NORTH DAKOTA
STATE DEPARTMENT OF HEALTH
AND CONSOLIDATED LABORATORIES

ENVIRONMENTAL HEALTH SECTION

1200 Missouri Avenue
P.O. Box 5520
Bismarck, North Dakota 58502-5520
Fax #701-221-5200

March 25, 1992

Mr. Brian Lusher
Acurex Environmental Corporation
555 Clyde Avenue
P.O. Box 7044
Mountain View, CA 94039

Dear Mr. Lusher:

Please find enclosed information from emissions tests conducted on major utility boilers in North Dakota that burned lignite. Also, enclosed is a copy of the permits for these facilities which describe the boilers and the air pollution control equipment. Additional information on the boilers is also supplied on a separate sheet.

As you are probably aware, State agencies have limited staff and more work than they can handle. To provide more information would take us away from the work we are designated to do. If additional information is needed, I suggest you visit our offices to go through the files.

If you have any questions, please feel free to contact me.

Sincerely,

Tom Bachman

Tom Bachman, P.E.
Manager
Air Quality Management Branch
Div. of Environmental Engineering

TB:gsh
Enc:

AP42 Section 1.7
4/93
Reference 15

Table 6

Company	Plant Name	Boiler Type	1 BTU's in 1985	2 Capacity (MW)
Basin Electric Power Coop.	AVS Unit #1	Pulverized Tangential	2.737×10^{13}	440
Basin Electric Power Coop.	AVS Unit #2	Pulverized Tangential	4.036×10^{12}	440
~~Basin Electric Power Coop.~~	~~AVS Unit #3~~	~~Pulverized Tangential~~	~~*~~	~~500~~
Basin Electric Power Coop.	Leland Olds #1	Pulverized Wall Fired	6.346×10^{12}	216
Basin Electric Power Coop.	Leland Olds #2	Cyclone	2.945×10^{13}	440
Basin Electric Power Coop.	WJ Neal #1	Pulverized Wall Fired	6.300×10^{11}	25
Basin Electric Power Coop.	WJ Neal #2	Pulverized Wall Fired	6.300×10^{11}	25
~~Montana Dakota Utilities~~	~~Beulah Plant~~	~~Spreader Stokers~~	~~3.018×10^{11}~~	~~14~~
Montana Dakota Utilities	Coyote	Cyclone	2.674×10^{13}	440
Montana Dakota Utilities	Heskett #1	Spreader Stoker	1.428×10^{12}	25
Montana Dakota Utilities	Heskett #2	Fluidized Bed	4.487×10^{12}	66
Minnkota Power Cooperative	Milton R. Young #1	Cyclone	1.751×10^{13}	240
Minnkota Square Butte	Milton R. Young #2	Cyclone	2.830×10^{13}	440
UPA/CPA	Coal Creek Unit #1	Pulverized Tangential	3.68×10^{13}	500
UPA/CPA	Coal Creek Unit #2	Pulverized Tangential	3.28×10^{13}	500
United Power Association	Stanton Unit #1**	Pulverized Front Wall Fired	1.111×10^{13}	130
United Power Association	Stanton Unit #10**	Pulverized Tangential	$.4706 \times 10^{13}$	60
TOTAL			2.326448×10^{14}	

*Not Constructed

**Common Stack

***The present allowable SO_2 emission rate for these units in 1.2 lb/10^6 BTU and 3,845 lb/hr (maximum from both units combined), whichever is more stringent. At maximum capacity when both units are operating, the equivalent allowable is 0.39 lb/10^6 BTU.

Note

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AIR POLLUTION CONTROL PERMIT TO OPERATE

Pursuant to Chapter 23-25 of the North Dakota Century Code, and the Air Pollution Control Rules of the State of North Dakota, and in reliance on statements and representations heretofore made by the owner designated below, a Permit to Operate is hereby issued authorizing such owner to operate the source unit(s) at the location designated below. This Permit to Operate is subject to all applicable rules and orders now or hereafter in effect of the North Dakota State Department of Health and Consolidated Laboratories and to any conditions specified below:

1. Owner:

   A. Name
   Basin Electric Power Cooperative

   B. Address
   1717 E Interstate Ave.
   Bismarck, ND 58501-0564

2. Permit Number
   F86003

3. Installation
   Antelope Valley Station
   Units 1 and 2

4. Installation Location
   Beulah, North Dakota Vicinity
   Mercer County

5. Expiration Date:
   January 27, 1995

6. Source Unit(s):

   A. One lignite-fired, electric utility steam generating station consisting of the following components:

      1. Two Combustion Engineering pulverized lignite boilers each with a rated maximum heat input capacity of 4,930 x 10^6 BTU/hr and each equipped with the following air pollution control equipment:

         a. One Joy Manufacturing Company, Western Precipitation Division and A/S Niro Atomizer flue gas desulfurization (FGD) system for control of sulfur dioxide and particulate matter. The FGD system consists of five parallel-connected spray dryer scrubbers in series with a fabric filter.

      2. The flue gas from each main boiler is emitted through a separate 600-foot stack. Each stack is equipped with the following continuous emission monitors:

a. One Lear Siegler SM810 continuous emission monitor to measure nitrogen oxides and sulfur dioxide emissions.

b. One Lear Siegler RM41 transmissometer to measure opacity.

c. One Lear Siegler CM50 monitor to measure oxygen content.

B. One Zurn Energy auxiliary boiler. The boiler has a rated maximum heat input capacity of 137.7 x 10^6 BTU/hr and is horizontally fired with #2 fuel oil or propane.

C. Coal handling system with the following 99.9% efficient air pollution control equipment:

1. One Carter-Day, Model 376RF6, fabric filter for the south row silos (dust collector 1A).

2. One Carter-Day, Model 376RF6, fabric filter for the north row silos (dust collector 1B).

3. One Carter-Day, Model 232RF9, fabric filter for the silo row transfer (dust collector 1C).

4. One Carter-Day, Model 376RF9, fabric filter for the plant transfer tower (dust collector 1D).

5. One Carter-Day, Model 376RF10, fabric filter for the plant conveyor loading chute (dust collector E).

6. One Carter-Day, Model 376RF10, fabric filter for the stackout conveyor loading chute (dust collector K).

7. One Carter-Day, Model 376RF7, fabric filter for the emergency stackout building (dust collector H).

8. One Carter-Day, Model 376RF6, fabric filter for the Unit 2 south row coal silos (dust collector 2A).

9. One Carter-Day, Model 376RF6, fabric filter for the Unit 2 north row coal silos (dust collector 2B).

10. One Carter-Day, Model 232RF9, fabric filter for the Unit 2 silo transfer (dust collector 2C).

11. One Carter-Day, Model 232RF9, fabric filter for the unit transfer tower (dust collector 2D).

D. Two cylindrical steel fuel oil storage tanks with a capacity of 350,000 gallons each which are used for #2 fuel oil storage. The tanks have a fixed flat roof.

E. One Cummins emergency diesel engine which couples to an electric generator. The engine is rated at 3,300,000 BTU/hr.

F. Dry SO_2 scrubber raw materials handling with the following 99.9% efficient air pollution control equipment:

1. One Pulseflow, Model PF24508-49, fabric filter for the scrubber lime day tank.

2. One Pulseflow, Model PF6012-260, fabric filter for the lime unloading building.

3. One Pulseflow, Model PR24508, fabric filter for the lime silo.

4. One Pulseflow, Model PF24508-49, fabric filter for the Unit 2 scrubber lime day tank.

G. Two cooling towers each with a circulating rate of 187,000 gallons per minute.

H. Water treatment facility with the following 99.9% efficient air pollution control equipment:

1. One Mikro Pulsaire, Model 8B, for the Great Plains Coal Gasification Project lime day tank.

2. One Mikro Pulsaire, Model 8B, for the Antelope Valley Station lime day tank.

3. One Mikro Pulsaire, Model 8B, for the primary water treatment soda ash tank.

CONDITIONS

7. A. **Emission Limits:** Emission limits from the operation of the major source unit(s) identified in Item 6 of this Permit to Operate (hereafter referred to as "permit") are as follows:

Source Unit*	Particulate Matter	Emission Limit SO_2**	Emission Limit NO_x
Unit 1 (main stack)	†0.1 lb/10^6 BTU or 210 lb/hr	†1.2 lb/10^6 BTU or ***3,845 lb/hr	†0.5 lb/10^6 BTU or ***4,930 lb/hr
Unit 2 (main stack)	†0.1 lb/10^6 BTU or 210 lb/hr	†1.2 lb/10^6 BTU or ***3,845 lb/hr	†0.5 lb/10^6 BTU or ***4,930 lb/hr
Auxiliary Boiler	1.39 lb/hr	42.7 lb/hr	20.1 lb/hr

