacifiCorp** (collectively "Buyer"), and **COALSALES, LLC** ("Seller"), a Delaware limited liability company with its principal offices located at 701 Market Street, Suite 831, Saint Louis, Missouri 63101, together with Seller, the "Parties."

WITNESSETH

WHEREAS, Buyer desires to purchase and accept delivery of and Seller desires to sell and deliver coal for use in Buyer's Units 1, 2, 3, and 4 of the Cholla Generating Station (the "Plant") on the terms and conditions set forth in this Agreement below;

WHEREAS, the Parties acknowledge and accept that Seller is not a coal production company and does not actually own or operate an active coal mine. However, Seller does currently, and/or in the future will, have a contractual right to acquire and to sell to Buyer coal produced from Seller's affiliated company's Lee Ranch Coal Company Mine and/or the El Segundo Mine in New Mexico, which is capable of commercial production and sale of coal in quantities and with the qualities and characteristics specified in this Agreement for use in the Plant.

NOW, THEREFORE, in consideration of the mutual covenants and promises set forth below, Buyer and Seller agree as follows:

Article 1. Term

§1.1 Term. The term of this Agreement shall commence on January 1, 2006 (the "Effective Date") and shall continue through December 31, 2024 (the "Term") unless earlier terminated in accordance with this Agreement. Deliveries of coal pursuant to the terms of this Agreement shall take place during the period beginning January 1, 2006 and continuing through December 31, 2024 (the "Delivery Period"). Provided, however the term of this Agreement may be extended in the event that tonnage is being made up due to poor carrier performance in 2024.

Article 2. Source, Point of Delivery, Title and Risk of Loss, Substitution and Reserves

§2.1 Source. The source of coal to be delivered pursuant to this Agreement shall be Seller's affiliated company's Lee Ranch Coal Company Mine and/or the El Segundo Mine in New Mexico (the "Mine"). In the event that substitute coal is delivered pursuant to Section 2.4, the term "Mine" shall then, and only then, include the substitute source(s) of coal.

§2.2 Point of Delivery. The "Point of Delivery" for coal purchased and sold pursuant to the terms of this Agreement will be F.O.B. Mine. The coal purchased and sold shall be delivered into unit trains ("Unit Trains") provided by Buyer or Buyer's carrier at the Point of Delivery. Buyer shall provide clean railcars with all doors locked and ready for loading at the Point of Delivery. Seller shall be responsible for any costs or charges imposed on or associated with the delivery of the coal up to the Point of Delivery. Buyer shall be responsible for any costs or charges imposed on or associated with the transportation of coal upon taking title to the coal at the Point of Delivery.

§2.3 Title and Risk of Loss. Title and risk of loss shall pass from Seller to Buyer after the coal is loaded into each railcar at the Point of Delivery, except to the extent that a loss is caused by the negligent act or omission of the mine operator or its agent, in which case title to and risk of loss shall be the responsibility of Seller until the last car in the relevant unit train, loaded with Seller's coal or coal from any substitute source, has passed the property line of the applicable Mine; provided, however, Seller shall not be responsible for any loss resulting from unlocked railcar doors or defects in the railcars. Buyer shall have the option, by written notice to Seller, to change the point at which title of the coal transfers to Buyer; provided, however, Buyer will retain the risk of loss during transportation of the coal to the Plant.

§2.4 Substitution. Seller shall have the right (but not the obligation) at any time during the Term of this Agreement to substitute coal for all or part of the coal then remaining to be delivered from the Mine pending Buyers agreement that substitute coal is a suitable coal for substitution, approval of which will not be unreasonably withheld. All substitute coal shall substantially conform to the quality specifications and all other

requirements of this Agreement. The price of substitute coal shall be determined in advance by Buyer and Seller so that the total cost to Buyer of acquiring and transporting and burning such substitute coal shall be the same on a cents per million Btu basis as the cost of acquiring and transporting coal from the original source. The right of Seller to substitute coal will be contingent upon a successful test burn, as determined by Buyer in the exercise of Buyer's sole discretion, of proposed coal by the Plant consistent with industry practice and customs. Transportation of any substitute coal shall meet the scheduling needs of the Buyer.

§2.5 Reserves. Seller shall require the Mine to dedicate sufficient reserves to this Agreement to ensure Seller's ability to meet the contractual commitment to Buyer under this Agreement. Buyer (or Buyer's independent contractor), within three (3) months of the execution of this Agreement, will have the right to verify the reserves and mine plan. Buyer shall confirm to Seller in writing whether or not Buyer has verified the reserves and whether the Mine plan is acceptable to Buyer. In event Buyer does not verify the reserves and Mine plan and exercising reasonable due diligence, the Buyer may terminate this Agreement at anytime within the three (3) month period upon ten (10) days prior written notice to Seller and this Agreement shall terminate without further recourse to either Party except for the coal delivered prior to termination.

§2.6 Performance of Seller's Obligations. The Parties acknowledge that Seller will provide or will cause its affiliate companies to provide the coal to be sold under this Agreement. Accordingly, any obligation required to be performed by Seller under this Agreement may be performed by Seller or Seller's affiliated company including the production and loading of coal by the Mine. Any right or obligation under this Agreement which references Seller shall be deemed to include the Mine, as applicable and shall be performed in accordance with the terms and conditions of this Agreement.

Article 3. Quantity

§3.1 Annual Quantity. During the Delivery Period, Seller agrees to sell and deliver to the Buyer and Buyer agrees to purchase and accept from Seller, FOB railcar at the Point of Delivery, the Annual Quantity of Coal each calendar year based on 9,200 Btu/lb. as follows:

Calendar Year	Annual Quantity (Tons)
2006	325,000
2007	500,000 to 700,000
2008	1,000,000
2009	2,300,000 to 2,500,000
2010-2024	3,700,000 to 4,300,000

No later than July 1 of 2006 and 2008, Buyer shall nominate the annual tonnage amount for calendar year 2007 and 2009, respectively.

For calendar years 2010-2024, no later than July 1 of each year, Buyer shall nominate the annual tonnage amount for the subsequent year. In no event will the nominated annual tonnage amount for calendar years 2010- 2024 be less than 3,700,000 tons.

All calendar year deliveries shall be made in approximate equal monthly quantities based on an annual schedule as agreed to by the Parties.

Seller shall provide Buyer by October 1 of each year with a non binding notification summary of the expected quality specifications, division of royalty structure (Fee Land/Federal/State), and mine origin (Lee Ranch/El Segundo) for planned deliveries in the following three years.

§3.2 Additional Tonnage. In the event Buyer determines that it needs more coal than the maximum annual quantity in a calendar year, the Parties agree to work together to determine if this coal could be supplied from Lee Ranch Coal Company Mine and/or the El Segundo Mine under the terms of this Agreement. If Seller cannot supply these tons from the Lee Ranch Coal Company Mine and/or the El Segundo Mine, Seller shall retain a right of first refusal to match the delivered price per MMBtu and associated quality specifications from another mine source.

§3.3 No Resale of Coal to Third Parties. Buyer shall have no right to resell any portion of the Coal sold and purchased under this Agreement to another party not an Affiliate of Buyer, without the prior written consent of Seller; provided, however, Buyer shall have the right to resell coal to a third party who will take delivery at the El Segundo/Lee Ranch Mine in order for Buyer to meet tonnage commitments and avoid shortfall payments to Seller.

In the event that the credit rating assigned to Buyer's long-term indebtedness falls below BBB- as defined by Standard & Poor's or the equivalent as defined by other public ratings agencies, and the Buyer has a material unpaid past due balance, Buyer shall, upon reasonable prior written notice from Seller, provide Seller with a mutually agreed upon form of credit enhancement under this Agreement (e.g. letter of credit, guaranty from an investment grade entity, advance payment in cash at the time of delivery etc.). If at anytime Buyer's credit rating is below BBB-, and until acceptable assurances of investment grade credit are received, Seller shall have the right to require payment in cash at the time of delivery.

In the event that the credit rating assigned to Peabody Energy Corporation's long term indebtedness falls below BB- as defined by Standard & Poor's or the equivalent as defined by other public ratings agencies, and the Seller has material, unexcused reductions in shipments from the agreed upon shipment schedule, Seller shall, upon reasonable prior written notice from Buyer, provide Buyer with a mutually agreed upon form of credit enhancement under this Agreement (e.g. performance bond, letter of credit, guaranty from an investment grade entity, etc.).

Buyer and Seller shall promptly inform each other of any event that may give rise to a request by the other party for credit enhancement.

§5.4 Other Rights of Seller. If: (i) Buyer fails to pay when due any undisputed amount owed to Seller pursuant to this Agreement, (ii) Buyer fails to perform any of its material obligations under this Agreement, (iii) Buyer becomes insolvent or subject to any proceeding under bankruptcy or insolvency laws, including any assignment for the benefit of creditors or (iv) any of Buyer's property is placed in custody of a receiver or trustee or is seized, attached or levied on, then, unless in respect to a default under (i), the default has not been cured within ten (10) days following receipt of Seller's written notice of default; and in respect to defaults under clauses (ii) through (iv), the default has been cured within thirty (30) days following receipt of Seller's written notice of default, Seller may suspend further deliveries and sales hereunder and shall have all rights and remedies available at law or in equity as the Seller of the coal.

Article 6. Coal Quality

§6.1 General Quality Conditions. The coal purchased and sold pursuant to this Agreement shall be crushed to no larger than a nominal size of 2.5" X 0", and substantially free from impurities including, but not limited to, bone, slate, earth, rock, pyrite, wood, tramp metal and mine debris.

§6.2 Specific Quality Characteristics. Coal purchased and sold pursuant to this Agreement shall conform to the following specifications on an "as received" monthly basis at the Point of Delivery:

Characteristics	Typical	Trainload Rejection Limits ("Rejection Point Coal")
Moisture Content (% by weight)	19.0%	>22.0%
Ash Content (% by weight)	19.0%	>24.0%
Calorific Value (BTUs per Pound)	9,200	<8,800
Sulfur Content (SO2 lbs/MMBtu)	2.4	> 3.0
Mercury (ppm)*	0.09 (range: 0.02 – 0.30)	NA

§6.3 Buyer's Right of Rejection and Suspension. Buyer shall have the right in cases of coal quality deficiencies, exercisable at its sole discretion, to immediately suspend further delivery of coal from Seller, by giving verbal, followed by written, notice to Seller, under any one or more of the following

* Currently, the extent of the Mine's mercury testing program is to send a sample once a month to the STS lab in Denver to run a trace element analysis, which would include mercury. If additional mercury testing requirements are required, the Parties will implement the required testing with additional costs of testing to be paid by Buyer. Within three (3) months of this Agreement Date, Seller will consult with Buyer to develop a process for initial determination and subsequent verification of the coal rank associated with the deposits to be mined to satisfy the requirements of this Agreement.

EL SEGUNDO

Total Area
TYPICAL ANALYSIS

Raw Basis
State of New Mexico

Report Date 3/30/2005
Prepared by W.B. Emke

	Mean	Min	Max
Proximate Analysis (As Received)			
Moisture	17.6	16.1	18.8
Ash	16.8	12.8	20.8
Volatile Matter	31.7	28.7	34.7
Fixed Carbon	33.9	30.4	36.9
BTU	9215	8700	9700
Sulfur	1.10	0.80	2.00
MAFBTU	14049		
Lb. S/MMBTU	1.19	0.94	1.44
Lb. SO2/MMBTU	2.38	1.88	3.60
Ultimate Analysis (Dry)			
Carbon	61.9	57.9	65.9
Hydrogen	4.6	4.0	5.2
Nitrogen	1.0	0.7	1.3
Chlorine	0.02	<0.01	0.03
Sulfur	1.33	0.98	2.43
Ash	20.4	15.6	25.3
Oxygen	10.75	8.3	13.2
Sulfur Forms (Dry)			
Pyritic	0.54	0.10	1.20
Sulfate	0.03	<0.01	0.10
Organic	0.76	0.25	1.50
Ash Fusion			
Reducing Atmosphere			
Initial Deformation (I.D.)	2450	2250	2650
Softening (H=W)	2510	2310	+2700
Hemispherical (H=1/2W)	2560	2360	+2700
Fluid	2650	2450	+2700
Oxidizing Atmosphere			
Initial Deformation (I.D.)	2545	2345	+2700
Softening (H=W)	2610	2410	+2700
Hemispherical (H=1/2W)	2675	2475	+2700
Fluid	+2700	2435	+2700
Mineral Analysis Of Ash (Ignited Basis)			
Silica (SiO2)	57.8	52.8	62.8
Alumina (Al2O3)	21.5	17.5	25.5
Titania (TiO2)	1.0	0.7	1.3
Ferric Oxide (Fe2O3)	8.6	7.1	10.1
Lime (CaO)	4.5	2.6	7.5
Magnesia (MgO)	1.1	0.5	2.0
Potassium Oxide (K2O)	0.8	0.6	1.4
Sodium Oxide (Na2O)	1.0	0.6	1.5
Phosphorous Pentoxide (P2O5)	0.2	0.1	0.4
Sulfur Trioxide (SO3)	3.2	1.7	5.5
Strontium Oxide (SrO)	0.2	<0.1	0.2
Barium Oxide (BaO)	0.1	<0.1	0.2
Manganese Dioxide (MnO2)	<0.1	<0.1	0.1
Alkalies As Na2O	0.31	0.21	0.41
Base/Acid Ratio	0.20	0.10	0.30
Silica Value	80.28	73	87
Slag Viscosity @ T250	2760	2500	>2900
Mercury (Dry Whole Coal Basis ppm)	0.09	<0.02	0.25
Water Soluble Alkalies (Dry)			
Sodium Oxide	0.086	0.02	0.17
Potassium Oxide	0.003	<0.01	0.01
Equilibrium Moisture	15.3	13.3	18.3
Free Swelling Index	0.0	0.0	0.5
HGI @ Production Moisture	52	46	58

Indicated ranges based on 95% of the samples from apporoximately 10,000 ton shipments sampled at the mine in accordance with ASTM Standards. Sampling and sample reduction tolerances have been disregarded as they are not specified in ASTM. Consequently, the ranges may be slightly greater then those values shown. All analysis are subject to revision due to additional coring, conditions specified in the coal supply agreement, actual operating conditions at time of mining, type of preparation at time of mining, or federal and state regulations. Analysis intended for informational purposes only. Analysis based on cores and production samples.