Source Unit*	Particulate Matter	Emission Limit SO_2**	Emission Limit NO_x
Coal Handling System			
Dust Collector 1A	1.97 lb/hr	N/A	N/A
Dust Collector 1B	1.97 lb/hr	N/A	N/A
Dust Collector 1C	1.89 lb/hr	N/A	N/A
Dust Collector 1D	2.83 lb/hr	N/A	N/A
Dust Collector E	3.26 lb/hr	N/A	N/A
Dust Collector K	3.26 lb/hr	N/A	N/A
Dust Collector H	2.23 lb/hr	N/A	N/A
Dust Collector 2A	1.97 lb/hr	N/A	N/A
Dust Collector 2B	1.97 lb/hr	N/A	N/A
Dust Collector 2C	1.89 lb/hr	N/A	N/A
Dust Collector 2D	1.89 lb/hr	N/A	N/A
Dry Scrubber Raw Materials Handling			
#1 Scrubber lime day tank	0.21 lb/hr	N/A	N/A
Lime unloading building	0.58 lb/hr	N/A	N/A
Lime silo	0.42 lb/hr	N/A	N/A
#2 Scrubber lime day tank	0.21 lb/hr	N/A	N/A
Station Emergency Diesel Generator	N/A	3 lb/hr	2.5 lb/hr
Water Treatment Facility	Negligible	N/A	N/A

* Minor source units not listed are subject to the applicable emission limits specified in the North Dakota Air Pollution Control Rules.

** When burning tar oil, the prorated standard for SO_2 emissions contained in Section 33-15-12-04 of the North Dakota Air Pollution Control Rules is applicable.

*** Total allowed from Units 1 and 2 combined.

† Whichever emission rate is less.

B. **Emissions Monitoring:** The owner described in Item 1 shall calibrate, maintain and operate equipment for continuously monitoring and recording opacity, sulfur dioxide, nitrogen oxides and oxygen measurements from the main stacks. The emissions of sulfur dioxide and nitrogen oxides shall be recorded in terms of $lb/10^6$ BTU and lb/hr. An excess emission for sulfur dioxide and nitrogen oxides shall be defined as any emission rate which exceeds the maximum emission rates in Condition 7.A. Quarterly excess emission reports shall be submitted within thirty days following the end of the calendar quarter.

C. **Performance Audit/Testing:** At its discretion, the Department may require a performance audit of any continuous emission monitoring (CEM) system or a performance test of the source(s) to ensure the monitor is reporting accurately or to ensure compliance with emission limitations.

D. **Ambient Air Quality:** An ambient air quality and meteorological monitoring program shall be operated and maintained in accordance with provisions specified by this Department and Title 40, Part 58 of the Code of Federal Regulations. The program shall be used to determine the ambient concentrations of designated pollutants in the vicinity of the plant site and to verify compliance with the North Dakota Ambient Air Quality Standards and Prevention of Significant Deterioration of Air Quality increments. The Department, at its discretion, may audit the performance of ambient air quality and meteorological monitoring equipment.

E. **Used Solvents and Used Oil Combustion:** Burning of used solvents and used oil is subject to the following:

1. The burning of used solvents and used oil shall be conducted in accordance with statements, representations, procedures, and supporting data as outlined in your letter dated May 22, 1987, and Figure 1, AVS Lead AAQS compliance, (attached) and any information submitted thereafter.

2. The owner/operator shall file a Notification of Hazardous Waste Activity (EPA Form 8700-12) with the Department indicating used oil fuel activities and hazardous waste activity.

3. The owner/operator shall maintain invoice records of waste oil received from marketers for a minimum of three years.

4. No used oil fuels containing PCB concentrations greater than two parts per million shall be burned without prior Department approval.

5. No used oil fuels containing total halogen concentrations greater than 1,000 parts per million shall be burned without prior Department approval.

6. The annual emission inventory report required by Condition H. shall include the amount of used oil and used solvents burned during the calendar year, and the type of used solvents burned. If the method of storage precludes the company from specifically tracking the amount of used oil and used solvents burned, the amount of used oil and used solvents received shall be tracked and an estimate of the amount of used oil and used solvents burned shall be calculated.

7. The burning of used solvents and used oil shall comply with 40 CFR, Part 266, Subpart H - Hazardous Waste Burned for Energy Recovery and Subpart E - Used Oil Burned for Energy Recovery; and other applicable rules, regulations, and ordinances.

F. **Tar Oil Combustion:** Up to 17,500 gallons of tar oil per day may be burned at a feed rate less than 12% of the total fuel heat input and must be conducted in accordance with statements, representations, procedures, and supporting data as outlined in your letter dated May 30, 1991 and any information submitted thereafter.

G. **Fugitive Emissions:** All reasonable precautions shall be taken by the owner/operator to prevent and/or minimize fugitive emissions from the operation of the source unit(s) identified under Item 6.

H. **Emission Inventory Reports:** Emission inventory reports including, but not limited to process information regarding the amount and types of fuel used, and air contaminant emissions shall be submitted to the Department, upon request, on forms supplied by the Department.

I. **Source Operations:** The owner/operator shall operate the source unit(s) described in Item 6 of this permit in accordance with statements, representations, procedures and supporting data contained in the initial application, and any supplemental information or renewal application(s) submitted thereafter.

J. **Alterations, Modifications or Changes:** Any alteration, rebuilding, repairing, expansion, change in the method of operation, or change of location of the source which results in the emission of an additional type or greater amount of air contaminants or which results in an increase in the ambient concentration of any air contaminant, must be reviewed and approved by the Department prior to the start of such alteration, rebuilding, repairing, expansion, change in the method of operation, or change of location.

K. **Nuisance or Danger:** This permit shall in no way authorize the maintenance of a nuisance or a danger to public health or safety.

L. **Malfunction Notification:** The owner/operator shall notify the Department of any malfunction which can be expected to last longer than twenty-four hours and can cause the emission of air contaminants in violation of applicable rules and regulations.

M. **Permit Renewal and Invalidation:** This permit shall be effective from the date of its issuance until the date specified in Item 5 unless sooner suspended, revoked or surrendered. Application for renewal of this permit shall be submitted sixty days prior

to such expiration date. The Department shall approve or disapprove the renewal of the permit within sixty days of receipt of the renewal application.

N. **Change of Ownership:** This permit may not be transferred and is to be returned to the Department upon the destruction or change of ownership of the source unit(s), or upon expiration, suspension or revocation of this permit.

O. **Right of Entry:** Any duly authorized officer, employee or agent of the North Dakota State Department of Health and Consolidated Laboratories may enter and inspect any property, premise or place at which the source listed in Item 3 of this permit is located at any time for the purpose of ascertaining the state of compliance with the North Dakota Air Pollution Control Rules. The Department may conduct tests and take samples of air contaminants, fuel, processing material, and other materials which affect or may affect emissions of air contaminants from any source. The Department shall have the right to access and copy any records required by the Department's rules and to inspect monitoring equipment located on the premises.

P. **Other Regulations:** The owner/operator of the source unit(s) described in Item 6 of this permit shall comply with all State and Federal environmental laws and rules. In addition, the owner/operator shall comply with all local burning, fire, zoning, and other applicable ordinances, codes, rules and regulations.