LEE RANCH COAL COMPANY

TYPICAL ANALYSIS
2005

Raw Basis
State of New Mexico

Report Date 3/30/2005
Prepared by W.B. Emke

	Mean	Min	Max
Proximate Analysis (As Received)			
Moisture	15.3	14.0	16.6
Ash	17.8	14.3	21.3
Volatile Matter	33.5	32.1	34.9
Fixed Carbon	33.4	30.4	36.4
BTU	9250	8750	9750
Sulfur	0.90	0.74	1.06
MAFBTU	13824		
Lb. S/MMBTU	0.97	0.81	1.13
Lb. SO2/MMBTU	1.94	1.64	2.24
Ultimate Analysis (Dry)			
Carbon	61.7	57.7	65.7
Hydrogen	4.5	3.9	5.1
Nitrogen	1.0	0.7	1.3
Chlorine	0.01	<0.01	0.01
Sulfur	1.06	0.88	1.24
Ash	21.0	16.9	25.1
Oxygen	10.73	9.1	12.3
Sulfur Forms (Dry)			
Pyritic	0.39	0.17	0.61
Sulfate	0.01	<0.01	0.01
Organic	0.66	0.48	0.84
Ash Fusion			
Reducing Atmosphere			
Initial Deformation (I.D.)	2495	2345	2645
Softening (H=W)	2560	2410	+2700
Hemispherical (H=1/2W)	2620	2470	+2700
Fluid	2675	2525	+2700
Oxidizing Atmosphere			
Initial Deformation (I.D.)	2590	2440	+2700
Softening (H=W)	2645	2495	+2700
Hemispherical (H=1/2W)	2690	2540	+2700
Fluid	+2700	2600	+2700
Mineral Analysis Of Ash (Ignited Basis)			
Silica (SiO2)	60.3	55.3	65.3
Alumina (Al2O3)	23.3	21.1	25.5
Titania (TiO2)	1.0	0.9	1.1
Ferric Oxide (Fe2O3)	5.6	4.5	6.7
Lime (CaO)	4.3	2.1	6.5
Magnesia (MgO)	1.0	0.8	1.2
Potassium Oxide (K2O)	1.1	0.8	1.4
Sodium Oxide (Na2O)	0.4	0.3	0.5
Phosphorous Pentoxide (P2O5)	0.1	0.9	1.1
Sulfur Trioxide (SO3)	2.6	2.0	4.5
Strontium Oxide (SrO)	0.1	<0.1	0.1
Barium Oxide (BaO)	0.2	<0.1	0.3
Manganese Dioxide (MnO2)	<0.1	<0.1	0.1
Alkalies As Na2O	0.24	0.15	0.33
Base/Acid Ratio	0.15	0.10	0.20
Silica Value	84.69	80.7	88.7
Slag Viscosity @ T250	>2900	2700	>2900
Water Soluble Alkalies (Dry)			
Sodium Oxide	0.079	0.02	0.14
Potassium Oxide	0.006	<0.01	0.02
Equilibrium Moisture	14.4	13.6	15.2
Free Swelling Index	0.0	0.0	0.5
HGI @ Production Moisture	55	47	63

Indicated ranges based on 95% of the samples from apporoximately 10,000 ton shipments sampled at the mine in accordance with ASTM Standards. Sampling and sample reduction tolerances have been disregarded as they are not specified in ASTM. Consequently, the ranges may be slightly greater then those values shown. All analysis are subject to revision due to additional coring, conditions specified in the coal supply agreement, actual operating conditions at time of mining, type of preparation at time of mining, or federal and state regulations. Analysis intended for informational purposes only. Analysis based on cores and production samples.

Attachment – C

Units 1-4 NOx Emission Data

Unit 1
GMW > 100
Average= 0.161 118.3

Date	Time	NOxBA lb/mbtu	Load GMW
1/1/2008	0:00	0.195	120
1/1/2008	1:00	0.193	120
1/1/2008	2:00	0.192	120
1/1/2008	3:00	0.19	120
1/1/2008	4:00	0.192	120
1/1/2008	5:00	0.189	120
1/1/2008	6:00	0.191	120
1/1/2008	7:00	0.189	120
1/1/2008	8:00	0.187	120
1/1/2008	9:00	0.193	121
1/1/2008	10:00	0.202	121
1/1/2008	11:00	0.201	121
1/1/2008	12:00	0.202	121
1/1/2008	13:00	0.203	121
1/1/2008	14:00	0.203	121
1/1/2008	15:00	0.2	111
1/1/2008	16:00	0.204	111
1/1/2008	17:00	0.202	119
1/1/2008	18:00	0.2	119
1/1/2008	19:00	0.2	119
1/1/2008	20:00	0.2	120
1/1/2008	21:00	0.2	120
1/1/2008	22:00	0.202	120
1/1/2008	23:00	0.2	119
1/2/2008	0:00	0.201	120
1/2/2008	1:00	0.198	119
1/2/2008	2:00	0.198	119
1/2/2008	3:00	0.2	119
1/2/2008	4:00	0.203	120
1/2/2008	5:00	0.198	120
1/2/2008	6:00	0.198	120
1/2/2008	7:00	0.206	122
1/2/2008	8:00	0.199	123
1/2/2008	9:00	0.199	122
1/2/2008	10:00	0.197	123
1/2/2008	11:00	0.195	123
1/2/2008	12:00	0.196	123
1/2/2008	13:00	0.199	122
1/2/2008	14:00	0.2	123
1/2/2008	15:00	0.199	122
1/2/2008	16:00	0.203	122
1/2/2008	17:00	0.203	122
1/2/2008	18:00	0.203	122
1/2/2008	19:00	0.205	123
1/2/2008	20:00	0.205	122
1/2/2008	22:00	0.201	118
1/2/2008	23:00	0.201	120

Unit 2
GMW > 244
Average= 0.304 286.1

Date	Time	NOxBA lb/mbtu	Load GMW
4/1/2008	0:00	0.318	269
4/1/2008	1:00	0.335	277
4/1/2008	2:00	0.344	277
4/1/2008	3:00	0.302	251
4/1/2008	4:00	0.315	265
4/1/2008	6:00	0.312	272
4/1/2008	7:00	0.334	286
4/1/2008	8:00	0.322	286
4/1/2008	9:00	0.322	284
4/1/2008	10:00	0.339	282
4/1/2008	11:00	0.367	283
4/1/2008	12:00	0.367	282
4/1/2008	13:00	0.339	282
4/1/2008	14:00	0.367	280
4/1/2008	15:00	0.367	282
4/1/2008	16:00	0.367	285
4/1/2008	17:00	0.367	284
4/1/2008	18:00	0.367	284
4/1/2008	19:00	0.343	280
4/1/2008	20:00	0.331	281
4/1/2008	21:00	0.32	280
4/2/2008	2:00	0.329	271
4/2/2008	3:00	0.392	278
4/2/2008	6:00	0.358	274
4/2/2008	7:00	0.32	285
4/2/2008	8:00	0.328	283
4/2/2008	9:00	0.32	270
4/2/2008	10:00	0.333	285
4/2/2008	11:00	0.329	280
4/2/2008	12:00	0.336	278
4/2/2008	13:00	0.336	279
4/2/2008	14:00	0.344	278
4/2/2008	15:00	0.336	278
4/2/2008	16:00	0.331	278
4/2/2008	17:00	0.34	278
4/2/2008	18:00	0.345	277
4/2/2008	19:00	0.347	279
4/2/2008	20:00	0.356	278
4/2/2008	21:00	0.36	275
4/2/2008	22:00	0.364	275
4/3/2008	5:00	0.353	259
4/3/2008	7:00	0.347	272
4/3/2008	8:00	0.368	274
4/3/2008	9:00	0.36	275
4/3/2008	10:00	0.367	275
4/3/2008	15:00	0.316	275
4/3/2008	16:00	0.322	289

Unit 1
GMW > 100

	Average=	**0.160**	**118.3**
Date	Time	NOxBA lb/mbtu	Load GMW
1/3/2008	5:00	0.191	107
1/3/2008	6:00	0.19	115
1/3/2008	7:00	0.19	113
1/3/2008	8:00	0.349	110
1/3/2008	9:00	0.192	109
1/3/2008	10:00	0.194	109
1/3/2008	11:00	0.197	114
1/3/2008	12:00	0.196	110
1/3/2008	13:00	0.193	105
1/3/2008	15:00	0.204	107
1/3/2008	16:00	0.209	115
1/3/2008	17:00	0.213	121
1/3/2008	18:00	0.216	123
1/3/2008	19:00	0.216	123
1/3/2008	20:00	0.213	123
1/3/2008	21:00	0.214	123
1/3/2008	22:00	0.214	123
1/3/2008	23:00	0.214	122
1/4/2008	0:00	0.215	123
1/4/2008	1:00	0.214	123
1/4/2008	2:00	0.213	123
1/4/2008	3:00	0.212	123
1/4/2008	4:00	0.214	123
1/4/2008	5:00	0.21	123
1/4/2008	6:00	0.214	123
1/4/2008	7:00	0.216	123
1/4/2008	8:00	0.219	121
1/5/2008	0:00	0.194	112
1/5/2008	1:00	0.199	114
1/5/2008	2:00	0.2	115
1/5/2008	3:00	0.201	114
1/5/2008	4:00	0.2	115
1/5/2008	5:00	0.198	115
1/5/2008	6:00	0.199	114
1/5/2008	7:00	0.201	114
1/5/2008	8:00	0.2	114
1/5/2008	9:00	0.195	114
1/5/2008	10:00	0.197	114
1/5/2008	11:00	0.199	114
1/5/2008	12:00	0.2	114
1/5/2008	13:00	0.2	115
1/5/2008	14:00	0.2	116
1/5/2008	15:00	0.199	116
1/5/2008	16:00	0.198	116
1/5/2008	17:00	0.2	117
1/5/2008	18:00	0.201	117
1/5/2008	20:00	0.201	117

Unit 2
GMW > 244

	Average=	**0.303**	**286.2**
Date	Time	NOxBA lb/mbtu	Load GMW
4/3/2008	21:00	0.329	287
4/3/2008	22:00	0.334	285
4/3/2008	23:00	0.333	284
4/4/2008	0:00	0.332	263
4/4/2008	1:00	0.331	251
4/4/2008	5:00	0.323	261
4/4/2008	6:00	0.32	273
4/4/2008	7:00	0.331	288
4/4/2008	8:00	0.327	288
4/4/2008	9:00	0.32	286
4/4/2008	10:00	0.32	287
4/4/2008	11:00	0.306	289
4/4/2008	12:00	0.303	290
4/4/2008	13:00	0.305	289
4/4/2008	14:00	0.305	291
4/4/2008	15:00	0.299	290
4/4/2008	16:00	0.298	291
4/4/2008	17:00	0.305	290
4/4/2008	18:00	0.308	289
4/4/2008	19:00	0.319	288
4/4/2008	20:00	0.325	288
4/4/2008	21:00	0.313	287
4/4/2008	22:00	0.317	288
4/4/2008	23:00	0.325	287
4/5/2008	0:00	0.34	256
4/5/2008	6:00	0.319	273
4/5/2008	7:00	0.317	267
4/5/2008	8:00	0.324	279
4/5/2008	9:00	0.325	282
4/5/2008	10:00	0.328	287
4/5/2008	11:00	0.325	286
4/5/2008	12:00	0.318	286
4/5/2008	13:00	0.325	285
4/5/2008	14:00	0.328	284
4/5/2008	15:00	0.326	284
4/5/2008	16:00	0.326	284
4/5/2008	17:00	0.332	282
4/5/2008	18:00	0.331	284
4/5/2008	19:00	0.328	285
4/5/2008	20:00	0.331	285
4/5/2008	21:00	0.335	262
4/7/2008	4:00	0.326	273
4/7/2008	6:00	0.321	268
4/7/2008	7:00	0.32	280
4/7/2008	8:00	0.324	278
4/7/2008	9:00	0.293	281
4/7/2008	11:00	0.271	285

	Unit 1		
	GMW > 100		
	Average=	**0.160**	**118.3**
Date	Time	NOxBA lb/mbtu	Load GMW
1/6/2008	1:00	0.204	117
1/6/2008	2:00	0.205	117
1/6/2008	3:00	0.204	117
1/6/2008	4:00	0.206	117
1/6/2008	5:00	0.204	117
1/6/2008	6:00	0.205	117
1/6/2008	7:00	0.207	117
1/6/2008	8:00	0.214	118
1/6/2008	9:00	0.209	118
1/6/2008	10:00	0.21	118
1/6/2008	11:00	0.208	116
1/6/2008	12:00	0.209	117
1/6/2008	13:00	0.206	117
1/6/2008	14:00	0.206	117
1/6/2008	15:00	0.206	117
1/6/2008	16:00	0.204	118
1/6/2008	17:00	0.205	117
1/6/2008	18:00	0.203	117
1/6/2008	19:00	0.202	118
1/6/2008	20:00	0.204	118
1/6/2008	21:00	0.203	117
1/6/2008	22:00	0.203	117
1/6/2008	23:00	0.202	117
1/7/2008	1:00	0.196	108
1/7/2008	2:00	0.199	114
1/7/2008	3:00	0.208	118
1/7/2008	4:00	0.209	118
1/7/2008	5:00	0.207	110
1/7/2008	6:00	0.21	116
1/7/2008	7:00	0.213	117
1/7/2008	8:00	0.218	117
1/7/2008	9:00	0.212	117
1/7/2008	10:00	0.214	118
1/7/2008	11:00	0.212	118
1/7/2008	12:00	0.211	118
1/7/2008	13:00	0.213	118
1/7/2008	14:00	0.213	117
1/7/2008	15:00	0.214	117
1/7/2008	16:00	0.214	117
1/7/2008	17:00	0.213	117
1/7/2008	18:00	0.211	117
1/7/2008	19:00	0.211	118
1/7/2008	20:00	0.211	118
1/7/2008	21:00	0.212	118
1/7/2008	22:00	0.213	118
1/7/2008	23:00	0.21	118
1/8/2008	1:00	0.206	118

	Unit 2		
	GMW > 244		
	Average=	**0.303**	**286.2**
Date	Time	NOxBA lb/mbtu	Load GMW
4/7/2008	16:00	0.309	282
4/7/2008	17:00	0.306	282
4/7/2008	18:00	0.3	280
4/7/2008	19:00	0.287	280
4/7/2008	22:00	0.284	280
4/7/2008	23:00	0.307	285
4/8/2008	0:00	0.321	285
4/8/2008	1:00	0.316	285
4/8/2008	2:00	0.302	285
4/8/2008	3:00	0.298	285
4/8/2008	4:00	0.305	285
4/8/2008	5:00	0.308	285
4/8/2008	6:00	0.304	285
4/8/2008	7:00	0.305	294
4/8/2008	8:00	0.307	294
4/8/2008	9:00	0.308	289
4/8/2008	10:00	0.32	288
4/8/2008	11:00	0.31	284
4/8/2008	12:00	0.306	282
4/8/2008	13:00	0.306	285
4/8/2008	14:00	0.291	288
4/8/2008	15:00	0.278	283
4/8/2008	16:00	0.268	285
4/8/2008	17:00	0.295	282
4/8/2008	18:00	0.317	278
4/8/2008	19:00	0.303	276
4/8/2008	20:00	0.313	278
4/8/2008	21:00	0.303	280
4/8/2008	22:00	0.315	278
4/8/2008	23:00	0.316	278
4/9/2008	0:00	0.318	279
4/9/2008	1:00	0.31	281
4/9/2008	2:00	0.313	282
4/9/2008	3:00	0.297	272
4/9/2008	4:00	0.29	276
4/9/2008	5:00	0.31	279
4/9/2008	6:00	0.31	279
4/9/2008	7:00	0.324	277
4/9/2008	8:00	0.305	280
4/9/2008	9:00	0.288	272
4/9/2008	10:00	0.29	271
4/9/2008	11:00	0.275	273
4/9/2008	12:00	0.274	272
4/9/2008	13:00	0.26	276
4/9/2008	14:00	0.258	263
4/9/2008	15:00	0.27	276
4/9/2008	17:00	0.233	281

	Unit 1				Unit 2		
	GMW > 100				GMW > 244		
	Average=	**0.160**	**118.3**		**Average=**	**0.303**	**286.2**
Date	Time	NOxBA lb/mbtu	Load GMW	Date	Time	NOxBA lb/mbtu	Load GMW
1/8/2008	6:00	0.205	118	4/9/2008	22:00	0.24	281
1/8/2008	7:00	0.2	118	4/9/2008	23:00	0.242	282
1/8/2008	8:00	0.203	118	4/10/2008	0:00	0.241	282
1/8/2008	9:00	0.199	118	4/10/2008	1:00	0.242	284
1/8/2008	10:00	0.201	118	4/10/2008	2:00	0.246	284
1/8/2008	11:00	0.2	118	4/10/2008	3:00	0.24	284
1/8/2008	12:00	0.201	118	4/10/2008	4:00	0.24	285
1/8/2008	13:00	0.203	118	4/10/2008	5:00	0.241	285
1/8/2008	14:00	0.202	118	4/10/2008	6:00	0.244	285
1/8/2008	15:00	0.202	118	4/10/2008	7:00	0.242	284
1/8/2008	16:00	0.201	118	4/10/2008	8:00	0.232	275
1/8/2008	17:00	0.201	117	4/10/2008	9:00	0.24	275
1/8/2008	18:00	0.201	118	4/10/2008	10:00	0.234	275
1/8/2008	19:00	0.201	117	4/10/2008	11:00	0.234	274
1/8/2008	20:00	0.202	118	4/10/2008	12:00	0.256	273
1/8/2008	21:00	0.201	118	4/10/2008	13:00	0.226	281
1/8/2008	22:00	0.2	118	4/10/2008	14:00	0.222	281
1/8/2008	23:00	0.206	117	4/10/2008	15:00	0.219	281
1/9/2008	0:00	0.209	117	4/10/2008	16:00	0.219	275
1/9/2008	1:00	0.207	117	4/10/2008	17:00	0.271	272
1/9/2008	2:00	0.206	118	4/10/2008	18:00	0.233	265
1/9/2008	3:00	0.204	117	4/10/2008	19:00	0.241	270
1/9/2008	4:00	0.202	118	4/10/2008	20:00	0.249	275
1/9/2008	5:00	0.201	117	4/10/2008	21:00	0.242	274
1/9/2008	6:00	0.2	118	4/10/2008	22:00	0.218	273
1/9/2008	7:00	0.208	118	4/10/2008	23:00	0.223	273
1/9/2008	8:00	0.211	118	4/11/2008	0:00	0.197	273
1/9/2008	9:00	0.204	118	4/11/2008	1:00	0.192	277
1/9/2008	10:00	0.206	118	4/11/2008	2:00	0.202	286
1/9/2008	11:00	0.21	118	4/11/2008	3:00	0.196	293
1/9/2008	12:00	0.209	118	4/11/2008	4:00	0.188	292
1/9/2008	13:00	0.207	118	4/11/2008	5:00	0.191	291
1/9/2008	14:00	0.208	118	4/11/2008	6:00	0.194	291
1/9/2008	15:00	0.207	118	4/11/2008	7:00	0.198	290
1/9/2008	16:00	0.206	118	4/11/2008	8:00	0.197	293
1/9/2008	17:00	0.203	118	4/11/2008	9:00	0.193	298
1/9/2008	18:00	0.204	118	4/11/2008	10:00	0.19	298
1/9/2008	19:00	0.203	118	4/11/2008	11:00	0.185	297
1/9/2008	20:00	0.202	118	4/11/2008	12:00	0.192	291
1/9/2008	21:00	0.201	118	4/11/2008	13:00	0.187	292
1/9/2008	22:00	0.202	118	4/11/2008	14:00	0.181	292
1/9/2008	23:00	0.202	118	4/11/2008	15:00	0.176	293
1/10/2008	0:00	0.201	118	4/11/2008	16:00	0.17	294
1/10/2008	1:00	0.2	118	4/11/2008	17:00	0.174	293
1/10/2008	2:00	0.2	118	4/11/2008	18:00	0.176	289
1/10/2008	3:00	0.198	118	4/11/2008	19:00	0.18	277
1/10/2008	5:00	0.196	118	4/11/2008	21:00	0.256	299

	Unit 1		
	GMW > 100		
	Average=	**0.160**	**118.3**
Date	Time	NOxBA lb/mbtu	Load GMW
1/10/2008	10:00	0.182	118
1/10/2008	11:00	0.181	118
1/10/2008	12:00	0.178	118
1/10/2008	13:00	0.18	118
1/10/2008	14:00	0.179	118
1/10/2008	15:00	0.178	118
1/10/2008	16:00	0.189	118
1/10/2008	17:00	0.186	118
1/10/2008	18:00	0.185	118
1/10/2008	19:00	0.184	118
1/10/2008	20:00	0.181	118
1/10/2008	21:00	0.181	118
1/10/2008	22:00	0.181	118
1/10/2008	23:00	0.182	118
1/11/2008	0:00	0.181	118
1/11/2008	1:00	0.19	118
1/11/2008	2:00	0.19	118
1/11/2008	3:00	0.188	118
1/11/2008	4:00	0.19	117
1/11/2008	6:00	0.192	118
1/11/2008	7:00	0.201	115
1/11/2008	10:00	0.19	115
1/11/2008	11:00	0.193	117
1/11/2008	12:00	0.199	117
1/11/2008	13:00	0.198	118
1/11/2008	14:00	0.196	118
1/11/2008	15:00	0.195	118
1/11/2008	16:00	0.205	119
1/11/2008	17:00	0.204	119
1/11/2008	18:00	0.203	119
1/11/2008	19:00	0.205	118
1/11/2008	20:00	0.209	118
1/11/2008	21:00	0.212	119
1/11/2008	22:00	0.211	118
1/11/2008	23:00	0.212	118
1/12/2008	0:00	0.211	118
1/12/2008	1:00	0.211	118
1/12/2008	2:00	0.213	117
1/12/2008	3:00	0.212	117
1/12/2008	4:00	0.211	118
1/12/2008	5:00	0.208	117
1/12/2008	6:00	0.206	117
1/12/2008	7:00	0.212	117
1/12/2008	8:00	0.204	117
1/12/2008	9:00	0.207	117
1/12/2008	10:00	0.207	117
1/12/2008	12:00	0.206	117

	Unit 2		
	GMW > 244		
	Average=	**0.304**	**286.2**
Date	Time	NOxBA lb/mbtu	Load GMW
4/12/2008	2:00	0.238	288
4/12/2008	3:00	0.229	277
4/12/2008	4:00	0.227	275
4/12/2008	5:00	0.239	286
4/12/2008	6:00	0.223	262
4/12/2008	7:00	0.226	280
4/12/2008	8:00	0.241	295
4/12/2008	9:00	0.18	293
4/12/2008	10:00	0.173	294
4/12/2008	11:00	0.171	292
4/12/2008	12:00	0.178	292
4/12/2008	13:00	0.175	292
4/12/2008	14:00	0.179	291
4/12/2008	15:00	0.187	290
4/12/2008	16:00	0.18	288
4/12/2008	17:00	0.176	290
4/12/2008	18:00	0.173	293
4/12/2008	19:00	0.18	290
4/12/2008	20:00	0.185	293
4/12/2008	21:00	0.183	291
4/12/2008	22:00	0.185	291
4/12/2008	23:00	0.182	294
4/13/2008	0:00	0.19	285
4/13/2008	1:00	0.221	258
4/13/2008	3:00	0.199	271
4/13/2008	7:00	0.233	284
4/13/2008	8:00	0.194	295
4/13/2008	9:00	0.188	294
4/13/2008	10:00	0.176	294
4/13/2008	11:00	0.166	295
4/13/2008	12:00	0.171	296
4/13/2008	13:00	0.168	293
4/13/2008	14:00	0.169	296
4/13/2008	15:00	0.172	292
4/13/2008	16:00	0.166	295
4/13/2008	17:00	0.173	293
4/13/2008	18:00	0.171	293
4/13/2008	19:00	0.174	286
4/13/2008	20:00	0.178	284
4/13/2008	21:00	0.174	284
4/13/2008	22:00	0.177	283
4/13/2008	23:00	0.188	282
4/14/2008	0:00	0.175	278
4/14/2008	1:00	0.168	262
4/14/2008	5:00	0.196	263
4/14/2008	6:00	0.206	269
4/14/2008	8:00	0.175	289

	Unit 1		
	GMW > 100		
	Average=	**0.159**	**118.3**
Date	Time	NOxBA lb/mbtu	Load GMW
1/12/2008	17:00	0.201	117
1/12/2008	18:00	0.201	117
1/12/2008	19:00	0.201	117
1/12/2008	20:00	0.202	117
1/12/2008	21:00	0.203	117
1/12/2008	22:00	0.201	117
1/12/2008	23:00	0.197	117
1/13/2008	0:00	0.196	117
1/13/2008	1:00	0.195	117
1/13/2008	2:00	0.195	117
1/13/2008	3:00	0.193	117
1/13/2008	4:00	0.192	117
1/13/2008	5:00	0.191	117
1/13/2008	6:00	0.189	117
1/13/2008	7:00	0.198	117
1/13/2008	8:00	0.19	117
1/13/2008	9:00	0.192	117
1/13/2008	10:00	0.196	117
1/13/2008	11:00	0.197	117
1/13/2008	12:00	0.197	117
1/13/2008	13:00	0.197	117
1/13/2008	14:00	0.195	117
1/13/2008	15:00	0.193	117
1/13/2008	16:00	0.191	117
1/13/2008	17:00	0.192	117
1/13/2008	18:00	0.19	117
1/13/2008	19:00	0.189	117
1/13/2008	20:00	0.188	117
1/13/2008	21:00	0.188	117
1/13/2008	22:00	0.189	117
1/13/2008	23:00	0.188	117
1/14/2008	0:00	0.189	117
1/14/2008	1:00	0.19	117
1/14/2008	2:00	0.189	117
1/14/2008	3:00	0.189	117
1/14/2008	4:00	0.19	117
1/14/2008	5:00	0.19	117
1/14/2008	6:00	0.19	117
1/14/2008	7:00	0.192	117
1/14/2008	8:00	0.194	118
1/14/2008	9:00	0.191	118
1/14/2008	10:00	0.19	118
1/14/2008	11:00	0.193	118
1/14/2008	12:00	0.197	118
1/14/2008	13:00	0.196	118
1/14/2008	14:00	0.195	118
1/14/2008	15:00	0.197	118

	Unit 2		
	GMW > 244		
	Average=	**0.305**	**286.2**
Date	Time	NOxBA lb/mbtu	Load GMW
4/14/2008	13:00	0.174	285
4/14/2008	14:00	0.164	285
4/14/2008	15:00	0.17	284
4/14/2008	16:00	0.175	287
4/14/2008	17:00	0.172	280
4/14/2008	18:00	0.18	284
4/14/2008	19:00	0.192	266
4/14/2008	20:00	0.173	275
4/14/2008	21:00	0.182	273
4/14/2008	22:00	0.177	280
4/14/2008	23:00	0.176	281
4/15/2008	0:00	0.177	281
4/15/2008	1:00	0.177	280
4/15/2008	2:00	0.175	282
4/15/2008	3:00	0.175	282
4/15/2008	4:00	0.172	281
4/15/2008	5:00	0.177	281
4/15/2008	6:00	0.171	280
4/15/2008	7:00	0.165	279
4/15/2008	8:00	0.148	269
4/15/2008	9:00	0.153	271
4/15/2008	10:00	0.166	279
4/15/2008	11:00	0.193	282
4/15/2008	12:00	0.194	277
4/15/2008	13:00	0.184	283
4/15/2008	14:00	0.185	284
4/15/2008	15:00	0.176	285
4/15/2008	16:00	0.164	285
4/15/2008	17:00	0.172	284
4/15/2008	18:00	0.17	284
4/15/2008	19:00	0.175	285
4/15/2008	20:00	0.179	284
4/15/2008	21:00	0.176	284
4/15/2008	22:00	0.177	284
4/15/2008	23:00	0.17	284
4/16/2008	0:00	0.172	286
4/16/2008	1:00	0.172	281
4/16/2008	2:00	0.187	246
4/16/2008	6:00	0.174	280
4/16/2008	7:00	0.171	285
4/16/2008	8:00	0.168	286
4/16/2008	9:00	0.16	286
4/16/2008	10:00	0.159	294
4/16/2008	11:00	0.16	291
4/16/2008	12:00	0.161	293
4/16/2008	13:00	0.169	292
4/16/2008	14:00	0.172	293

	Unit 1				Unit 2		
	GMW > 100				GMW > 244		
	Average=	**0.159**	**118.3**		**Average=**	**0.305**	**286.3**
		NOxBA	Load			NOxBA	Load
Date	Time	lb/mbtu	GMW	Date	Time	lb/mbtu	GMW
1/14/2008	21:00	0.194	118	4/16/2008	20:00	0.203	285
1/14/2008	22:00	0.194	118	4/16/2008	21:00	0.21	294
1/14/2008	23:00	0.194	119	4/16/2008	22:00	0.208	298
1/15/2008	0:00	0.195	118	4/16/2008	23:00	0.203	298
1/15/2008	1:00	0.197	118	4/17/2008	0:00	0.205	298
1/15/2008	2:00	0.196	119	4/17/2008	1:00	0.202	296
1/15/2008	3:00	0.196	119	4/17/2008	2:00	0.205	297
1/15/2008	4:00	0.196	119	4/17/2008	3:00	0.207	296
1/15/2008	5:00	0.195	119	4/17/2008	4:00	0.188	299
1/15/2008	6:00	0.196	119	4/17/2008	5:00	0.193	296
1/15/2008	7:00	0.198	119	4/17/2008	6:00	0.205	300
1/15/2008	8:00	0.199	119	4/17/2008	7:00	0.188	298
1/15/2008	9:00	0.197	119	4/17/2008	8:00	0.169	297
1/15/2008	10:00	0.196	119	4/17/2008	9:00	0.158	300
1/15/2008	11:00	0.197	119	4/17/2008	10:00	0.159	297
1/15/2008	12:00	0.198	119	4/17/2008	11:00	0.15	294
1/15/2008	13:00	0.199	119	4/17/2008	12:00	0.158	289
1/15/2008	14:00	0.197	119	4/17/2008	13:00	0.158	289
1/15/2008	15:00	0.197	119	4/17/2008	14:00	0.179	290
1/15/2008	16:00	0.199	119	4/17/2008	15:00	0.179	291
1/15/2008	17:00	0.199	119	4/17/2008	16:00	0.183	291
1/15/2008	18:00	0.201	119	4/17/2008	17:00	0.18	291
1/15/2008	19:00	0.206	119	4/17/2008	18:00	0.178	291
1/15/2008	20:00	0.206	119	4/17/2008	19:00	0.18	293
1/15/2008	21:00	0.204	119	4/17/2008	20:00	0.182	293
1/15/2008	22:00	0.205	119	4/17/2008	21:00	0.181	292
1/15/2008	23:00	0.205	119	4/17/2008	22:00	0.198	298
1/16/2008	0:00	0.202	119	4/17/2008	23:00	0.206	299
1/16/2008	1:00	0.2	119	4/18/2008	0:00	0.203	298
1/16/2008	2:00	0.2	119	4/18/2008	1:00	0.205	297
1/16/2008	3:00	0.2	119	4/18/2008	2:00	0.206	298
1/16/2008	4:00	0.195	119	4/18/2008	3:00	0.208	297
1/16/2008	5:00	0.196	119	4/18/2008	4:00	0.205	297
1/16/2008	6:00	0.197	119	4/18/2008	12:00	0.202	284
1/16/2008	7:00	0.199	120	4/18/2008	13:00	0.195	293
1/16/2008	8:00	0.198	120	4/18/2008	14:00	0.194	291
1/16/2008	9:00	0.193	120	4/18/2008	15:00	0.204	285
1/16/2008	10:00	0.19	120	4/18/2008	16:00	0.227	291
1/16/2008	11:00	0.19	120	4/18/2008	17:00	0.226	289
1/16/2008	12:00	0.192	120	4/18/2008	18:00	0.224	289
1/16/2008	13:00	0.19	120	4/18/2008	19:00	0.226	290
1/16/2008	14:00	0.191	120	4/18/2008	20:00	0.219	290
1/16/2008	15:00	0.192	120	4/18/2008	21:00	0.225	289
1/16/2008	16:00	0.19	120	4/18/2008	22:00	0.222	295
1/16/2008	17:00	0.191	120	4/18/2008	23:00	0.223	297
1/16/2008	18:00	0.19	120	4/19/2008	0:00	0.219	298
1/16/2008	20:00	0.187	121	4/19/2008	2:00	0.236	288