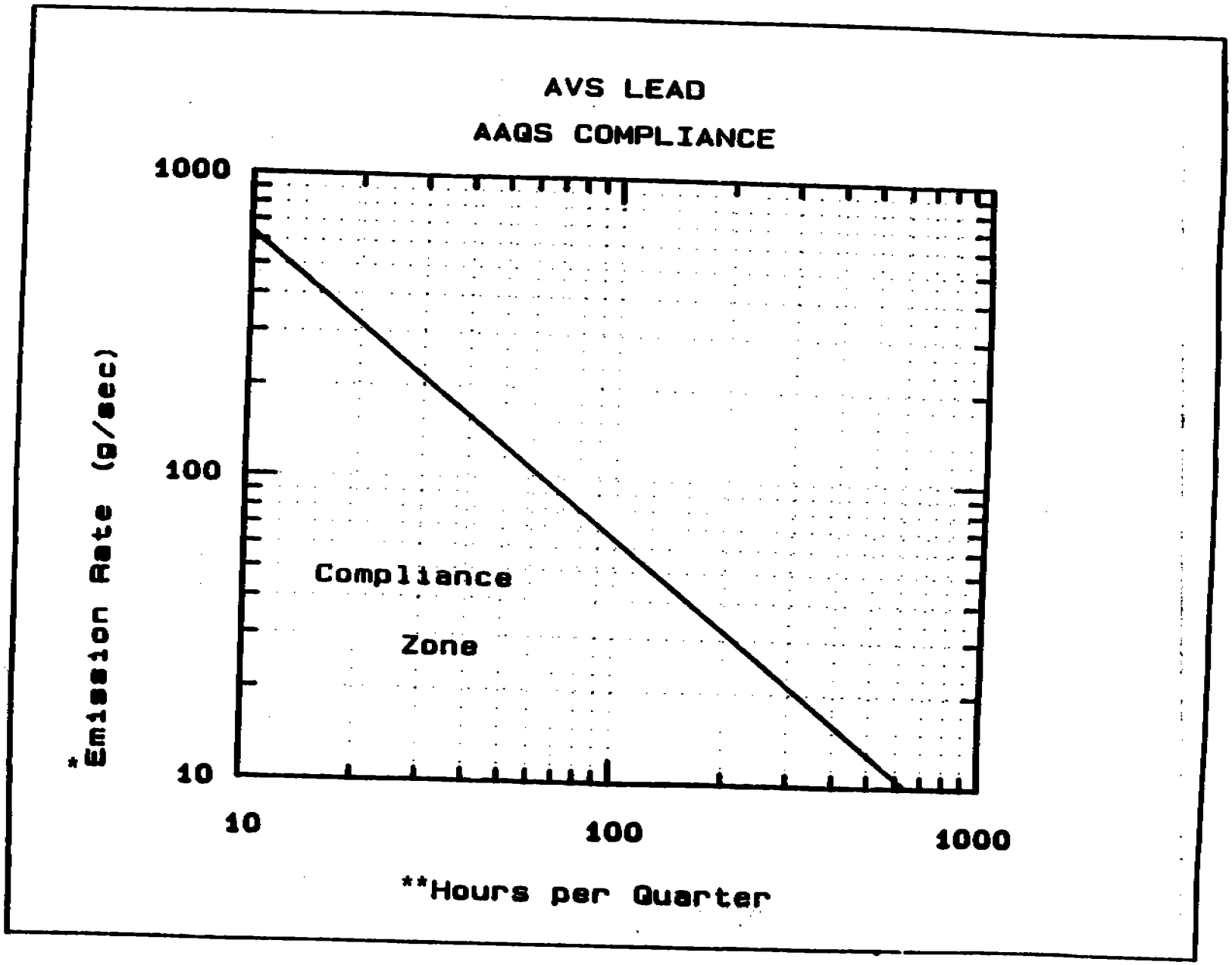
Q. **Permit Issuance:** This permit is issued in reliance upon the accuracy and completeness of the information set forth in the application. The conditions of this permit herein become, upon the effective date of this permit, enforceable by the Department pursuant to any remedies it now has, or may in the future have, under the North Dakota Air Pollution Control Law, NDCC Chapter 23-25. Each and every condition of this permit is a material part thereof, and is not severable.

FOR THE NORTH DAKOTA STATE
DEPARTMENT OF HEALTH AND
CONSOLIDATED LABORATORIES

Date 1/15/92

By _____
Dana K. Mount, Director
Division of Environmental
Engineering

Figure 1



*Lead emission rate.
**Hours that used oil is burned per quar

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Fax #701-221-5200

AIR POLLUTION CONTROL PERMIT TO OPERATE

Pursuant to Chapter 23-25 of the North Dakota Century Code, and the Air Pollution Control Rules of the State of North Dakota, and in reliance on statements and representations heretofore made by the owner designated below, a Permit to Operate is hereby issued authorizing such owner to operate the source unit(s) at the location designated below. This Permit to Operate is subject to all applicable rules and orders now or hereafter in effect of the North Dakota State Department of Health and Consolidated Laboratories and to any conditions specified below:

1. Owner: A. Name Montana-Dakota Utilities Company B. Address 400 North 4th Street Bismarck, ND 58501	2. Permit Number F76001 3. Installation R.M. Heskett Station 4. Installation Location Mandan, North Dakota Morton County

5. Expiration Date:
August 19, 1994

6. Source Unit(s):

A. Lignite-fired, steam electric power generation plant consisting of the following components:

1. Unit No. 1, Riley Stoker Corporation boiler with a rated maximum heat input of 387,630,000 BTU/hr equipped with the following air pollution control equipment:

a. Research Cottrell electrostatic precipitator with a design efficiency of 99.0%.

2. Unit No. 2, a Babcock and Wilcox Company atmospheric fluidized bed boiler with a design continuous rated heat input of 916.5 x 10^6 BTU/hr, equipped with the following air pollution control equipment:

a. Research Cottrell electrostatic precipitator with a design efficiency of 97.0%.

b. Western Precipitation Division of the Joy Manufacturing Company Multiclone, Model 9VGRAB-14, with an operating efficiency of 78.0%.

3. United Conveyors Corporation ash handling system for the electrostatic precipitator on Units 1 and 2, consisting of the following equipment:

a. Primary Receiver
b. Secondary Receiver
c. Ash Silo
d. Diffusers
e. Fluidizing Blower
f. Dust Unloader
g. Bag Filter Set

4. Each unit is equipped with a Lear Siegler RM41 opacity monitor.

CONDITIONS

7. A. **Emission Limits:** Emission limits from the operation of the major source unit(s) identified in Item 6 of this Permit to Operate (hereafter referred to as "permit") are as follows:

Source* Unit	Air Contaminant	Emission Limit
Unit 1	Opacity	20%
	Particulate	0.1 lb/10^6 BTU
	SO_2	3 lb/10^6 BTU
Unit 2	Opacity	20%
	Particulate	0.057 lb/10^6 BTU
	SO_2	1.7 lb/10^6 BTU
	NO_x	0.4 lb/10^6 BTU

* Minor source units not listed are subject to the applicable emission limits specified in the North Dakota Air Pollution Control Rules.

B. **Fugitive Emissions:** All reasonable precautions shall be taken by the owner/operator to prevent and/or minimize fugitive emissions to the outside air from the operation of the source unit(s) identified under Item 6.

C. **Emission Inventory Reports:** Emission inventory reports including, but not limited to process information regarding the amount and type of fuel usage, and air contaminant emissions shall be submitted to the Department, upon request, on forms supplied by the Department.

D. **Source Operations:** The owner/operator shall operate the source unit(s) described in Item 6 of this permit in accordance with statements, representations, procedures and supporting data contained in the initial application, and any supplemental information or renewal application(s) submitted thereafter.

E. **Alterations, Modifications or Changes:** Any alteration, rebuilding, repairing, expansion, change in the method of operation, or change of location of the source which results in the emission of an additional type or greater amount of air contaminants or which results in an increase in the ambient concentration of any air contaminant, must be reviewed and approved by the Department prior to the start of such alteration, rebuilding, repairing, expansion, change in the method of operation, or change of location.

F. **Nuisance or Danger:** This permit shall in no way authorize the maintenance of a nuisance or a danger to public health or safety.

G. **Malfunction Notification:** The owner/operator shall notify the Department of any malfunction which can be expected to last longer than twenty-four hours and can cause the emission of air contaminants in violation of applicable rules and regulations.

H. **Permit Renewal and Invalidation:** This permit shall be effective from the date of its issuance until the date specified in Item 5 unless sooner suspended, revoked or surrendered. Application for renewal of this permit shall be submitted sixty days prior to such expiration date. The Department shall approve or disapprove the renewal of the permit within sixty days of receipt of the renewal application.

I. **Emission Monitoring:** The owner described in Item 1 shall calibrate, maintain, and operate equipment for continuously monitoring and recording opacity on Units No. 1 and No. 2. The monitoring and recording shall be in accordance with the requirements for notification and recordkeeping (Subsection 6 of Section 33-15-12-01) and monitoring requirements (Subsection 11 of Section 33-15-12-01) of the North Dakota Air Pollution Control Rules. At its discretion, the Department may require a performance audit of any continuous emission monitoring (CEM) system or a performance test of the source(s) to ensure the monitor is reporting accurately or to ensure compliance with emission limitations.

J. **Change of Ownership:** This permit may not be transferred and is to be returned to the Department upon the destruction or change of ownership of the source unit(s), or upon expiration, suspension or revocation of this permit.

K. **Right of Entry:** Any duly authorized officer, employee or agent of the North Dakota State Department of Health and Consolidated Laboratories may enter and inspect any property, premise or place at which the source listed in Item 3 of this permit is located at any time for the purpose of ascertaining the state of compliance with the North Dakota Air Pollution Control Rules. The Department may conduct tests and take samples of air contaminants, fuel, processing material, and other materials which affect or may affect emissions of air contaminants from any source. The Department shall have the right to access and copy any records required by the Department's rules and to inspect monitoring equipment located on the premises.