	Unit 1				Unit 2		
	GMW > 100				GMW > 244		
	Average=	**0.159**	**118.3**		**Average=**	**0.306**	**286.2**
		NOxBA	Load			NOxBA	Load
Date	Time	lb/mbtu	GMW	Date	Time	lb/mbtu	GMW
1/17/2008	1:00	0.185	122	4/19/2008	7:00	0.241	292
1/17/2008	2:00	0.183	122	4/19/2008	8:00	0.238	294
1/17/2008	3:00	0.184	122	4/19/2008	9:00	0.235	288
1/17/2008	4:00	0.184	122	4/19/2008	10:00	0.236	288
1/17/2008	5:00	0.183	122	4/19/2008	11:00	0.241	288
1/17/2008	6:00	0.182	122	4/19/2008	12:00	0.241	290
1/17/2008	7:00	0.184	122	4/19/2008	13:00	0.243	290
1/17/2008	8:00	0.191	122	4/19/2008	14:00	0.24	289
1/17/2008	9:00	0.188	122	4/19/2008	15:00	0.219	265
1/17/2008	10:00	0.188	123	4/19/2008	16:00	0.204	282
1/17/2008	11:00	0.19	122	4/19/2008	17:00	0.216	278
1/17/2008	12:00	0.191	122	4/19/2008	18:00	0.233	291
1/17/2008	13:00	0.19	122	4/19/2008	19:00	0.232	289
1/17/2008	14:00	0.189	123	4/19/2008	20:00	0.236	288
1/17/2008	15:00	0.188	123	4/19/2008	21:00	0.236	289
1/17/2008	16:00	0.189	123	4/19/2008	22:00	0.236	291
1/17/2008	17:00	0.192	123	4/19/2008	23:00	0.232	289
1/17/2008	18:00	0.194	123	4/20/2008	0:00	0.231	287
1/17/2008	19:00	0.193	122	4/20/2008	1:00	0.23	291
1/17/2008	20:00	0.197	123	4/20/2008	2:00	0.236	291
1/17/2008	21:00	0.204	123	4/20/2008	7:00	0.201	270
1/17/2008	22:00	0.2	123	4/20/2008	8:00	0.254	291
1/17/2008	23:00	0.201	123	4/20/2008	9:00	0.338	295
1/18/2008	0:00	0.201	122	4/20/2008	10:00	0.226	293
1/18/2008	1:00	0.2	122	4/20/2008	11:00	0.225	293
1/18/2008	2:00	0.198	122	4/20/2008	12:00	0.232	293
1/18/2008	3:00	0.199	121	4/20/2008	13:00	0.23	293
1/18/2008	4:00	0.196	119	4/20/2008	14:00	0.23	293
1/18/2008	5:00	0.193	118	4/20/2008	15:00	0.229	292
1/18/2008	6:00	0.193	117	4/20/2008	16:00	0.222	293
1/18/2008	7:00	0.196	117	4/20/2008	17:00	0.228	293
1/18/2008	8:00	0.198	117	4/20/2008	18:00	0.229	293
1/18/2008	9:00	0.192	116	4/20/2008	19:00	0.228	293
1/18/2008	10:00	0.189	116	4/20/2008	20:00	0.229	294
1/18/2008	11:00	0.19	113	4/20/2008	21:00	0.239	293
1/18/2008	13:00	0.192	115	4/20/2008	22:00	0.238	294
1/18/2008	14:00	0.192	115	4/20/2008	23:00	0.242	293
1/18/2008	15:00	0.19	115	4/21/2008	0:00	0.244	293
1/18/2008	16:00	0.192	116	4/21/2008	1:00	0.245	293
1/18/2008	17:00	0.193	118	4/21/2008	2:00	0.242	293
1/18/2008	18:00	0.185	118	4/21/2008	3:00	0.241	293
1/18/2008	19:00	0.186	118	4/21/2008	4:00	0.237	293
1/18/2008	20:00	0.186	118	4/21/2008	5:00	0.237	292
1/18/2008	21:00	0.186	118	4/21/2008	6:00	0.239	292
1/18/2008	22:00	0.188	118	4/21/2008	7:00	0.239	293
1/18/2008	23:00	0.193	118	4/21/2008	8:00	0.237	295
1/19/2008	1:00	0.192	118	4/21/2008	10:00	0.239	295

	Unit 1				Unit 2		
	GMW > 100				GMW > 244		
	Average=	**0.159**	**118.3**		**Average=**	**0.307**	**286.2**
		NOxBA	Load			NOxBA	Load
Date	Time	lb/mbtu	GMW	Date	Time	lb/mbtu	GMW
1/19/2008	8:00	0.193	118	4/21/2008	15:00	0.234	295
1/19/2008	9:00	0.195	118	4/21/2008	16:00	0.234	295
1/19/2008	10:00	0.191	118	4/21/2008	17:00	0.236	295
1/19/2008	11:00	0.193	118	4/21/2008	18:00	0.235	295
1/19/2008	12:00	0.192	118	4/21/2008	19:00	0.225	294
1/19/2008	13:00	0.19	118	4/21/2008	20:00	0.214	296
1/19/2008	14:00	0.19	106	4/21/2008	21:00	0.21	297
1/19/2008	17:00	0.189	112	4/21/2008	22:00	0.201	265
1/19/2008	18:00	0.189	116	4/22/2008	1:00	0.389	284
1/19/2008	19:00	0.193	118	4/22/2008	2:00	0.237	281
1/19/2008	20:00	0.194	118	4/22/2008	3:00	0.203	246
1/19/2008	21:00	0.196	118	4/22/2008	4:00	0.227	265
1/19/2008	22:00	0.198	118	4/22/2008	5:00	0.249	285
1/19/2008	23:00	0.194	104	4/22/2008	6:00	0.248	285
1/20/2008	0:00	0.193	107	4/22/2008	7:00	0.257	296
1/20/2008	1:00	0.188	118	4/22/2008	8:00	0.334	296
1/20/2008	2:00	0.19	118	4/22/2008	9:00	0.273	295
1/20/2008	3:00	0.189	118	4/22/2008	10:00	0.273	294
1/20/2008	4:00	0.186	118	4/22/2008	11:00	0.265	294
1/20/2008	5:00	0.183	118	4/22/2008	12:00	0.273	293
1/20/2008	6:00	0.182	118	4/22/2008	13:00	0.277	291
1/20/2008	7:00	0.193	118	4/22/2008	14:00	0.257	296
1/20/2008	8:00	0.209	118	4/22/2008	15:00	0.258	295
1/20/2008	9:00	0.207	118	4/22/2008	16:00	0.251	296
1/20/2008	10:00	0.208	118	4/22/2008	17:00	0.254	296
1/20/2008	11:00	0.206	118	4/22/2008	18:00	0.254	296
1/20/2008	12:00	0.202	118	4/22/2008	19:00	0.258	295
1/20/2008	13:00	0.2	118	4/22/2008	20:00	0.266	297
1/20/2008	14:00	0.201	118	4/22/2008	21:00	0.265	296
1/20/2008	15:00	0.201	118	4/22/2008	22:00	0.267	298
1/20/2008	16:00	0.203	118	4/22/2008	23:00	0.262	297
1/20/2008	17:00	0.203	118	4/23/2008	0:00	0.257	296
1/20/2008	18:00	0.204	118	4/23/2008	1:00	0.253	292
1/20/2008	19:00	0.202	118	4/23/2008	2:00	0.263	296
1/20/2008	20:00	0.199	118	4/23/2008	3:00	0.266	296
1/20/2008	21:00	0.198	118	4/23/2008	4:00	0.261	297
1/20/2008	22:00	0.201	118	4/23/2008	5:00	0.264	298
1/20/2008	23:00	0.205	118	4/23/2008	6:00	0.235	298
1/21/2008	0:00	0.205	118	4/23/2008	7:00	0.244	297
1/21/2008	1:00	0.204	118	4/23/2008	8:00	0.273	299
1/21/2008	2:00	0.204	118	4/23/2008	9:00	0.279	297
1/21/2008	3:00	0.205	118	4/23/2008	10:00	0.254	298
1/21/2008	4:00	0.204	118	4/23/2008	11:00	0.273	290
1/21/2008	5:00	0.205	119	4/23/2008	12:00	0.296	291
1/21/2008	6:00	0.204	119	4/23/2008	13:00	0.23	283
1/21/2008	7:00	0.206	119	4/23/2008	14:00	0.251	293
1/21/2008	9:00	0.207	119	4/23/2008	16:00	0.241	296

Unit 4
GMW > 340

	Average=	**0.182**	**395.3**
Date	Time	NOxBA lb/mbtu	Load GMW
6/1/2008	13:00	0.301	360
6/1/2008	14:00	0.297	373
6/1/2008	15:00	0.299	373
6/1/2008	16:00	0.293	374
6/1/2008	17:00	0.295	374
6/1/2008	18:00	0.299	374
6/1/2008	19:00	0.297	374
6/1/2008	20:00	0.3	375
6/1/2008	21:00	0.298	373
6/1/2008	22:00	0.299	374
6/2/2008	5:00	0.322	351
6/2/2008	6:00	0.262	411
6/2/2008	7:00	0.289	408
6/2/2008	8:00	0.27	405
6/2/2008	9:00	0.273	409
6/2/2008	10:00	0.263	410
6/2/2008	11:00	0.264	412
6/2/2008	12:00	0.263	410
6/2/2008	13:00	0.261	410
6/2/2008	14:00	0.262	411
6/2/2008	15:00	0.262	410
6/2/2008	16:00	0.263	408
6/2/2008	17:00	0.262	409
6/2/2008	18:00	0.263	409
6/2/2008	19:00	0.265	412
6/2/2008	20:00	0.266	412
6/2/2008	21:00	0.268	407
6/2/2008	22:00	0.269	411
6/2/2008	23:00	0.311	352
6/3/2008	0:00	0.304	361
6/3/2008	3:00	0.317	359
6/3/2008	4:00	0.308	368
6/3/2008	6:00	0.3	380
6/3/2008	7:00	0.313	392
6/3/2008	8:00	0.295	384
6/3/2008	9:00	0.153	399
6/3/2008	10:00	0.147	406
6/3/2008	11:00	0.144	406
6/3/2008	12:00	0.147	407
6/3/2008	14:00	0.147	406

	Unit 4		
	GMW > 340		
	Average=	**0.181**	**395.3**
Date	Time	NOxBA lb/mbtu	Load GMW
6/3/2008	19:00	0.29	379
6/3/2008	20:00	0.27	402
6/3/2008	21:00	0.173	409
6/3/2008	22:00	0.147	409
6/3/2008	23:00	0.28	386
6/4/2008	0:00	0.269	377
6/4/2008	1:00	0.269	378
6/4/2008	2:00	0.267	378
6/4/2008	3:00	0.263	381
6/4/2008	4:00	0.265	384
6/4/2008	5:00	0.25	400
6/4/2008	6:00	0.247	408
6/4/2008	7:00	0.268	408
6/4/2008	8:00	0.257	400
6/4/2008	9:00	0.177	395
6/4/2008	10:00	0.144	408
6/4/2008	11:00	0.14	408
6/4/2008	12:00	0.139	408
6/4/2008	13:00	0.142	407
6/4/2008	14:00	0.146	407
6/4/2008	15:00	0.148	405
6/4/2008	16:00	0.153	404
6/4/2008	17:00	0.181	405
6/4/2008	18:00	0.244	405
6/4/2008	19:00	0.271	374
6/4/2008	20:00	0.269	377
6/4/2008	21:00	0.246	403
6/4/2008	22:00	0.268	386
6/4/2008	23:00	0.274	379
6/5/2008	0:00	0.27	378
6/5/2008	1:00	0.276	371
6/5/2008	11:00	0.259	399
6/5/2008	12:00	0.262	394
6/5/2008	13:00	0.294	360
6/5/2008	14:00	0.295	360
6/5/2008	15:00	0.296	360
6/5/2008	16:00	0.291	360
6/5/2008	17:00	0.294	359
6/5/2008	18:00	0.297	360
6/5/2008	19:00	0.301	361
6/5/2008	20:00	0.289	380
6/5/2008	21:00	0.263	401
6/5/2008	22:00	0.272	391
6/5/2008	23:00	0.286	379
6/6/2008	0:00	0.281	379
6/6/2008	1:00	0.281	376
6/11/2008	12:00	0.229	381

Unit 4
GMW > 340

	Average=	**0.181**	**395.4**
Date	Time	NOxBA lb/mbtu	Load GMW
6/12/2008	8:00	0.309	404
6/12/2008	9:00	0.304	415
6/12/2008	10:00	0.304	432
6/12/2008	11:00	0.228	436
6/12/2008	12:00	0.228	418
6/12/2008	13:00	0.295	407
6/12/2008	14:00	0.305	403
6/12/2008	15:00	0.303	402
6/12/2008	16:00	0.298	402
6/12/2008	17:00	0.302	396
6/12/2008	18:00	0.302	379
6/12/2008	19:00	0.307	379
6/12/2008	20:00	0.311	397
6/12/2008	21:00	0.307	411
6/12/2008	22:00	0.31	406
6/12/2008	23:00	0.32	380
6/13/2008	0:00	0.317	380
6/13/2008	1:00	0.315	380
6/13/2008	2:00	0.313	380
6/13/2008	3:00	0.319	380
6/13/2008	4:00	0.318	380
6/13/2008	5:00	0.317	370
6/13/2008	9:00	0.327	405
6/13/2008	10:00	0.322	404
6/13/2008	11:00	0.219	411
6/13/2008	12:00	0.151	411
6/13/2008	13:00	0.165	411
6/13/2008	14:00	0.17	411
6/13/2008	15:00	0.177	411
6/13/2008	16:00	0.175	411
6/13/2008	17:00	0.175	405
6/13/2008	18:00	0.175	350
6/13/2008	19:00	0.16	350
6/13/2008	20:00	0.161	350
6/13/2008	21:00	0.158	350
6/16/2008	14:00	0.151	368
6/16/2008	15:00	0.149	350
6/16/2008	19:00	0.146	350
6/16/2008	20:00	0.143	368
6/16/2008	21:00	0.144	370
6/16/2008	22:00	0.145	370
6/16/2008	23:00	0.153	369
6/17/2008	0:00	0.159	370
6/17/2008	1:00	0.161	370
6/17/2008	2:00	0.168	370
6/17/2008	3:00	0.165	370
6/17/2008	5:00	0.17	370

Unit 4
GMW > 340

	Average=	**0.180**	**395.5**
Date	Time	NOxBA lb/mbtu	Load GMW
6/17/2008	10:00	0.158	410
6/17/2008	11:00	0.165	411
6/17/2008	12:00	0.167	411
6/17/2008	13:00	0.17	411
6/17/2008	14:00	0.181	411
6/17/2008	15:00	0.186	411
6/17/2008	16:00	0.177	411
6/17/2008	17:00	0.183	408
6/17/2008	18:00	0.157	404
6/17/2008	19:00	0.173	411
6/17/2008	20:00	0.168	411
6/17/2008	21:00	0.177	411
6/17/2008	22:00	0.162	411
6/18/2008	1:00	0.15	374
6/18/2008	4:00	0.155	367
6/18/2008	7:00	0.129	407
6/18/2008	8:00	0.147	410
6/18/2008	9:00	0.176	411
6/18/2008	10:00	0.155	354
6/18/2008	11:00	0.148	371
6/18/2008	12:00	0.148	380
6/18/2008	13:00	0.288	380
6/18/2008	14:00	0.155	380
6/18/2008	15:00	0.153	373
6/18/2008	16:00	0.141	370
6/18/2008	18:00	0.158	362
6/18/2008	19:00	0.2	409
6/18/2008	20:00	0.192	409
6/18/2008	21:00	0.2	390
6/18/2008	22:00	0.172	392
6/19/2008	14:00	0.145	373
6/19/2008	15:00	0.152	388
6/19/2008	16:00	0.176	407
6/19/2008	17:00	0.143	370
6/19/2008	18:00	0.137	367
6/19/2008	21:00	0.16	397
6/19/2008	22:00	0.166	392
6/20/2008	3:00	0.151	351
6/20/2008	4:00	0.142	348
6/20/2008	7:00	0.143	358
6/20/2008	8:00	0.285	375
6/20/2008	9:00	0.176	407
6/20/2008	10:00	0.173	406
6/20/2008	11:00	0.167	406
6/20/2008	12:00	0.146	375
6/20/2008	13:00	0.149	367
6/20/2008	14:00	0.151	362

Unit 4
GMW > 340

	Average=	**0.180**	**395.5**
Date	Time	NOxBA lb/mbtu	Load GMW
6/20/2008	20:00	0.153	383
6/20/2008	21:00	0.142	383
6/20/2008	22:00	0.14	383
6/20/2008	23:00	0.142	383
6/21/2008	0:00	0.142	384
6/21/2008	1:00	0.143	384
6/21/2008	2:00	0.142	358
6/21/2008	3:00	0.14	354
6/21/2008	4:00	0.139	354
6/21/2008	5:00	0.138	353
6/21/2008	6:00	0.139	344
6/21/2008	7:00	0.137	363
6/21/2008	8:00	0.137	372
6/21/2008	9:00	0.134	347
6/21/2008	10:00	0.155	397
6/21/2008	11:00	0.162	404
6/21/2008	12:00	0.161	405
6/21/2008	13:00	0.161	405
6/21/2008	14:00	0.165	405
6/21/2008	15:00	0.164	404
6/21/2008	16:00	0.164	404
6/21/2008	17:00	0.162	404
6/21/2008	18:00	0.159	405
6/21/2008	19:00	0.161	404
6/21/2008	20:00	0.166	405
6/21/2008	21:00	0.161	405
6/21/2008	22:00	0.161	404
6/21/2008	23:00	0.161	404
6/22/2008	0:00	0.156	404
6/22/2008	1:00	0.136	381
6/22/2008	2:00	0.149	391
6/22/2008	3:00	0.14	384
6/22/2008	4:00	0.157	402
6/22/2008	5:00	0.135	371
6/22/2008	7:00	0.165	401
6/22/2008	8:00	0.156	404
6/22/2008	9:00	0.125	386
6/22/2008	10:00	0.143	394
6/22/2008	11:00	0.157	404
6/22/2008	12:00	0.142	381
6/22/2008	13:00	0.156	404
6/22/2008	14:00	0.154	394
6/22/2008	15:00	0.15	391
6/22/2008	16:00	0.152	390
6/22/2008	17:00	0.147	373
6/22/2008	18:00	0.141	372
6/22/2008	20:00	0.141	372

	Unit 4		
	GMW > 340		
	Average=	**0.181**	**395.6**
Date	Time	NOxBA lb/mbtu	Load GMW
6/23/2008	1:00	0.142	353
6/23/2008	2:00	0.144	354
6/23/2008	3:00	0.15	377
6/23/2008	4:00	0.145	364
6/23/2008	5:00	0.142	359
6/23/2008	6:00	0.146	381
6/23/2008	7:00	0.152	374
6/23/2008	9:00	0.146	357
6/23/2008	10:00	0.156	359
6/23/2008	11:00	0.152	359
6/23/2008	12:00	0.153	367
6/23/2008	13:00	0.155	370
6/23/2008	14:00	0.163	388
6/23/2008	15:00	0.147	397
6/23/2008	16:00	0.162	394
6/23/2008	17:00	0.166	380
6/23/2008	18:00	0.175	381
6/23/2008	19:00	0.164	360
6/23/2008	21:00	0.19	388
6/23/2008	22:00	0.196	394
6/23/2008	23:00	0.182	385
6/24/2008	0:00	0.184	384
6/24/2008	1:00	0.164	356
6/24/2008	2:00	0.181	378
6/24/2008	3:00	0.202	395
6/24/2008	4:00	0.205	393
6/24/2008	5:00	0.196	386
6/24/2008	6:00	0.21	392
6/24/2008	7:00	0.162	357
6/24/2008	8:00	0.167	359
6/24/2008	13:00	0.152	346
6/24/2008	14:00	0.158	373
6/24/2008	15:00	0.19	403
6/24/2008	16:00	0.195	405
6/24/2008	17:00	0.194	405
6/24/2008	18:00	0.195	405
6/24/2008	19:00	0.195	405
6/24/2008	20:00	0.198	404
6/24/2008	21:00	0.201	405
6/24/2008	22:00	0.203	405
6/24/2008	23:00	0.171	360
6/25/2008	3:00	0.187	374
6/25/2008	4:00	0.194	383
6/25/2008	5:00	0.196	380
6/25/2008	10:00	0.189	368
6/25/2008	11:00	0.176	348
6/25/2008	13:00	0.209	405

Unit 4
GMW > 340

	Average=	**0.181**	**395.7**
Date	Time	NOxBA lb/mbtu	Load GMW
6/25/2008	19:00	0.191	363
6/25/2008	20:00	0.211	379
6/25/2008	21:00	0.232	404
6/25/2008	22:00	0.236	405
6/25/2008	23:00	0.221	385
6/26/2008	0:00	0.219	382
6/26/2008	1:00	0.215	381
6/26/2008	2:00	0.218	380
6/26/2008	3:00	0.22	381
6/26/2008	4:00	0.215	381
6/26/2008	5:00	0.19	349
6/26/2008	16:00	0.297	410
6/26/2008	17:00	0.254	423
6/26/2008	18:00	0.256	431
6/26/2008	19:00	0.223	379
6/26/2008	20:00	0.227	389
6/26/2008	21:00	0.224	400
6/26/2008	22:00	0.201	382
6/26/2008	23:00	0.192	392
6/27/2008	0:00	0.169	352
6/27/2008	7:00	0.162	350
6/27/2008	8:00	0.16	355
6/27/2008	9:00	0.159	355
6/27/2008	10:00	0.159	358
6/27/2008	11:00	0.185	375
6/27/2008	14:00	0.168	348
6/27/2008	15:00	0.175	360
6/27/2008	16:00	0.267	369
6/27/2008	17:00	0.267	370
6/27/2008	18:00	0.267	369
6/27/2008	19:00	0.267	360
6/27/2008	20:00	0.267	361
6/27/2008	21:00	0.267	347
6/27/2008	22:00	0.267	355
6/27/2008	23:00	0.267	354
6/28/2008	0:00	0.18	363
6/28/2008	3:00	0.174	365
6/28/2008	4:00	0.165	348
6/28/2008	8:00	0.157	349
6/28/2008	9:00	0.161	353
6/28/2008	10:00	0.182	364
6/28/2008	11:00	0.193	366
6/28/2008	12:00	0.196	380
6/28/2008	13:00	0.198	385
6/28/2008	14:00	0.209	400
6/28/2008	15:00	0.195	375
6/28/2008	17:00	0.214	402

Unit 4
GMW > 340

	Average=	**0.180**	**395.8**
Date	Time	NOxBA lb/mbtu	Load GMW
6/28/2008	22:00	0.208	401
6/28/2008	23:00	0.206	400
6/29/2008	0:00	0.171	355
6/29/2008	1:00	0.17	354
6/29/2008	2:00	0.171	353
6/29/2008	7:00	0.18	343
6/29/2008	9:00	0.193	369
6/29/2008	10:00	0.228	402
6/29/2008	11:00	0.233	402
6/29/2008	12:00	0.227	401
6/29/2008	13:00	0.204	368
6/29/2008	14:00	0.216	373
6/29/2008	15:00	0.214	375
6/29/2008	16:00	0.193	344
6/29/2008	18:00	0.207	358
6/29/2008	19:00	0.23	380
6/29/2008	20:00	0.219	378
6/29/2008	21:00	0.209	361
6/29/2008	22:00	0.209	369
6/29/2008	23:00	0.192	355
6/30/2008	1:00	0.185	345
6/30/2008	3:00	0.195	359
6/30/2008	4:00	0.199	369
6/30/2008	5:00	0.191	351
6/30/2008	8:00	0.206	373
6/30/2008	9:00	0.207	377
6/30/2008	10:00	0.204	380
6/30/2008	11:00	0.213	391
6/30/2008	12:00	0.206	390
6/30/2008	13:00	0.215	402
6/30/2008	14:00	0.19	361
6/30/2008	15:00	0.187	355
6/30/2008	16:00	0.197	373
6/30/2008	17:00	0.195	367
6/30/2008	19:00	0.2	365
6/30/2008	20:00	0.205	378
6/30/2008	21:00	0.2	380
6/30/2008	22:00	0.199	382
6/30/2008	23:00	0.18	350

Attachment – D

Recent Permitted Unit Emission Limits

Control Device	Facility Name	Limit lb/MBtu	Test Method	Averaging Time
FF/BH	Spurlock Unit 4	0.012 (f/c)		stack test
FF/BH	Western Greenbrier	0.03 (f/c)		30 day rolling average
IGCC				
Control Device	**Facility Name**	**Limit lb/MBtu**	**Test Method**	**Averaging Time**
GCP	Kentucky Pioneer Energy, LLC	0.011		stack test
GCP	Lima Energy	0.01 calculated		
PC				
Control Device	**Facility Name**	**Limit lb/MBtu**	**Test Method**	**Averaging Time**
ESP	Cross Generating Station Units 3 & 4	0.018 (f/c)	Method 201, 202	
ESP	Prairie Energy Power Plant	0.02 (f)	Method 5, or 201, or 201A, with 19; 202	3 hour block average
ESP	Prairie Energy Power Plant	0.04 (f/c) estimated, not a limit		
ESP, WESP	Prairie State Units 1 & 2	0.035 (f/c)	Method 202 (adapted to prevent bias)	3 hour block average
ESP, WESP	Thoroughbred	0.018 (f/c)	Methods 5, 9, 201 or 201A, 202	3 hour average
FF/BH	Big Cajun II Power Station Unit 4	0.015 (f)		3 hour average
FF/BH	Comanche Plant Unit 3	0.012 (f)		stack test
FF/BH	Comanche Plant Unit 3	0.020 (f/c)		stack test
FF/BH	Council Bluffs	0.025 (f/c)	Method 201A, 202	stack test
FF/BH	Hawthorn Unit 5	0.018 (f/c)	Method 201A, 202	
FF/BH	Iatan Generating Station Unit 2	0.014 (f)		3 hour rolling average
FF/BH	Iatan Generating Station Unit 2	0.0236 (f/c)		30 day rolling average
FF/BH	Intermountain Power Unit 3	0.012 (f)	Method 201, 201A, 202	stack test
FF/BH	J.K. Spruce Plant Unit 2	0.022 (f/c)		3 hour average
FF/BH	Longview Power (GenPower)	0.018 (f/c)	Methods 201 or 201A , 202	6 hour rolling average
FF/BH	Plum Point Power Station	0.018 (f/c)	Method 201A, 202	
FF/BH	Sandy Creek	0.015 (f)		12 month rolling average
FF/BH	Sandy Creek	0.040 (f/c)		12 month rolling average
FF/BH	Southwest Power Station Unit 2	0.018 (f/c)		30 day rolling average
FF/BH	Trimble County Generating Station Unit 2	0.018 (f/c)		stack test
FF/BH	TS Power Plant	0.012 (f)		24 hour rolling average
FF/BH	Tucson - Springerville Units 3 & 4	0.055 (f/c)	Method 5, 9, 201 or 201A, and 202	3 hour average
FF/BH	Two Elk Unit 1	0.018 (f)		
FF/BH	Weston Unit 4	0.018 (f/c)	Method 5 or 5B plus 202 or (201A and 202) or CTM039	3 hour rolling average

Recently Permitted U.S. Coal-Fired Electric Utility Units

Control Device	Facility Name	Limit lb/MBtu	Test Method	Averaging Time
FF/BH	Whelan Energy Center Unit 2	0.018 (f/c)		3 hour average
FF/BH	Wygen Unit 1	0.02 (f)	Method 5	
FF/BH	Wygen Unit 2 (100 MW)	0.012 (f)		
FF/BH, WESP	Elm Road Generating Station	0.018 (f/c)	Method 5, 202	3 hour rolling average
multiclone	Hardin Generator Project	0.015		

BH - Baghouse
CFB - Circulating fluidized bed boiler
ESP - Electrostatic precipitator
(f) - Filterable
(f/c) - Filterable and Condensable
FF - Fabric filter
IGCC - Integrated gasification combined cycle
PC - Pulverized coal boiler
WESP - Wet electrostatic precipitator

Attachment – E

RACT / BACT PM-10 Permit Limits

http://cfpub.epa.gov/rblc/cfm/POLTDETL.CFM?facnum=25704&poltnum=135296&procnum=102795
Last updated on Friday, May 29th, 2009.