L. **Other Regulations:** The owner/operator of the source unit(s) described in Item 6 of this permit shall comply with all State and Federal environmental laws and rules. In addition, the owner/operator shall comply with all local burning, fire, zoning, and other applicable ordinances, codes, rules and regulations.

M. **Permit Issuance:** This permit is issued in reliance upon the accuracy and completeness of the information set forth in the application. The conditions of this permit herein become, upon the effective date of this permit, enforceable by the Department pursuant to any remedies it now has, or may in the future have, under the North Dakota Air Pollution Control Law, NDCC Chapter 23-25. Each and every condition of this permit is a material part thereof, and is not severable.

FOR THE NORTH DAKOTA STATE
DEPARTMENT OF HEALTH AND
CONSOLIDATED LABORATORIES

Date 8/27/91

By _____
Dana K. Mount, Director
Division of Environmental
Engineering

NORTH DAKOTA
STATE DEPARTMENT OF HEALTH
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ENVIRONMENTAL HEALTH SECTION

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AIR POLLUTION CONTROL
PERMIT TO OPERATE

Pursuant to Chapter 23-25 of the North Dakota Century Code, and the Air Pollution Control Rules of the State of North Dakota, and in reliance on statements and representations heretofore made by the owner designated below, a Permit to Operate is hereby issued authorizing such owner to operate the source unit(s) at the location designated below. This Permit to Operate is subject to all applicable rules and orders now or hereafter in effect of the North Dakota State Department of Health and Consolidated Laboratories and to any conditions specified below:

1. Owner:

   A. Name
   Minnkota Power
   Cooperative, Inc.

   B. Address
   Box 1318
   Grand Forks, ND 58201

2. Permit Number
   F76009

3. Installation

   Milton R. Young Station
   Unit #1

4. Installation Location

   Center, North Dakota
   Oliver County

5. Expiration Date:
   November 30, 1994

6. Source Unit(s):

   A. One lignite-fired 235 MW electrical power generating facility, consisting of the following:

      1. A Babcock & Wilcox cyclone-fired furnace with a heat input rating of 2,500,000,000 BTU/hr and a boiler unit rated at 1,714,000 pounds of steam per hour (identification numbers PL-3941 and RB-457) equipped with the following air pollution control equipment:

         a. Research-Cottrell, Inc. electrostatic precipitator of four units, with each unit divided into four 9 x 30 foot sections containing discharge electrode wires and Opzel type collecting electrode plates.

2. One continuous emission monitoring system comprised of a Lear Siegler Model RM 41 optical transmissometer.

3. One fly ash silo equipped with a United Conveyor Model 1036 rotary unloader for the temporary storage of electrostatic precipitator ash.

4. One vitrified fly-ash silo equipped with a water injected, dustless unloader rated at 150 ton/hr. This silo is used on a standby basis for the temporary storage of precipitator ash.

5. Two 500,000 gallon fixed roof petroleum storage tanks used for storage of No. 2 fuel oil.

6. A Cleaver Brooks boiler unit rated at 60,000 lb of steam per hour fired on No. 2 fuel oil. This unit is used on a standby basis.

7. A lignite handling system comprised of the following:

Unloading Station

a. A Stamler Model BF-29C-0-8F feeder equipped with a Hercules single roll breaker will prepare coal for unloading onto a Link Belt 42" x 332" unloading belt conveyor, referred to as conveyor 1D. Air pollution control consists of a Johnson-March Corp dust suppression system at the primary crusher discharge point.

Crusher House

b. A receiving hopper equipped with two Syntron Co. vibrating feeders, with each feeder rated at 500 ton/hr.

c. Two half-capacity Pennsylvania ring hammer crushers, with each crusher rated at 400 ton/hr, equipped with a Link Belt 36" x 495' stackout conveyor (referred to as conveyor 1-C) and a telescopic chute attached to the end of the conveyor. Air pollution control consists of:

   1. A Johnson-March Corp. dust suppression system for the secondary crusher, at the secondary crusher discharge point and for the 1-C conveyor belt.

   2. An American Air Filter Company Type "W" rotoclone for the 1-C conveyor belt discharge point near the secondary crusher.

Stackout and Reclaim Area

d. Three underground reclaim hoppers equipped with Syntron Co. vibrating feeders, with each feeder rated at 300

ton/hr, and a Link-Belt 30" x 875' reclaim belt conveyor (referred to as conveyor 1-B). Air pollution control consists of a Johnson-March Corp. dust suppression system at the discharge points of the reclaim feeders.

Coal Storage Bunkers

e. A Link-Belt silo belt conveyor (referred to as conveyor 1-A) discharging to seven coal storage silos located within the plant, each with a capacity of 420 tons. Air pollution control consists of an American Air Filter Co. Type "W" rotoclone for the storage silos and a #14 Type "D" rotoclone for various drop points in the tripper room.

CONDITIONS

7. A. **Emission Limits:** Emission limits from the operation of the major source unit(s) identified in Item 6 of this Permit to Operate (hereafter referred to as "permit") are as follows:

Source* Unit	Air Contaminant	Emission Limit
6.A.1. Babcock and Wilcox Cyclone-fired furnace	Particulate Matter	0.10 lb/10^6 BTU
	Visible Emissions	20% opacity
	Sulfur Dioxide	3 lb/10^6 BTU

*Minor source units not listed are subject to the applicable emission limits specified in the North Dakota Air Pollution Control Rules.

B. **Emissions Monitoring:** A continuous emission monitoring system (CEMS) to measure opacity from the main stack shall be calibrated, maintained and operated by the owner or operator.

The continuous emission monitoring equipment is to be operated in accordance with applicable standards set forth in Subsection 11 (Monitoring Requirements) of Section 33-15-12-01 of the North Dakota Air Pollution Control Rules.

C. **Quarterly Excess Emission Reports:** A quarterly excess emissions report shall be submitted by the thirtieth day following the end of each calendar quarter. The report shall include those items identified in Subsection 6 (Notification and Recordkeeping) of Section 33-15-12-01 of the North Dakota Air Pollution Control Rules. Periods of excess emissions are defined as follows:

(1) **Opacity.** Any six-minute period during which the average opacity of emissions exceeds twenty percent opacity except that a maximum of forth percent opacity shall be permissible for not more than one six-minute period per hour.

D. **Performance Audit/Test:** At its discretion, the Department may require a performance audit of the CEM system or a performance test of the source to ensure that the CEM is reporting accurately or to ensure compliance with emission limitations.

E. **Used Oil Combustion:** Burning of up to 40,000 gallons per year of used oil is allowed subject to the following:

1. Burning shall be conducted in accordance with statements, representations, and procedures contained in your May 9, 1991 application and any supplemental information submitted thereafter.

2. The owner/operator shall file a Notification of Hazardous Waste Activity (EPA Form 8700-12) with the Department indicating used oil fuel activities.

3. The owner/operator shall maintain invoice records of waste oil received from marketers for a minimum of three years.

4. Burning must be in accordance with the Waste Fuel Management Plan submitted on July 2, 1991.

5. Within thirty days after the end of the calendar quarter, the owner/operator shall submit (a) a report to the Department detailing the amount of waste oil burned on a daily basis during the previous quarter and (b) a copy of a representative chemical analysis of such waste oil.

6. The annual emission inventory report required by condition 7.C. shall include the amount of waste oil burned during the calendar year.

7. The burning of waste oil shall comply with 40 CFR, Part 266, Subpart E - Used Oil Burned for Energy Recovery and other applicable rules, regulations, and ordinances.

8. Only oil which contains less than 50 ppm PCB may be burned. Burning of oil which contains PCB is only allowed for used oil generated by the Minnkota Power Cooperative, its associated electric system, or its associated mining facilities.

F. **Fugitive Emissions:** All reasonable precautions shall be taken by the owner/operator to prevent and/or minimize fugitive emissions from the operation of the source unit(s) identified under Item 6.

G. **Emission Inventory Reports:** Emission inventory reports including, but not limited to process information regarding the amount and type of fuel consumed and the air contaminants emitted shall be submitted to the Department, upon request, on forms supplied by the Department.

H. **Source Operations:** The owner/operator shall operate the source unit(s) described in Item 6 of this permit in accordance with statements, representations, procedures and supporting data contained in the initial application, and any supplemental information or renewal application(s) submitted thereafter.

I. **Alterations, Modifications or Changes:** Any alteration, rebuilding, repairing, expansion, change in the method of operation, or change of location of the source which results in the emission of an additional type or greater amount of air contaminants or which results in an increase in the ambient concentration of any air contaminant, must be reviewed and approved by the Department prior to the start of such alteration, rebuilding, repairing, expansion, change in the method of operation, or change of location.

J. **Nuisance or Danger:** This permit shall in no way authorize the maintenance of a nuisance or a danger to public health or safety.