Technology Transfer Network
Clean Air Technology Center -
RACT/BACT/LAER Clearinghouse

Pollutant Information

Click on the Process Information button to see more information about the process associated with this pollutant.
Or click on the Process List button to return to the list of processes.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information | Pollutant Information

RBLC ID: MT-0022
Corporate/Company: BULL MOUNTAIN DEV. COMPANY
Facility Name: BULL MOUNTAIN, NO. 1, LLC - ROUNDUP POWER PROJECT
Process: BOILER, PC NO. 2

Pollutant: Particulate matter, filterable < 10 μ (FPM10) **CAS Number:** PM

Pollution Prevention/Add-on Control Equipment/Both/No Controls Feasible: A

P2/Add-on Description: FABRIC FILTERS

Test Method:	Unspecified	EPA/OAR Methods
Estimated % Efficiency:	99.820	
Compliance Verified:		
EMISSION LIMITS:		
Basis:	BACT-PSD	
Other Applicable Requirements:		
Other Factors Influence Decision:		
Emission Limit 1:	60.2000 LB/H	
Emission Limit 2:	0.0150 LB/MMBTU	
Standardized:	0.0150 LB/MMBTU	

COST DATA: **Verified by Agency?** Yes

http://cfpub.epa.gov/rblc/cfm/POLTDETL.CFM?facnum=25837&poltnum=136206&procnum=103094
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Pollutant Information

Click on the Process Information button to see more information about the process associated with this pollutant.
Or click on the Process List button to return to the list of processes.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information | Pollutant Information

RBLC ID: MT-0027
Corporate/Company: ROCKY MOUNTAIN POWER, INC.
Facility Name: HARDIN GENERATOR PROJECT
Process: BOILER, PULVERIZED COAL-FIRED

Pollutant: Particulate matter, filterable < 10 μ (FPM10) **CAS Number:** PM

Pollution Prevention/Add-on Control Equipment/Both/No Controls Feasible: A

P2/Add-on Description: MULTICLONE USED IN CONJUNCTION WITH WET SCRUBBER

Test Method: Unspecified EPA/OAR Methods

Estimated % Efficiency:
Compliance Verified:
EMISSION LIMITS:
Basis: Other Case-by-Case
Other Applicable Requirements:
Other Factors Influence Decision:
Emission Limit 1: 0.0150 LB/MMBTU
Emission Limit 2:
Standardized: 0.0150 LB/MMBTU

COST DATA: **Verified by Agency?** No

http://cfpub.epa.gov/rblc/cfm/POLTDETL.CFM?facnum=26604&poltnum=144266&procnum=105867
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Pollutant Information

Click on the Process Information button to see more information about the process associated with this pollutant.
Or click on the Process List button to return to the list of processes.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information | Pollutant Information

RBLC ID: MO-0071
Corporate/Company: GREAT PLAINS ENERGY
Facility Name: KANSAS CITY POWER & LIGHT COMPANY - IATAN STATION
Process: PULVERIZED COAL BOILER - UNIT 2

Pollutant: Particulate matter, filterable < 10 μ (FPM10) **CAS Number:** PM

Pollution Prevention/Add-on Control Equipment/Both/No Controls Feasible: A

P2/Add-on Description: KCPL SHALL INSTALL A FABRIC FILTRATION SYSTEM (BAGHOUSE) F 2 BOILER TO REDUCE PM10 EMISSIONS.

Test Method:	Unspecified EPA/OAR Methods
Estimated % Efficiency:	99.900
Compliance Verified:	UNKNOWN
EMISSION LIMITS:	
Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Other Factors Influence Decision:	Yes
Emission Limit 1:	0.0236 LB/MMBTU 30 DAYS ROLLING AVERAGE FILT
Emission Limit 2:	0.0140 LB/MMBTU 3 HOURS ROLLING AVERAGE - FI PM10
Standardized:	0.0150 LB/MMBTU 3 HOURS ROLLING AVERAGE

http://cfpub.epa.gov/rblc/cfm/POLTDETL.CFM?facnum=25868&poltnum=136299&procnum=103131

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Pollutant Information

Click on the Process Information button to see more information about the process associated with this pollutant.
Or click on the Process List button to return to the list of processes.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information | Pollutant Information

RBLC ID: SC-0104
Corporate/Company: SANTEE COOPER
Facility Name: SANTEE COOPER CROSS GENERATING STATION
Process: BOILER, NO. 3 AND NO. 4

Pollutant: Particulate matter, filterable < 10 μ (FPM10) **CAS Number:** PM

Pollution Prevention/Add-on Control Equipment/Both/No Controls Feasible: A

P2/Add-on Description: ESP

Test Method: Unspecified EPA/OAR Methods

Estimated % Efficiency:
Compliance Verified: UNKNOWN
EMISSION LIMITS:
Basis: BACT-PSD
Other Applicable Requirements:
Other Factors Influence Decision: Unknown
Emission Limit 1: 0.0180 LB/MMBTU
Emission Limit 2:
Standardized: 0.0180 LB/MMBTU

COST DATA: **Verified by Agency?** No

http://cfpub.epa.gov/rblc/cfm/POLTDETL.CFM?facnum=25653&poltnum=132869&procnum=101904

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Pollutant Information

Click on the Process Information button to see more information about the process associated with this pollutant.
Or click on the Process List button to return to the list of processes.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information | Pollutant Information

RBLC ID: AR-0074
Corporate/Company: PLUM POINT ASSOCIATES, LLC
Facility Name: PLUM POINT ENERGY
Process: BOILER , UNIT 1 - SN-01

Pollutant: Particulate matter, filterable < 10 μ (FPM10) **CAS Number:** PM

Pollution Prevention/Add-on Control Equipment/Both/No Controls Feasible: A

P2/Add-on Description: BAGHOUSE

Test Method: Unspecified EPA/OAR Methods

Estimated % Efficiency:
Compliance Verified:
EMISSION LIMITS:
Basis: BACT-PSD
Other Applicable Requirements:
Other Factors Influence Decision:
Emission Limit 1: 0.0180 LB/MMBTU
Emission Limit 2:
Standardized: 0.0180 LB/MMBTU

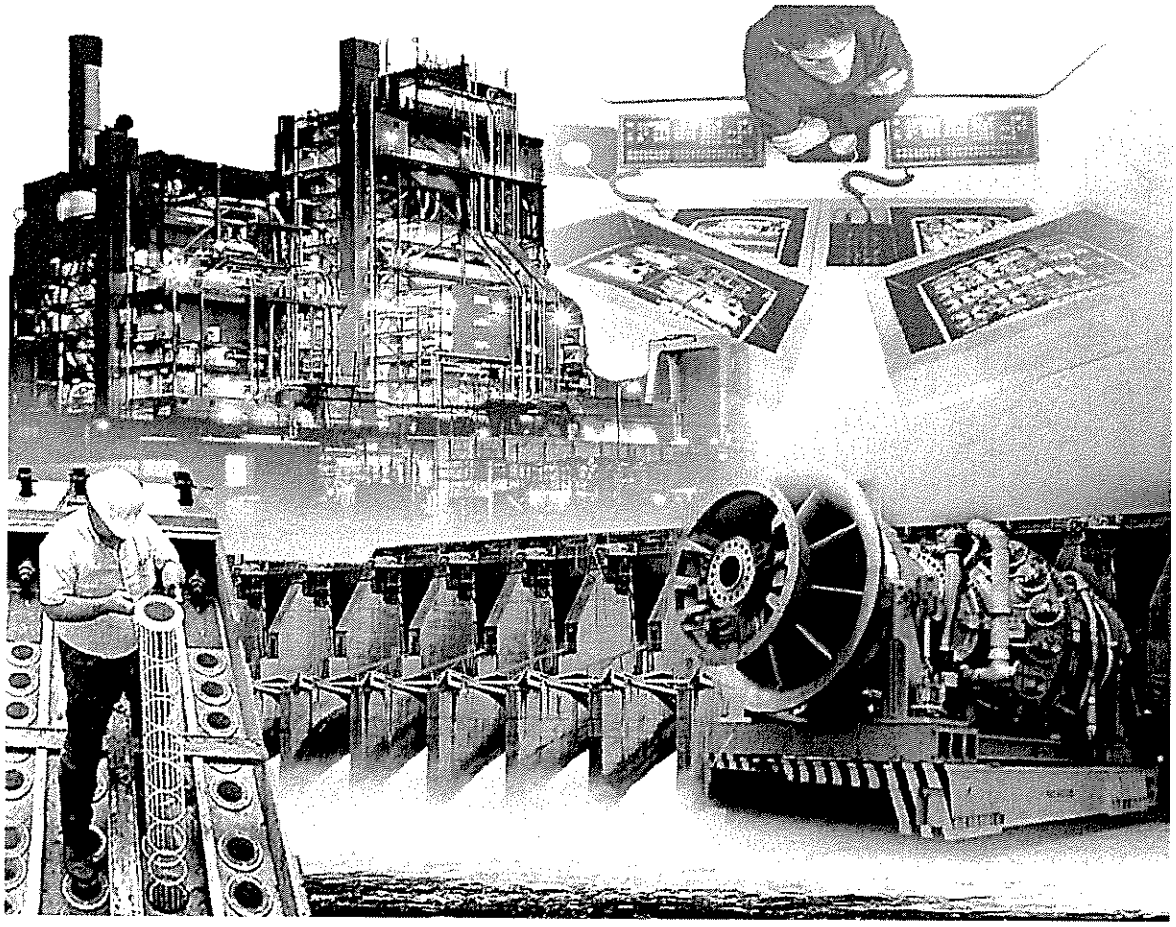
COST DATA: **Verified by Agency?** No

Attachment – F
EPRI Report on Status and Performance of
Recent Permitted BACT / LAER Units

ELECTRIC POWER RESEARCH INSTITUTE

Status and Performance of Recently Permitted BACT/LAER Plants

1013346



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Status and Performance of Recently Permitted BACT/LAER Plants

1013346

Technical Update, December 2006

EPRI Project Manager

C. Dene

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REPORT SUMMARY

This study is intended to provide a better understanding of the best available control technology (BACT) as it is required today in permits issued for new coal-fired power plants and to document the actual emissions performance of the emission control technologies on new units. The study focused on: control technologies, data reporting, initial test results, and permitting trends.

Background

In 2004, EPRI conducted a study to summarize the emission limitations identified as BACT in recently-issued permits for new coal-fired power plants, and to compare these limits to the emissions performance achieved in practice by the most recently operational new coal-fired power plants. The combustion technologies included in that study were limited to pulverized coal (PC) and circulating fluidized bed (CFB) units. The pollutants considered in that investigation included SO_2, NO_x, PM_{10}, CO, and VOC. Due to the time lag between permitting of a new coal-fired power plant and initial operation and emissions performance testing, it is necessary to consider units which have been permitted but not yet started up. The previous study included units that had received permits during the period from January 1997 through February 2005. A report was prepared to document the results of the investigation and was released by EPRI in March 2005 as EPRI Report No. 1008114, *Status and Performance of Best Available Control Technologies.*

The U.S. power industry is undergoing the largest installation of emission control technology since the mid 1980's. It is also subject to increasing pressure to decrease emissions of flue gas constituents such as mercury (Hg) and sulfuric acid mist (H_2SO_4). In addition, the level of interest in and development of integrated gasification combined cycle (IGCC) plants has increased substantially. Consequently, EPRI decided to expand and update the previous study.

Objectives

The project objectives are to (1) update the investigation performed for the previous study to reflect permits that have been issued since February 2005 and emissions testing information for these new units that has become available since February 2005, (2) expand the range of units considered in the investigation to include IGCC units, (3) expand the pollutants considered in the investigation to include mercury (Hg) and sulfuric acid mist (H_2SO_4), and (4) prepare a new report that will include all information from the previous report, plus include the expanded range of unit types and pollutants and any newly available performance testing data and continuous emission monitoring system (CEMS) data that will identify and document the emission limits that are actually being achieved in practice by recently-permitted coal-fired electric utility units in the United States.

Approach

Information regarding the emission control technology and the emission limits cited in recent permits for new coal-based electric generating units was obtained from a review of the final permit documents for each plant. CEMS data for SO_2 and NO_x were obtained from the EPA's Clean Air Markets website. Data from initial compliance tests of the operating plants was obtained from the permitting authorities. Due to the time lag between permitting of a new coal-fired power plant and initial operation and emissions performance testing, it is necessary to consider units which have been permitted but not yet started up. The study examined the most recent permits that have been issued through October 2006. It was necessary to examine permits issued as far back as 1997 in order to find plants that had sufficient operating data to examine with respect to emissions performance as indicated by initial operation tests.

Results

Within the 10-year study period, final permits for 32 PC units and 30 CFB units were identified. However, only four IGCC units (at two plants) were issued final permits in the last 10 years, and neither of these is operating yet. Nearly all PC units use selective catalytic reduction (SCR) as BACT for NO_x control and wet or dry flue gas desulfurization (FGD) for SO_2 control. Most CFB units employ dry FGD for SO_2 control and selective non-catalytic reduction (SNCR) for NO_x control. For either PC or CFB units, a fabric filter/baghouse is the overwhelming choice for particulate control, although electrostatic precipitators (ESPs) are still permitted as BACT for particulate in some high-sulfur coal applications. For both VOC and CO, all types of units use "good combustion practices" as BACT. In most cases, H_2SO_4 control technology was associated with the SO_2 control technique, although wet ESPs or dry sorbent injection have been identified as BACT for H_2SO_4 in some high-sulfur coal applications. Most permits did not identify specific control techniques for Hg, relying instead on "co-benefit" control. However, activated carbon injection (ACI) was identified as the BACT (or BACT-equivalent) method of Hg control in a few permits for PC units. The permitting trends for most pollutants suggest an increasing tightening of control, and the initial operating experience shows that the operating units were able to achieve the permit limits in nearly every case for every pollutant. There is increased scatter in the BACT emission limits for PM_{10} in recent permits, corresponding with recognition of the difficulties associated with accurate measurement of the condensable portion of PM_{10}.

EPRI Perspective

This report provides a distillation of available information on the emissions control technologies for coal-fired generating stations. It provides a ready source of information on not only the permit limits but also the ability to achieve those limits on start-up. The trend in permit limitations, combined with the technologies installed, provides some insights into the appropriate technologies for consideration when designing a new coal-based electric generation facility.

Keywords

Emissions Control Technologies
SO_2 Control
NO_X Control
Hg Control
H_2SO_4 Control
BACT

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1
INTRODUCTION

EPRI has been working with its members to develop a plan that links the near-term, tactically-focused work to the ultimate vision of "The Roadmap for the Electricity Sector". A key element of the plan is the development of Near Zero Emissions (NZE) plants that preserve the coal option. Qualitatively, NZE is defined as being virtually equivalent to emissions from gas-fired power plants, with the exception of CO_2.