K. **Malfunction Notification:** The owner/operator shall notify the Department of any malfunction which can be expected to last longer than twenty-four hours and can cause the emission of air contaminants in violation of applicable rules and regulations.

L. **Permit Renewal and Invalidation:** This permit shall be effective from the date of its issuance until the date specified in Item 5 unless sooner suspended, revoked or surrendered. Application for renewal of this permit shall be submitted sixty days prior to such expiration date. The Department shall approve or disapprove the renewal of the permit within sixty days of receipt of the renewal application.

M. **Change of Ownership:** This permit may not be transferred and is to be returned to the Department upon the destruction or change of ownership of the source unit(s), or upon expiration, suspension or revocation of this permit.

N. **Right of Entry:** Any duly authorized officer, employee or agent of the North Dakota State Department of Health and Consolidated Laboratories may enter and inspect any property, premise or place at which the source listed in Item 3 of this permit is located at any time for the purpose of ascertaining the state of compliance with the North Dakota Air Pollution Control Rules. The Department may conduct tests and take samples of air contaminants, fuel, processing material, and other materials which affect or may affect emissions of air contaminants from any source. The Department shall have the right to access and copy any records required by the

Department's rules and to inspect monitoring equipment located on the premises.

O. **Other Regulations:** The owner/operator of the source unit(s) described in Item 6 of this permit shall comply with all State and Federal environmental laws and rules. In addition, the owner/operator shall comply with all local burning, fire, zoning, and other applicable ordinances, codes, rules and regulations.

P. **Permit Issuance:** This permit is issued in reliance upon the accuracy and completeness of the information set forth in the application. The conditions of this permit herein become, upon the effective date of this permit, enforceable by the Department pursuant to any remedies it now has, or may in the future have, under the North Dakota Air Pollution Control Law, NDCC Chapter 23-25. Each and every condition of this permit is a material part thereof, and is not severable.

FOR THE NORTH DAKOTA STATE
DEPARTMENT OF HEALTH AND
CONSOLIDATED LABORATORIES

Date 12/2/91

By _____
Dana K. Mount, Director
Division of Environmental
Engineering

NORTH DAKOTA
STATE DEPARTMENT OF HEALTH
AND CONSOLIDATED LABORATORIES
State Capitol
600 E. Boulevard Avenue
Bismarck, North Dakota 58505-0200

ENVIRONMENTAL HEALTH SECTION
1200 Missouri Avenue
P.O. Box 5520
Bismarck, North Dakota 58502-5520

AIR POLLUTION CONTROL
PERMIT TO OPERATE

Pursuant to Chapter 23-25 of the North Dakota Century Code, and the Air Pollution Control Rules of the State of North Dakota, and in reliance on statements and representations heretofore made by the owner designated below, a Permit to Operate is hereby issued authorizing such owner to operate the source unit(s) at the location designated below. This Permit to Operate is subject to all applicable rules and orders now or hereafter in effect of the North Dakota State Department of Health and Consolidated Laboratories and to any conditions specified below:

1. Owner: A. Name Square Butte Electric Cooperative, Inc. B. Address Box 1318 Grand Forks, ND 58201	2. Permit Number F78007 3. Installation Milton R. Young Station Unit 2 4. Installation Location Center, North Dakota Oliver County

5. Expiration Date:

November 14, 1993

6. Source Unit(s):

A. Unit 2, a 440 MW lignite-fired electrical power generating facility, composed of the following:

1) A Babcock and Wilcox cyclone fired furnace with a heat input rating of 4,696 x 10^6 BTU/hr and a boiler unit rated at 3,200,000 pounds of steam per hour equipped with the following air pollution control equipment:

a) Two Wheelabrator Lurgi Model 90/40/4x9/12" electrostatic precipitators. Each precipitator is comprised of two chambers with four fields containing 90 gas passages, discharge electrode wires and collecting plates.

b) A flue gas desulfurization system consisting of two modified Combustion Equipment Associates, Inc. spray tower scrubber absorber modules. The scrubbing system is designed to utilize a scrubbing medium consisting of either fly ash, fly ash supplemented with lime or lime.

2) Emissions from the main stack are monitored by a continuous emission monitoring system comprised of a Lear Siegler, Inc. Model RM 4200 transmissometer, a Lear Siegler, Inc. Model SM 8100 SO_2/NO stack gas analyzer and a Lear Siegler, Inc. Model EX 4700 analyzer for measurement of CO, CO_2 and moisture.

B. One 40,000 cubic foot capacity fly ash silo equipped with a United Conveyor Model 1036 rotary unloader for the temporary storage of electrostatic precipitator ash.

C. One 450 ton capacity lime storage silo equipped with a Dustex Model 3100 fabric filter type dust collector.

D. A Hewitt-Robins coal handling system comprised of the following:

1) Unloading Station

One truck unloading hopper equipped with a W. R. Stamler Corp. primary crusher and feeder rated at 1600 tons per hour. Coal is discharged to a Robbins Engineering discharge belt conveyor referred to as Conveyor 2-I. Air pollution control equipment consists of an Aquadyne dust suppression system at the primary crusher discharge point.

2) Crusher House/Station

a) One drop chute equipped with two Vibranetics, Inc. Model VF-96-HD vibratory feeders, each with a capacity of 1000 tons per hour.

b) Two Type K Pennsylvania crushers rated at 1000 tons per hour discharging to conveyor 2-H. Air pollution control equipment consists of an Aquadyne dust suppression system.

c) The dust suppression system for the crusher house/station consists of an American Air Filter Type W rotoclone.

3) Auxiliary Reclaim Area

An American Pulverizer Type AC-3F frozen lump crusher rated at 800 ton per hour discharging to conveyor 2-H. Air pollution control equipment consists of an Aquadyne dust suppression system.

4) Active Storage Building

Conveyor 2-H transports coal to an enclosed coal stacker for active storage. Coal is removed from the active storage building by a plow to conveyor 2-F and transferred to Conveyor 2-E. Air pollution control equipment consists of an Aquadyne dust suppression system for the primary crusher discharge.

5) Transfer House

Conveyor 2-E transports coal to the transfer house and onto Conveyor 2-D.

6) Tripper Deck

Conveyor 2-D transports coal to the tripper deck to Conveyor 2-C. Coal is transferred onto Conveyors 2-A and 2-B which discharge to twelve coal silos within the plant. Air pollution control equipment consists of an American Air Filter Type W rotoclone.

E. Two fuel oil storage tanks, each with a capacity of 500,000 gallons. These tanks are common to both Units 1 and 2.

F. Two underground fuel oil storage tanks each with a capacity of 15,000 gallons. These tanks are common to both Units 1 and 2.

G. One diesel fuel storage tank with a capacity of 30,000 gallons.

H. Emergency/Standby Equipment

1) One Cummins Engine Company, Inc. Model NT 855-G diesel engine with a rated capacity of 355 BHP at 1800 rpm equipped with an Onan Model 200 DFP generator.

2) One Cummins Engine Company, Inc. Model N-855-F diesel engine with a rated capacity of 190 HP at 1750 rpm. It is equipped with a Worthington Corp. Model 15M-185-3 fire pump.

CONDITIONS

7. A. **Emission Limits:** Emission limits from the operation of the major source unit(s) identified in Item 6 of this Permit to Operate (hereafter referred to as "permit") are as follows:

Source* Unit	Air Contaminant	Emission Limit
Unit 2	Particulate Matter	0.1 lb/10^6 BTU
	Opacity	20%
	Sulfur Dioxide	1.2 lb/10^6 BTU
	Nitrogen Oxides	3820 lb/hr

*Minor source units not listed are subject to the applicable emission limits specified in the North Dakota Air Pollution Control Rules.

B. **Emissions Monitoring:** The owner described in Item 1 shall calibrate, maintain and operate equipment for continuously monitoring and recording opacity, sulfur dioxide, and carbon dioxide emissions from the main stack. The emissions of sulfur dioxide shall be recorded in terms of lb/10^6 BTU. Quarterly excess emission reports shall be submitted within thirty days following the end of the calendar quarter.

C. **Performance Audit/Test:** At its discretion, the Department may require a performance audit of any continuous emission monitoring (CEM) system or a performance test of the source(s) to ensure the monitor is reporting accurately or to ensure compliance with emission limitations.

D. **Supplemental Fuel:** A semiannual report detailing the chemical constituents of a 50-50 blend of waste oil and Grade 2 oil, which is utilized as supplemental fuel to minimize slagging in the furnace and/or boiler unit, shall be submitted to the Department. A log is to be maintained that will outline fuel oil usage on a daily basis.

E. **Fugitive Emissions:** All reasonable precautions shall be taken by the owner/operator to prevent and/or minimize fugitive emissions from the operation of the source unit(s) identified under Item 6.