The focus is on pulverized coal (PC) boilers and circulating fluidized bed (CFB) boilers in Rankine cycle plants, as well as integrated gasification combined cycle (IGCC) plants. IGCC plants have very different needs because they use species capture devices for both process reasons (before the addition of combustion air) and emission constraints. However, some of the findings and technologies for PC- and CFB-based plants could apply to the final pollution control systems in the stream of devices in IGCC plants. This investigation is intended to provide a better understanding of best available control technology (BACT) proposed today as well as the performance of the most recently installed equipment on coal-fired power plants. Due to the time lag between permitting of a new coal-fired power plant and initial operation and emissions performance testing, it is necessary to consider units which have been permitted but not yet started up.

Due to the widespread use of EPA's "Top Down" policy for the determination of BACT, the gap between emission limitations that represent BACT and the "lowest achievable emission rate" (LAER) is narrowing. Under the top down policy, the best, or most stringent, emission limitation for each pollutant subject to a BACT analysis must be selected as BACT unless it can be rejected, on a case-by-case basis, due to considerations of economics, energy or environmental impacts. Therefore, although LAER technically applies only to those pollutants for which the proposed power plant location is not in attainment with the national ambient air quality standards (NAAQS), on a practical level BACT and LAER emission levels are becoming nearly indistinguishable from one another. This practical lack of distinction between these two regulatory terms is reflected in this study, whose goal is the identification of the emission levels permitted for and achievable by new electric utility power plants in the United States.

2
RECENTLY PERMITTED U.S. COAL-FIRED ELECTRIC UTILITY UNITS

The list of units to include in the study was obtained from three sources:

- The RACT/BACT/LAER Clearinghouse (RBLC) database www.epa.gov/ttn/catc
- The National Coal-Fired Utility Projects Spreadsheet http://www.epa.gov/ttn/catc/dir1/natlcoal.xls
- Correspondence with state permitting agencies

For purposes of this study, "recent" permits are those issued during the calendar year 1997 or thereafter. Advanced queries were run on the RBLC database to find all facilities permitted in 1997 or after and having a Standard Industrial Classification (SIC) code of 4911 "Electric Services". Additionally, the RBLC listed "process" was examined to eliminate any units that were not coal-fired boilers or IGCC units. Added to this basic list were any additional units from the National Coal-Fired Utility Projects Spreadsheet. From this list, all citations for anything other than new coal-fired electric utility boilers or electric utility IGCC units were eliminated (e.g. modifications to existing boilers were eliminated). Lastly, all units which did not have an issued permit as of October 2006 were eliminated.

To determine the operational status of each unit, the state agency was contacted.

Included Units

Sixty-six units at 50 facilities have been identified as meeting the requirements of this study (32 PC units, 30 CFB units, 4 IGCC units). Seventeen of these units are now operational. Table 2-1 lists the units included in this study and summarizes each facility. Appendix A describes each facility in detail. Plants that were excluded from the study are listed in Appendix B.

Controls

PC and CFB boilers employ the types of emission control for the various pollutants that are effective for the boiler configuration and operating conditions. Emission controls can be integral to the combustion process or add-on equipment that is installed downstream of the combustion zone. The types of emission control employed for BACT at recently permitted utility boilers are described below. The specific control equipment utilized for each pollutant at each boiler unit identified in Table 2-1 is listed in Tables 2-2 through 2-7.

Table 2-1
Recently Permitted Coal-Fired Power Plants Included in the Study

State	Facility	Developer	# of Units	Boiler Type	Operational Status					Controls						
					Permitted	Under Construction	Construction Finished	Operational	Tested	CO	H_2SO_4	Hg	NO_x	PM	SO_2	VOC
CO	Lamar Light & Power Plant Unit 8	Lamar Utilities Board	1	CFB	X	X				GCP	NA	NA	CFB	FF/BH	CFB/LI	GCP
FL	JEA Northside Units 1 & 2	JEA	2	CFB	X		X	X	X	GCP	NA	SDA/FF	SNCR	FF/BH	DFGD, CFB	GCP
IL	EnviroPower IL - Benton	EnviroPower	2	CFB	X					GCP	NA	ACI	SNCR	FF/BH	DFGD, CFB	GCP
IL	Indeck-Elwood, LLC	Indeck-Elwood	2	CFB	X	X				GCP	NA	NA	SNCR	FF/BH	DFGD, CFB	GCP
IL	Marion Generating Station	Southern Illinois Coop	1	CFB	X		X	X	X	GCP	NA	NA	SNCR	FF/BH	CFB	GCP
KY	Kentucky Mountain Power, LLC Units 1 & 2	EnviroPower	2	CFB	X	X				GCP	NA	FF/BH	SNCR	FF/BH	DFGD, CFB	GCP
KY	Spurlock Unit 3/ EA Gilbert	E. KY Power Coop	1	CFB	X		X	X		GCP	CFB/LI, DFGD	SNCR, FDA, FF/BH	SNCR	FF/BH	DFGD, CFB	GCP
KY	Spurlock Unit 4	E. KY Power Coop	1	CFB	X	X				GCP	DFGD	NA	SNCR	FF/BH	DFGD	GCP
LA	Rodemacher Brownfield Unit 3	Cleco Power	2	CFB	X	X				GCP	CFBS	NA	SNCR	FF/BH	CFBS	GCP
MS	Red Hills Units 1 & 2	Choctaw Generation Limited Partnership	2	CFB	X		X	X		GCP	CFB	NA	CFB	FF/BH	CFB	GCP
MT	Highwood Generation Station	Southern Montana Electric Generation (SME)	1	CFB	X					GCP	NA	Hydrated Ash Reinjection	SNCR	FF/BH	CFB/LI	GCP
ND	Gascoyne Generating Station	MDU (Montana Dakota Utilities) Westmoreland Power	1	CFB	X					GCP	SDA/LI	NA	SNCR	FF/BH	SDA/LI	GCP
OH	Bayshore Plant (Unit 1)	Toledo Edison Co.	1	CFB	X		X	X	X	GCP	NA	NA	CFB	FF/BH	CFB	GCP
PA	Beech Hollow	Robinson Power	1	CFB	X	X				GCP	LI, SDA	NA	SNCR	FF/BH	LI, SDA	GCP
PA	Greene Energy Resource Recovery Project	Wellington Development	2	CFB	X					GCP	SDA	FF/BH	SNCR	FF/BH	SDA	GCP
PA	River Hill	River Hill Power Co, LLC	1	CFB	X	X				GCP	NA	NA	SNCR	FF/BH	DFGD	GCP
PA	Seward	Reliant	2	CFB	X		X	X	X	GCP	LI, NIDS	NA	SNCR	FF/BH	DFGD, CFB	GCP

State	Facility	Developer	# of Units	Boiler Type	Operational Status					Controls						
					Permitted	Under Construction	Construction Finished	Operational	Tested	CO	H_2SO_4	Hg	NO_x	PM	SO_2	VOC
PR	AES Puerto Rico Units 1 & 2	AES	2	CFB	X		X	X	X	GCP	NA	NA	SNCR	ESP	DFGD, CFB	GCP
UT	Sevier Power	Nevco Energy	1	CFB	X	X				GCP	NA	FF/BH	SNCR	FF/BH	DFGD, CFB	GCP
WI	Manitowoc Public Utilities	Manitowoc Public Utilities	1	CFB	X	X		X	X	GCP	CFB	FF/BH	SNCR	FF/BH	CFB	GCP
WV	Western Greenbrier	Western Greenbrier Co-Generation, LLC	1	CFB	X					GCP	NA	NA	SNCR	FF/BH	SDA	GCP
KY	Kentucky Pioneer Energy, LLC	Global Energy, Inc.	2	IGCC	X	X				GCP	NA	NA	SI	GCP	Syngas	GCP
OH	Lima Energy	Lima Energy	2	IGCC	X	X				GCP	NA	NA	DI	GCP	NA	GCP
AR	Plum Point Power Station	Plum Point Energy Associates/L.S. Power	1	PC	X	X				GCP	DFGD, FF	FF/BH	SCR, LNB, OFA	FF/BH	DFGD	GCP
AZ	Tucson – Springerville Units 3 & 4	Tucson Electric Power	2	PC	X	Unit 4	Unit 3	Unit 3		GCP	SDA, FF/BH	SDA, FF/BH	SCR, LNB	FF/BH	DFGD	GCP
CO	Comanche Plant Unit 3	Public Service Company of CO	1	PC	X	X				GCP	SDA/BH	ACI	LNB, OFA, SCR	FF/BH	DFGD	GCP
IA	Council Bluffs	Mid American Energy	1	PC	X	X				GCP	DFGD/BH	ACI	SCR, LNB	FF/BH	DFGD	GCP
IL	Dallman Unit 4	CWLP	1	PC	X					GCP	WESP	ACI, if needed	SCR, LNB	FF/BH	WFGD	GCP
IL	Prairie Energy Power Plant	Corn Belt Energy Corporation	1	PC	X	X				GCP	WFGD	ACI, if needed	SCR, LNB	ESP	WFGD	GCP
IL	Prairie State Units 1 & 2	Prairie State Generating Company, LLC	2	PC	X	X				GCP	WESP	ACI, if needed	SCR, LNB	ESP, WESP	WFGD	GCP
KY	Thoroughbred	Thoroughbred Generating Company, LLC	2	PC	X					GCP	GCP, ESP, FGD, WESP	ESP, WESP, WFGD	SCR, LNB	ESP, WESP	WFGD, WESP	GCP
KY	Trimble County Generating Station Unit 2	Louisville Gas and Electric Company	1	PC	X	X				GCP	WESP	NA	SCR	FF/BH	WFGD	GCP
LA	Big Cajun II Power Station Unit 4	Louisiana Generating, LLC	1	PC	X					GCP	NA	ESP	SCR, LNB	FF/BH	DFGD or WFGD	GCP
MO	Hawthorn Unit 5	Kansas City Power & Light	1	PC	X		X	X	X	GCP	NA	NA	SCR	FF/BH	DFGD	GCP
MO	Iatan Generating Station Unit 2	Great Plains Energy/KCPL	1	PC	X	X				GCP	NA	WFGD	SCR	FF/BH	WFGD	GCP
MO	Southwest Power Station Unit 2	City Utilities of Springfield, Missouri	1	PC	X	X				GCP	NA	TBD	SCR, LNB	FF/BH	DFGD	GCP

Recently Permitted U.S. Coal-Fired Electric Utility Units

State	Facility	Developer	# of Units	Boiler Type	Operational Status					Controls						
					Permitted	Under Construction	Construction Finished	Operational	Tested	CO	H_2SO_4	Hg	NO_x	PM	SO_2	VOC
MT	Hardin Generator Project	Rocky Mountain Power	1	PC	X		X	X	X	GCP	NA	NA	SCR	Multi clone	WFGD	GCP
NE	Nebraska City Unit 2	Omaha Public Power District	1	PC	X	X				GCP	NA	ACI	SCR	FF/BH	DFGD, FF/BH	GCP
NE	Whelan Energy Center Unit 2	Hastings Utilities	1	PC	X	X				GCP	NA	NA	SCR	FF/BH	DFGD	GCP
NV	TS Power Plant	Newmont NV Energy Investment, LLC	1	PC	X	X				GCP	DFGD	ACI	SCR, LNB	FF/BH	DFGD	GCP
SC	Cross Generating Station Units 3 & 4	Santee Cooper	2	PC	X	Unit 4	Unit 3	Unit 3		GCP	NA	ESP, FGD, LNB, SCR	SCR, LNB	ESP	WFGD	GCP
TX	J.K. Spruce Plant Unit 2	City Public Service of San Antonio	1	PC	X	X				GCP	NA	FF/BH, WFGD, SCR	SCR, LNB	FF/BH	WFGD	GCP
TX	Sandy Creek	LS Power	1	PC	X					GCP	DFGD	ACI	SCR	FF/BH	DFGD	GCP
UT	Intermountain Power Unit 3	Intermountain Power Service Corp.	1	PC	X					GCP	NA	NA	SCR, LNB	FF/BH	WFGD	GCP
WI	Elm Road Generating Station	WE-Energies	2	PC	X	X				GCP	FGD, WESP	FF/BH, FGD, SCR	SCR, LNB	FF/BH, WESP	WFGD	GCP
WI	Weston Unit 4	Wisconsin Public Service	1	PC	X	X				GCP	FGD	FF/BH, DSI	SCR, LNB	FF/BH	DFGD	GCP
WV	Longview Power (GenPower)	Longview Power, LLC	1	PC	X					GCP	DSI, FF/BH	NA	SCR, LNB	FF/BH	WFGD	GCP
WY	Two Elk Unit 1	Two Elk Generation Partners, L.P.	1	PC	X	X				GCP	NA	NA	SCR, LNB	FF/BH	DFGD	GCP
WY	Wygen Unit 1	Black Hills Power & Light	1	PC	X		X	X	X	GCP	NA	NA	LNB, OFA	FF/BH	DFGD	GCP
WY	Wygen Unit 2 (100 MW)	Black Hills Power & Light	1	PC	X	X				GCP	NA	NA	SCR, LNB	FF/BH	DFGD	GCP

ACI-activated carbon injection
CFB-circulating fluidized bed
CFBS- circulating fluidized bed scrubber
DFGD-dry flue gas desulfurization
DI-diluent injection
DSI-dry sorbent injection
ESP-electrostatic precipitator
FDA-flash dryer absorber
FF/BH-fabric filter/baghouse
GCP-good combustion practices
IGCC-integrated gasification combined cycle
LI-limestone injection
LNB-low NOx burners
NA-not applicable
NIDS-novel integrated desulfurization system
OFA-over fire air
PC-pulverized coal
SCR-selective catalytic absorber
SDA-spray dryer absorber
SI-steam injection
SNCR-selective non-catalytic absorber
TBD-to be determined
WESP-wet electrostatic precipitator
WFGD-wet flue gas desulfurization

Table 2-2
SO_2 Controls

Control Device	Facility Name	Limit lb/MBtu	Test Method	Averaging Time	Notes
CFB					
CFB	Bayshore Plant (Unit 1)	70% reduction if <0.6 , not BACT	CEMS	30 day rolling average	70% reduction allowed if emissions are below 0.6 lb/MBtu
		0.73 and 90% reduction, not BACT	CEMS	30 day rolling average	90% reduction and 0.73 lb/MBtu required except as noted above
		1.093	Method 6	3 hour average	Calculated from lb/hr limit and Heat input
CFB	Manitowoc Public Utilities	0.3	Method 6, 6A or 6C	30 day rolling average	
CFB	Marion Generating Station	0.6 not BACT	Method 6 or 19	30 day rolling average	
CFB	Red Hills Units 1 & 2	0.25		30 day rolling average	
CFB, LI	Lamar Light & Power Plant Unit 8	0.103		Daily	
CFB/CFBS, low sulfur fuel	AES Puerto Rico Units 1 & 2	0.022	Method 6C	3 hour rolling average	1.0% sulfur maximum
CFB/LI	Highwood Generation Station	0.038		30 day rolling average	
		0.048		24 hour rolling average	
		0.057		3 hour average	
DFGD	River Hill	0.2		30 day rolling average	
		0.274		24 hour rolling average	
		0.311		3 hour block average	
DFGD	Spurlock Unit 4	0.15		24 hour block average	
DFGD, CFB	EnviroPower IL - Benton	0.25	Method 6 or 19	30 day rolling average	92% control, if emissions are 0.20 lb/MBtu or greater. 90% control
DFGD, CFB	Indeck-Elwood, LLC	0.10 - 0.15	Method 19	30 day rolling average	Illinois coal, washed: 3.51 percent sulfur by weight and 9,965 Btu/lb HHV, uncontrolled rate: 7.0 lb/MBtu, washed coal uncontrolled rate: 4.7 lb/MBtu
DFGD, CFB	JEA Northside Units 1 & 2	0.15 not BACT		30 day rolling average	
		0.2 not BACT		24 hour block average	