F. **Emission Inventory Reports:** Emission inventory reports including, but not limited to process information regarding the amount and type of fuel usage and air contaminant emissions shall be submitted to the Department, upon request, on forms supplied by the Department.

G. **Source Operations:** The owner/operator shall operate the source unit(s) described in Item 6 of this permit in accordance with statements, representations, procedures and supporting data contained in the initial application, and any supplemental

information or renewal application(s) submitted thereafter.

H. **Alterations, Modifications or Changes:** Any alteration, rebuilding, repairing, expansion, change in the method of operation, or change of location of the source which results in the emission of an additional type or greater amount of air contaminants or which results in an increase in the ambient concentration of any air contaminant, must be reviewed and approved by the Department prior to the start of such alteration, rebuilding, repairing, expansion, change in the method of operation, or change of location.

I. **Nuisance or Danger:** This permit shall in no way authorize the maintenance of a nuisance or a danger to public health or safety.

J. **Malfunction Notification:** The owner/operator shall notify the Department of any malfunction which can be expected to last longer than twenty-four hours and can cause the emission of air contaminants in violation of applicable rules and regulations.

K. **Permit Renewal and Invalidation:** This permit shall be effective from the date of its issuance until the date specified in Item 5 unless sooner suspended, revoked or surrendered. Application for renewal of this permit shall be submitted sixty days prior to such expiration date. The Department shall approve or disapprove the renewal of the permit within sixty days of receipt of the renewal application.

L. **Change of Ownership:** This permit may not be transferred and is to be returned to the Department upon the destruction or change of ownership of the source unit(s), or upon expiration, suspension or revocation of this permit.

M. **Right of Entry:** Any duly authorized officer, employee or agent of the North Dakota State Department of Health and Consolidated Laboratories may enter and inspect any property, premise or place at which the source listed in Item 3 of this permit is located at any time for the purpose of ascertaining the state of compliance with the North Dakota Air Pollution Control Rules. The Department may conduct tests and take samples of air contaminants, fuel, processing material, and other materials which affect or may affect emissions of air contaminants from any source. The Department shall have the right to access and copy any records required by the Department's rules and to inspect monitoring equipment located on the premises.

N. **Other Regulations:** The owner/operator of the source unit(s) described in Item 6 of this permit shall comply with all State and Federal environmental laws and rules. In addition, the owner/operator shall comply with all local burning, fire, zoning, and other applicable ordinances, codes, rules and regulations.

O. **Permit Issuance:** This permit is issued in reliance upon the accuracy and completeness of the information set forth in the application. The conditions of this permit herein become, upon the effective date of this permit, enforceable by the Department pursuant to any remedies it now has, or may in the future have, under the North Dakota Air Pollution Control Law, NDCC Chapter 23-25. Each and every condition of this permit is a material part thereof, and is not severable.

FOR THE NORTH DAKOTA STATE
DEPARTMENT OF HEALTH AND
CONSOLIDATED LABORATORIES

Date 1/10/91

By _____
Dana K. Mount, Director
Division of Environmental
Engineering

NORTH DAKOTA
STATE DEPARTMENT OF HEALTH
AND CONSOLIDATED LABORATORIES

ENVIRONMENTAL HEALTH SECTION

1200 Missouri Avenue
P.O. Box 5520
Bismarck, North Dakota 58502-5520
Fax #701-221-5200

AIR POLLUTION CONTROL
PERMIT TO OPERATE

Pursuant to Chapter 23-25 of the North Dakota Century Code, and the Air Pollution Control Rules of the State of North Dakota, and in reliance on statements and representations heretofore made by the owner designated below, a Permit to Operate is hereby issued authorizing such owner to operate the source unit(s) at the location designated below. This Permit to Operate is subject to all applicable rules and orders now or hereafter in effect of the North Dakota State Department of Health and Consolidated Laboratories and to any conditions specified below:

1. Owner:

   A. Name
   United Power Association/
   Cooperative Power
   Association

   B. Address
   14615 Lone Oak Road
   Eden Prairie, MN 55344-2287

2. Permit Number
   F82006

3. Installation

   Coal Creek Station
   Units I and II

4. Installation Location

   Underwood, ND Vicinity
   McLean County

5. Expiration Date:

   July 10, 1994

6. Source Unit(s):

   A. Units No. 1 and No. 2 - Two identical lignite-fired, steam generating units, each consisting of the following components:

      1. One Combustion Engineering tangentially fired 2,620 psi boiler, with a maximum operating steam output capacity of 3,730,000 pounds per hour and a maximum rated heat input capacity of 5,280 x 10^6 BTU/hr and equipped with the following air pollution control equipment:

         a. One Wheelabrator - Frye, Inc. electrostatic precipitator for control of particulate matter. The precipitator has a design efficiency of 99.5%.

b. One Combustion Engineering, Inc., four (4) module flue gas desulfurization system which is designed to remove 90% of the sulfur dioxide from 60% of the exit flue gas.

2. The flue gas from each unit is emitted through a separate 650-foot stack. Each stack is equipped with the following continuous emission monitors:

a. One Lear Siegler SM810 continuous emission monitor to measure nitrogen oxides and sulfur dioxide emissions.

b. One Lear Siegler RM41 transmissometer to measure opacity.

c. One Lear Siegler CM50 monitor to measure oxygen content.

B. Two auxiliary boilers - Fuel oil fired boilers (Nos. 91 and 92) each with a heat input of 172 x 10^6 BTU/hr.

C. Lignite handling facility - designed to provide coal to Units No. 1 and No. 2 with the following equipment and/or operations:

1. Belt type conveying equipment (enclosed) used for conveying lignite to various points in the plant. The conveyors have capacities as follows:

Conveyor	Capacity (TPH)
901	2500
902	2500
903	2500
904	2500
905	2000
906	2000
907	2000
908	2000
909	2500
910	2000
911	2000
912	2000
913	1000
914	1000
915	40
916	40
11	575
12	575
21	575
22	575
Cascades	575

2. Transfer house used for transferring lignite from receiving conveyors to discharge conveyors. A bagfilter (dust collector 91) is provided for dust emissions from the transfer house. The bagfilter has a design efficiency of 99.9%.

3. Two lignite yard storage silos. Two bagfilters (dust collectors 93 and 94) are provided for dust emissions from the storage silos. The bagfilters have a design efficiency of 99.9%.

4. Emergency reclaim system rated at 2000 TPH. A bagfilter (dust collector 92) is provided for dust emissions from the emergency stockout and reclaim area. The bagfilter has a design efficiency of 99.9%.

5. Crusher building and equipment. The crusher building has two Pennsylvania crushers rated at 1000 TPH each. A bagfilter (dust collector 95) is provided for dust emissions from the crushing and conveying operations. The bagfilter has a design efficiency of 99.9%.

6. Generation building containing hoppers serving Units No. 1 and No. 2. Five bagfilters (dust collectors 21, 22, 11, 12, and 96) are provided for dust emissions from the generation building. The bagfilters have a design efficiency of 99.9%.

7. One bagfilter (dust collector 97) is located at the bottom of Falkirk Mining Company's mine silos. The bagfilter has a design efficiency of 99.9% and collects dust emissions from the bottom of the silos and conveyor 901.

8. Storage piles (lignite)

   a. Active storage 126,000 tons
   b. Inactive storage 900,000 tons
   c. Emergency storage 32,000 tons

D. Fly ash handling and storage facilities

1. Fly ash is removed from the electrostatic precipitator hoppers and transported to two storage silos or to the two flue gas desulfurization systems. The operating capacity of the fly ash transportation system is 54 tons per hour per generating unit. Three bagfilters with a design efficiency of 99.9% are provided for each of the two fly ash disposal silos for dust control. One bagfilter of the three on each silo is used as a backup. These dust collectors are identified as 911, 912, 913 and 921, 922, 923. One bagfilter with a design efficiency of 99.9% is provided for each of the two scrubber fly ash storage silos. These dust collectors are identified as 11 and 821.

E. Lime storage and handling equipment

1. One lime handling system rated at 30 tons/hr for the water treatment building. A bagfilter with a design efficiency of 99.9% is provided for controlling emissions (lime dust) from this system.

2. One lime handling system for the flue gas desulfurization additive for Units No. 1 and No. 2 scrubber buildings. The system is rated at 75 ton/hr per unit. A bagfilter with a design efficiency of 99.9% is provided to control emissions (lime dust) from this system.

F. Three cooling towers which service Units No. 1 and No. 2. The design inlet circulating water flow to each tower is 210,000 gpm.