Control Device	Facility Name	Limit lb/MBtu	Test Method	Averaging Time	Notes
CFB					
DFGD, CFB	Kentucky Mountain Power, LLC Units 1 & 2	0.13	401 KAR 50:015	30 day rolling average	
DFGD, CFB	Sevier Power	0.022	Method 6, 6A, 6B, 6C	30 day rolling average	1.0 lb S/MBtu
		0.05	Method 6, 6A, 6B, 6C	24 hour rolling average	1.0 lb S/MBtu
DFGD, CFB	Seward	0.6 not BACT		30 day rolling average	
DFGD, CFB	Spurlock Unit 3/ EA Gilbert	0.2		30 day rolling average	
FDA	Western Greenbrier	0.14		3 hour and 24 hour average	
		98%		monthly	
LI, SDA	Beech Hollow	0.245		24 hour average	97% reduction
CFBS	Rodemacher Brownfield Unit 3	0.15		30 day rolling average	
SDA	Greene Energy Resource Recovery Project	0.156		30 day rolling average	
LI, SDA	Gascoyne Generating Station	0.038	CEMS	30 day rolling average	
		70% reduction	CEMS	30 day rolling average	
IGCC					
Control Device	**Facility Name**	**Limit lb/MBtu**	**Test Method**	**Averaging Time**	**Notes**
NA	Lima Energy	0.022 calculated			
Syngas cleanup to 40 ppm H_2S	Kentucky Pioneer Energy, LLC	0.032		3 hour rolling average	
PC					
Control Device	**Facility Name**	**Limit lb/MBtu**	**Test Method**	**Averaging Time**	**Notes**
DFGD	Comanche Plant Unit 3	0.10 not BACT		30 day rolling average	
DFGD	Council Bluffs	0.1	Method 6C	30 day rolling average	0.625 lb S/MBtu
DFGD	Hawthorn Unit 5	0.12		30 day rolling average	1.60 lb S/MBtu max at scrubber inlet, 92.5% control

		0.54		24 hour average	1.60 lbs S/MBtu max at scrubber inlet, 92.5% control
DFGD	Plum Point Power Station	0.16	Method 6C	30 day for NSPS, 3 hour rolling average*	
DFGD	Sandy Creek	0.1		12 month rolling average	
		0.12		30 day rolling average	
DFGD	Southwest Power Station Unit 2	0.095		30 day rolling average	
DFGD	TS Power Plant	0.065 (coal sulfur <0.45%)		24 hour rolling average	While combusting coal with a Sulfur content less than 0.45 percent (30-day rolling period). 91% minimum SO_2 removal efficiency will be maintained across the system, based on a 30-day rolling period.
		0.09 (coal sulfur >0.45%)		24 hour rolling average	While combusting coal with a sulfur content equal to or greater than 0.45 percent (30-day rolling period). 95% minimum SO_2 removal efficiency will be maintained across the system, based on a 30-day rolling period.
DFGD	Tucson - Springerville Units 3 & 4	0.6 not BACT		30 day rolling average	
DFGD	Two Elk Unit 1	0.132	Method 6C	30 day rolling average	70% minimum removal efficiency (30 day rolling)
		0.15	Method 6C	3 hour rolling average	70% minimum removal efficiency (30 day rolling)
DFGD	Weston Unit 4	90%			
		0.09	Method 6, 6A or 6C	12 month rolling average	1.23 lb S/MBtu 30 day average
		0.1	Method 6, 6A or 6C	30 day rolling average	1.23 lb S/MBtu 30 day average
DFGD	Whelan Energy Center Unit 2	0.12	Method 19	30 day rolling average	
		1.1	Method 19	3 hour rolling average	
DFGD	Wygen Unit 1	0.17	Method 6	30 day rolling average	
		0.2	Method 6	3 hour block average	
DFGD	Wygen Unit 2 (100 MW)	0.1		30 d	
		0.12		3 hr	
		70%		30 day	
DFGD or WFGD	Big Cajun II Power Station Unit 4	0.1		30 day rolling average	
DFGD, FF/BH	Nebraska City Unit 2	0.095		30 day rolling average	
		0.163		24 hour rolling average	
		0.48		3 hour rolling average	
WFGD	Cross Generating Station Units 3 & 4	0.13 not BACT	Method 6 or 6C	365 day rolling average	95% removal efficiency (365-day rolling avg.)

WFGD	Dallman Unit 4	0.2 not BACT		30 day rolling average	
WFGD	Elm Road Generating Station	0.15	Method 6, 6A or 6C	30 day rolling average	
WFGD	Hardin Generator Project	0.14		30 day rolling average	Unit is a vintage 1968 boiler relocated from South Africa.
WFGD	Iatan Generating Station Unit 2	0.09		30 day rolling average	
WFGD	Intermountain Power Unit 3	0.09	Method 6, 6A, 6B, 6C	30 day rolling average	
		0.1	Method 6, 6A, 6B, 6C	24 hour block average	
WFGD	J.K. Spruce Plant Unit 2	0.06 not BACT		12 month rolling average	
		0.10 not BACT		30 day rolling average	
WFGD	Longview Power (GenPower)	0.095		annual	
		0.12		24 hour rolling average	
		0.15		3 hour rolling average	
WFGD	Prairie Energy Power Plant	0.10 - 0.15	Method 6 or 19	30 day rolling average	3.25%, 6.2 lb S/MBtu uncontrolled
WFGD	Prairie State Units 1 & 2	0.182	Method 19	30 day rolling average	4% sulfur in raw coal
		98 %		12 month rolling average	
WFGD	Trimble County Generating Station Unit 2	0.11 calculated, not BACT			
WFGD, WESP	Thoroughbred	0.167		30 day rolling average	
		0.41 (opt. study)		24 hour rolling average	

CFB - Circulating fluidized bed boiler
CFBS - Circulating fluidized bed scrubber
DFGD - Semi-dry flue gas desulfurization (either fluidized bed dry scrubber or spray dryer absorber)
FDA- Flash Dryer Absorber
IGCC - Integrated gasification combined cycle
LI – Limestone injection
PC - Pulverized coal boiler
SDA – Spray dryer absorber
WFGD - Wet flue gas desulfurization
WESP – Wet electrostatic precipitator

Table 2-3
NO_x Controls

Control Device	Facility Name	Limit lb/MBtu	Test Method	Averaging Time	Notes
CFB					
CFB	Bayshore Plant (Unit 1)	0.2 not BACT		30 day rolling average	
CFB	Red Hills Units 1 & 2	0.2 not BACT		30 day rolling average	
SNCR	Beech Hollow	0.08		30 day rolling average	
SNCR	EnviroPower IL - Benton	0.125 - 0.07	Method 7, 7E or 19	30 day rolling average	Evaluation to 0.07 lb/MBtu
SNCR	Gascoyne Generating Station	0.09 calculated	CEMS	30 day rolling average	
SNCR	Greene Energy Resource Recovery Project	0.08		30 day rolling average	
SNCR	Highwood Generation Station	0.07		30 day rolling average	
SNCR	Indeck-Elwood, LLC	0.10 (optimization study to 0.08)	Method 19	30 day rolling average	
SNCR	JEA Northside Units 1 & 2	0.09		30 day rolling average	
SNCR	Kentucky Mountain Power, LLC Units 1 & 2	0.07	401 KAR 50:015	30 day rolling average	The NOX emission limit of 0.07 lbs/MBTU is waived for the specific SNCR optimization study activity
SNCR	Manitowoc Public Utilities	0.155	Method 7	30 day rolling average	In the first month of operation, the average monthly NOx emissions may not exceed the limit of 0.155 pound per million Btu heat input. After the second month, the average NOx emissions shall be determined to be the total NOx emissions for the last two mo
SNCR	Marion Generating Station	0.15 not BACT	Method 7, 7E or 19	30 day rolling average	The permit NOx limit is the NSPS value of 1.6 lb/MWh. This is nominally equivalent to 0.15 lb/MBtu
SNCR	River Hill	0.07		30 day rolling average	
SNCR	Seward	0.15 not BACT		30 day rolling average	
SNCR	Spurlock Unit 3/ EA Gilbert	0.07-0.1		30 day rolling average	SNCR optimization study
SNCR	Spurlock Unit 4	0.07-0.09 (opt. study)		30 day rolling average	

Control Device	Facility Name	Limit lb/MBtu	Test Method	Averaging Time	Notes
SNCR	Western Greenbrier	0.1		30 day rolling average	
PC					
Control Device	**Facility Name**	**Limit lb/MBtu**	**Test Method**	**Averaging Time**	**Notes**
LNB, OFA, SCR	Comanche Plant Unit 3	0.08 not BACT		30 day rolling average	
SCR	Hardin Generator Project	0.09		30 day rolling average	Unit is a vintage 1968 boiler relocated from South Africa.
SCR	Hawthorn Unit 5	0.08		30 day rolling average	36-mo. evaluation period NOx limited to 0.12 lb/MBtu (30-day)
SCR	Iatan Generating Station Unit 2	0.08		30 day rolling average	
SCR	Nebraska City Unit 2	0.07		30 day rolling average	
SCR	Sandy Creek	0.07		30 day rolling average	
SCR	Whelan Energy Center Unit 2	0.08		30 day rolling average	During the first 18 months following initial startup (demonstration period), the Unit 2 Boiler shall not emit NOx exceeding 0.12 lb/MBtu on a 30-day rolling average instead of 0.08 lb/MBtu as listed in Table 4
SCR, LNB	Big Cajun II Power Station Unit 4	0.07		30 day rolling average	
SCR, LNB	Council Bluffs	0.07	Method 7E	30 day rolling average	
SCR, LNB	Cross Generating Station Units 3 & 4	0.185 not BACT	Method 7 or 7E	30 day rolling average	
SCR, LNB	Dallman Unit 4	0.1 not BACT		30 day rolling average	
SCR, LNB	Elm Road Generating Station	0.07	Method 7	30 day rolling average	
SCR, LNB	Intermountain Power Unit 3	0.07	Method 7, 7A, 7B, 7C, 7D, 7E	30 day rolling average	
SCR, LNB	J.K. Spruce Plant Unit 2	0.069 not BACT		30 day rolling average	
SCR, LNB	Longview Power (GenPower)	0.07		30 day rolling average	
SCR, LNB	Prairie Energy Power Plant	0.1	Method 7, 7E, or 19	30 day rolling average	2 year demonstration period; determine if lower NOx limit (as low as 0.07) may be reliably achieved, 0.12 demonstration / 0.10 or lower at conclusion of demonstration period
SCR, LNB	Prairie State Units 1 & 2	0.07	Method 19	30 day rolling average	

Control Device	Facility Name	Limit lb/MBtu	Test Method	Averaging Time	Notes
SCR, LNB	Southwest Power Station Unit 2	0.08		30 day rolling average	
SCR, LNB	Thoroughbred	0.07		30 day rolling average	
SCR, LNB	Tucson - Springerville Units 3 & 4	0.15 not BACT, calculated	Method 7E	30 day rolling average	Calc from NSPS value - Calculated lb/MBtu = 1.6 lb/MW-hr * 400 MW = 640 lb/hr / 4,200 MBtu/hr = 0.15 lb/MBtu
SCR, LNB	Two Elk Unit 1	0.09		30 day rolling average	
SCR, LNB	Weston Unit 4	0.06	Method 7, 7E	30 day rolling average	
SCR, LNB	Wygen Unit 2 (100 MW)	0.07		30 day rolling average	
SCR, LNB, OFA	Plum Point Power Station	0.09	Method 7E	30 day for NSPS, 24 hour rolling average*	

* Secondary averaging period
CFB - Circulating fluidized bed boiler
LNB - Low NOx burner
IGCC - Integrated gasification combined cycle
OFA - Over-fire air
PC - Pulverized coal boiler
SCR - Selective catalytic reduction
SNCR - Selective non-catalytic reduction

Table 2-4
PM_{10} Controls

Control Device	Facility Name	Limit lb/MBtu	Test Method	Averaging Time
CFB				
ESP	AES Puerto Rico Units 1 & 2	0.015 (f)		
ESP	AES Puerto Rico Units 1 & 2	0.03 (f/c)	Method 201, 201A, 202	
FF/BH	Bayshore Plant (Unit 1)	0.025 not BACT		
FF/BH	Beech Hollow	0.012 (f/c)		
FF/BH	EnviroPower IL - Benton	0.015 (f)	Method 5, or 201, or 201A or 19	
FF/BH	Gascoyne Generating Station	0.013 (f)	Method 201a/202 The Department may approve modifications to these methods when it is demonstrated that the modifications are necessary to assure the accuracy of the measurement. The modifications must also be approved by the U.S. EPA.	3 hour average
FF/BH	Gascoyne Generating Station	0.0275 (f/c)	Method 201a/202 The Department may approve modifications to these methods when it is demonstrated that the modifications are necessary to assure the accuracy of the measurement. The modifications must also be approved by the U.S. EPA.	3 hour average
FF/BH	Greene Energy Resource Recovery Project	0.012 (f/c)		3 hour rolling average
FF/BH	Highwood Generation Station	0.026 (f/c)		
FF/BH	Indeck-Elwood, LLC	0.015 (f)	Method 5, 201 or 201A, 202	3 hour block average
FF/BH	Indeck-Elwood, LLC	0.035 (f/c)		
FF/BH	JEA Northside Units 1 & 2	0.011 (f)	Method 201 or 201A	3 hour average
FF/BH	Kentucky Mountain Power, LLC Units 1 & 2	0.015	401 KAR 50:015	3 hour average
FF/BH	Lamar Light & Power Plant Unit 8	0.012 (f)		stack test
FF/BH	Lamar Light & Power Plant Unit 8	0.032 (f/c)		stack test
FF/BH	Manitowoc Public Utilities	0.03 (f/c)	Method 5, 202	
FF/BH	Marion Generating Station	0.011 (f) not BACT	Method 5,or 201, or 201A, or 19	
FF/BH	Marion Generating Station	0.03 (f/c) not BACT		
FF/BH	Red Hills Units 1 & 2	0.015 (f/c)	Method 5	
FF/BH	River Hill	0.012 (f/c)		
FF/BH	Rodemacher Brownfield Unit 3	0.011		30 day rolling average
FF/BH	Sevier Power	0.0154 (f/c)	Method 201, 201A, 202	24 hour rolling average
FF/BH	Seward	0.01 not BACT		stack test
FF/BH	Spurlock Unit 3/ EA Gilbert	0.015 (f)	Method 5	3 hour average