CONDITIONS

7. A. **Emission Limits:** Emission limits from the operation of the major source unit(s) identified in Item 6 of this Permit to Operate (hereafter referred to as "permit") are as follows:

Source* Unit	Air Contaminant	Emission Limit
Unit I (main stack)	TSP	0.1 lb/10^6 BTU/528 lb/hr
	SO_2	1.2 lb/10^6 BTU/6336 lb/hr
	NO_x	5104 lb/hr
Unit II (main stack)	TSP	0.1 lb/10^6 BTU/528 lb/hr
	SO_2	1.2 lb/10^6 BTU/6336 lb/hr
	NO_x	5104 lb/hr
Auxiliary Boilers 91 & 92	TSP	4.5 lb/hr each
	SO_2	3 lb/10^6 BTU/516 lb/hr each
	NO_x	0.7 lb/10^6 BTU/120 lb/hr each
Dust Collectors 91 through 97	TSP	3 lb/hr (each)
Dust Collectors 21 and 22	TSP	3 lb/hr (each)
Dust Collectors 11 and 12 (lignite handling facility)	TSP	3 lb/hr (each)

Bagfilters 911, 912 913, 811, 821, 921 922 and 923 (fly ash handling and storage system)	TSP	3 lb/hr (each)
Bagfilter (lime handling system for water treatment)	TSP	3 lb/hr
Bagfilter (lime handling system for flue gas desulfurization system additive)	TSP	3 lb/hr

Dust collector TSP emissions limited to 3.0 lb/hr are based on the Department's review of a performance test conducted on September 29, 1979, at Coal creek Station and subsequent information submitted on June 15, 1982.

All of the above source unit(s) are limited to 20% opacity.

*Minor source units not listed are subject to the applicable emission limits specified in the North Dakota Air Pollution Control Rules.

B. **Fugitive Emissions:** The owner named in Item 1 shall take, but is not limited to, the following precautions to prevent and/or minimize fugitive emissions to the ambient air from the operation of the source unit(s) identified under Item 6:

1) Properly construct and compact coal storage piles to minimize emissions.

2) Plant and maintain landscape materials to restrict wind blowing of surface soils.

3) Pave or treat roads on-site to minimize dust generation by vehicular traffic.

C. **Emission Inventory Reports:** Emission inventory reports including, but not limited to process information regarding the amount and types of fuel usage, production and air contaminant emissions, shall be submitted to the Department, upon request, on forms supplied by the Department.

D. **Source Operations:** The owner named in Item 1 shall operate the source unit(s) described in Item 6 of this permit in accordance with the following statements made to the NDSDH&CL:

1) The owner will maintain all covered conveyors and bagfilters to control dust emissions.

2) The owner will maintain bagfilter and dust suppression equipment used in handling fly ash and lime.

3) The owner will maintain and operate the electrostatic precipitators on Units No. 1 and No. 2 to restrict emissions to the levels shown in 7.A. above.

4) The owner will maintain and operate the flue gas desulfurization units on Units No. 1 and No. 2 to restrict emissions to the levels shown in 7.A. above.

E. **Alterations, Modifications or Changes:** Any alteration, rebuilding, repairing, expansion, change in the method of operation, or change of location of the source which results in the emission of an additional type or greater amount of air contaminants or which results in an increase in the ambient concentration of any air contaminant, must be reviewed and approved by the Department prior to the start of such alteration, rebuilding, repairing, expansion, change in the method of operation, or change of location.

F. **Nuisance or Danger:** This permit shall in no way authorize the maintenance of a nuisance or a danger to public health or safety.

G. **Malfunction Notification:** The owner/operator shall notify the Department of any malfunction which can be expected to last longer than twenty-four hours and can cause the emission of air contaminants in violation of applicable rules, regulations, and permit conditions.

H. **Permit Renewal and Invalidation:** This permit shall be effective from the date of its issuance until the date specified in Item 5 unless sooner suspended, revoked or surrendered. Application for renewal of this permit shall be submitted sixty days prior to such expiration date. The Department shall approve or disapprove the renewal of the permit within sixty days of receipt of the renewal application.

I. **Emission Monitoring:** The owner described in Item 1 shall calibrate, maintain and operate equipment for continuously monitoring and recording opacity, sulfur dioxide, nitrogen oxides and oxygen measurements on Units No. 1 and No. 2. The monitoring and recording shall be in accordance with the requirements for notification and recordkeeping (Subsection 6 of Section 33-15-12-01) and monitoring requirements (Subsection 11 of Section 33-15-12-01) of the North Dakota Air Pollution Control Rules. At its discretion, the Department may require a performance audit of any continuous emission monitoring (CEM) system or a performance test of the source(s) to ensure the monitor is reporting accurately or to ensure compliance with emission limitations.

J. **Used Oil/Used Solvents/Hazardous Waste:**

1) The burning of used oil, used solvents and hazardous waste shall be conducted in accordance with statements, representations, and procedures outlined in letters dated October 31, 1986, December 22, 1986, March 18, 1987, September 17, 1991, and any supplemental information submitted thereafter.

2) The owner/operator shall maintain invoice records of waste oil received from markets for a minimum of three years.

3) No used oil, used solvents or hazardous waste containing PCB concentrations greater than two parts per million shall be burned without prior Department approval.

4) The burning of used oil and used solvents shall comply with 40 CFR Part 266, Subpart E - Used Oil Burned for Energy Recovery and other applicable rules, regulations, and ordinances.

5) The burning of hazardous waste shall comply with 40 CFR Part 266, Subpart H - Hazardous Waste Burned for Energy Recovery.

6) The owner/operator must maintain at the facility for at least three years sufficient records documenting compliance with the hazardous waste quantity, firing rate, and heating value limits of Section 266.108 of Subpart H - Hazardous Waste Burned for Energy Recovery.

7) Within thirty days after the end of the calendar quarter, the owner/operator shall submit (a) a report to the Department detailing the amount of used oil, used solvents and hazardous waste burned on a daily basis during the previous quarter and (b) a copy of a representative chemical analysis of such used oil, used solvents and hazardous waste.

8) The annual emission inventory report required by Condition 7.C. shall include the amount of used oil, used solvents and hazardous waste burned during the calendar year.

9) Burning of hazardous waste is only allowed for hazardous waste generated at the Coal Creek Station.

10) No more than 240 gallons of hazardous waste may be burned in any 12-month period.

11) When burning hazardous waste, the boiler must be operating at full load and the ESP and wet scrubber must be operating properly.

K. **Change of Ownership:** This permit may not be transferred and is to be returned to the Department upon the destruction or change of ownership of the source unit(s), or upon expiration, suspension or revocation of this permit.

L. **Right of Entry:** Any duly authorized officer, employee or agent of the North Dakota State Department of Health and Consolidated Laboratories may enter and inspect any property, premise or place at which the source listed in Item 3 of this permit is located at any time for the purpose of ascertaining the state of compliance with the North Dakota Air Pollution Control Rules. The Department may conduct tests and take samples of air contaminants, fuel, processing material, and other materials which affect or may affect emissions of air contaminants from any source. The Department shall have the right to access and copy any records required by the Department's rules and to inspect monitoring equipment located on the premises.

M. **Other Regulations:** The owner/operator of the source unit(s) described in Item 6 of this permit shall comply with all State and Federal environmental laws and rules. In addition, the owner/operator shall comply with all local burning, fire, zoning, and other applicable ordinances, codes, rules and regulations.

N. **Permit Issuance:** This permit is issued in reliance upon the accuracy and completeness of the information set forth in the application. The conditions of this permit herein become, upon the effective date of this permit, enforceable by the Department pursuant to any remedies it now has, or may in the future have, under the North Dakota Air Pollution Control Law, NDCC Chapter 23-25. Each and every condition of this permit is a material part thereof, and is not severable.

FOR THE NORTH DAKOTA STATE
DEPARTMENT OF HEALTH AND
CONSOLIDATED LABORATORIES

Date 12/3/91

By _____
Dana K. Mount, Director
Division of Environmental
Engineering

NORTH DAKOTA
STATE DEPARTMENT OF HEALTH
AND CONSOLIDATED LABORATORIES
State Capitol
Bismarck, North Dakota 58505

ENVIRONMENTAL HEALTH SECTION

1200 Missouri Avenue
P.O. Box 5520
Bismarck, North Dakota 58502-5520

AIR POLLUTION CONTROL
PERMIT TO OPERATE

Pursuant to Chapter 23-25 of the North Dakota Century Code, and the Air Pollution Control Rules of the State of North Dakota, and in reliance on statements and representations heretofore made by the owner designated below, a Permit to Operate is hereby issued authorizing such owner to operate the source unit(s) at the location designated below. This Permit to Operate is subject to all applicable rules and orders now or hereafter in effect of the North Dakota State Department of Health and Consolidated Laboratories and to any conditions specified below:

1. Owner: A. Name United Power Association B. Address Elk River, MN 55330-0800	2. Permit Number F76007 3. Installation Stanton Power Plant Unit #1 and Unit #10 4. Installation Location Stanton, North Dakota Mercer County

5. Expiration Date:

October 1, 1992

6. Source Unit(s):

A lignite-fired, steam electric power generation plant consisting of the following components:

A. Unit 1

1) One Foster Wheeler boiler with a rated maximum heat input of 1,800 x 10^6 BTU/hr equipped with the following air pollution control equipment:

a) Research Cottrell, Inc. half capacity electrostatic precipitator with a design efficiency of 98% (1 PW).

b) Research Cottrell, Inc. half capacity electrostatic precipitator with a design efficiency of 98% (1 PE).

2) One auxiliary boiler rated at 18 x 10^6 BTU/hr.

3) Coal handling and conveying system for Unit 1 equipped with the following air pollution control equipment:

   a) Multi-tube dust collector.

4) One Lear Siegler RM 41 opacity monitor to measure opacity from Unit I.

B. Unit 10

1) One Combustion Engineering boiler with a rated maximum heat input of 642 x 10^6 BTU/hr equipped with the following air pollution control equipment:

   a) Research Cottrell, Inc. dry scrubber/fabric filter system with a design particulate removal efficiency of 99 + % and SO_2 removal efficiency of a minimum of 70%.

2) Coal handling and conveying system for Unit #10 equipped with the following air pollution control equipment:

   a) Pneufill fabric filter dust collector.

3) Lime storage tank for Unit #10 equipped with the following air pollution equipment:

   a) Fuller-Dracco Uni-Filter.

4) One Lear Siegler SM8100 gas emission monitor which measures SO_2 and NO_x from Unit #10.

5) One Lear Siegler CM60 oxygen analyzer which measures oxygen from Unit #10.

6) One Contraves Goerz M400 opacity monitor which measures opacity from Unit #10.

7) One Cleaver-Brooks Model D-42 auxiliary boiler with a rated maximum heat input of 30,891,000 BTU/hr.

CONDITIONS

7. A. The maximum emission rates for Unit #1 and #10 shall be as specified below:

Source	Particulate	SO_2	NO_x	Opacity
Unit #1	0.30 lb/10^6 BTU	3 lb/10^6 BTU	---	20%
Unit #10	0.03 lb/10^6 BTU	0.6 lb/10^6 BTU (70% reduction) (30 day rolling average)	0.6 lb/10^6 BTU (30 day rolling average)	20%

Emissions from Unit #1 and Unit #10 are emitted through a common stack.

B. The following fuels are approved for use:

Source	Primary Fuel	Standby Fuel
Unit #1 Boiler	Lignite	No. 2 Fuel Oil
Auxiliary Boiler	No. 2 Fuel Oil	------
Unit #10 Boiler	Lignite	No. 2 Fuel Oil
Cleaver-Brooks D-42	No. 2 Fuel Oil	------

C. The opacity from Unit #1 shall be no greater than 20 percent (six-minute average), except for one six-minute per hour of not more than forty percent.

D. The opacity from Unit #10 shall be no greater than 20 percent (six-minute average), except for one six-minute per hour of not more than 27 percent.

E. The total SO_2 emission rate from Unit #1 and Unit #10 shall not exceed 557 grams per second (4,416 pounds per hour) averaged over a 36-hour period of operation when both units are in operation.

F. All reasonable precautions shall be taken by the owner to prevent and/or minimize fugitive emissions from the operation of the source unit(s) identified under Item 6.

G. Emission inventory reports including, but not limited to production, fuel usage, and air contaminant emissions shall be submitted by the owner to the Department, upon request, on forms supplied by the Department, not later than forty-five (45) days following the end of the calendar year.

H. The owner named in Item 1 shall operate the source unit(s) described in Item 6 of this Permit in accordance with statements, representations, procedures and supporting data contained in an application dated August 2, 1989.

I. Any alteration, rebuilding, repairing, expansion, change in the method of operation, or change of location of the source which results in the emission of an additional type or greater amount of air contaminants or which results in an increase in the ambient concentration of any air contaminant, must be reviewed and approved by the Department prior to the start of such alteration, rebuilding, repairing, expansion, change in the method of operation, or change in location.

J. This Permit to Operate shall in no way permit or authorize the maintenance of a nuisance or a danger to public health or safety.

K. A continuous emission monitoring and recording system (CEM) to measure opacity, SO_2 NO_x, and O_2 from the outlet of Unit 10 and opacity from Unit 1 shall be installed, calibrated, maintained and operated by the owner or operator.

The continuous emission monitoring equipment shall be operated in accordance with applicable standards set forth by Section 33-15-12-01.11 (Monitoring Requirements) of the North Dakota Air Pollution Control Rules and 40 CFR, Part 60, Appendix F - Quality Assurance Procedures.

Quarterly excess emission reports shall be submitted by the 30th day following the end of each calendar quarter. The reports shall include those items identified in Section 33-15-12-01.6 (Notification and Recordkeeping) of the North Dakota Air Pollution Control Rules.

L. At its discretion, the Department may require a performance audit of the CEM system or a performance test of the source to ensure the monitor is reporting accurately or to ensure compliance with emission limitations.

M. This Permit to Operate shall be effective from the date of its issuance until August 30, 1992, unless sooner suspended, revoked or surrendered. Application for renewal of this Permit shall be submitted sixty (60) days prior to such expiration date. The Department shall approve or disapprove the renewal of the Permit to Operate within sixty (60) days of receipt of the renewal application.

N. This Permit may not be transferred and is to be returned to the Department upon the destruction or change of ownership of the source unit(s), or upon expiration, suspension or revocation of this Permit.

O. The owner/operator shall file a Notification of Hazardous Waste Activity (EPA Form 8700-12) with the Department indicating used oil fuel activities and hazardous waste activity.

P. The owner/operator shall maintain invoice records of waste oil received from marketers for a minimum of three years.

Q. No used oil fuels containing PCB concentrations greater than two parts per million shall be burned without prior Department approval.

R. No used fuels containing total halogen concentrations greater than 1000 parts per million shall be burned without prior Department approval.

S. The annual emission inventory report required by Condition 7.G. shall include the amount of used oil and used solvents burned during the calendar year, and the type of waste solvents burned. If the method of storage precludes the company from specifically tracking the amount of used oil and used solvents burned, the amount of used oil and used solvent received shall be tracked and an estimate of the amount of used oil and used solvent shall be calculated.

T. The burning of used solvents and used oil shall comply with 40 CFR, Part 266, Subpart D - Hazardous Waste Burned for Energy Recovery and Subpart E - Used Oil Burned for Energy Recovery; and other applicable rules, regulations, and ordinances.

U. The active coal pile must be reclaimed for fuel within 36 hours of applying the used oil and used solvents.

V. The burning of used oil and used solvents shall be conducted in accordance with statements, representations, procedures, and supporting data as outlined in letter dated May 29, 1987.

W. This Permit to Operate is issued in reliance upon the accuracy and completeness of the information set forth in the application. The conditions of this Permit herein become, upon the effective date of this Permit, enforceable by the Department pursuant to any remedies it now has, or may in the future have, under the North Dakota Air Pollution Control Law, NDCC Chapter 23-25. Each and every condition of this Permit is a material part thereof, and is not severable.

FOR THE NORTH DAKOTA STATE
DEPARTMENT OF HEALTH AND
CONSOLIDATED LABORATORIES

Date 11/8/89

By Dana K. Mount
Dana K. Mount, Director
Division of Environmental
Engineering

MOU Heskett

THE EMISSION MEASUREMENT PEOPLE, INC. unit 2

TABLE 3-6<R>
TEST RESULTS, BY RUN
METHODS 1-4, 5, CEMS, CEMS

FLUE ID: (2)

RUN NUMBER:	101 INVALID RUN	102 (2)	103 (2)	104	AVERAGE
PLANT PROCESS AND PRODUCTION DATA **********					
PRODUCTION RATE, <10^3 lb steam	525.0	525.0	525.0	525.0	525.0
FEED RATE, <Btu>: x10^6/hr.	824.9	824.9	824.9	824.9	824.9 ARBITRARY # NOT USED
SETPOINT * 1 <->:					
SETPOINT * 2 <->:					
PARTICULATE EMISSION RESULTS **********					
GR./ACF:	0.0126	0.0101	0.0093	0.0136	0.0114
GR./DSCF:	0.0210	0.0168	0.0145	0.0204	0.0182
GR./DSCF <a 12% CO2>:					
LB./HR:	39.9024	31.4184	28.9576	42.6748	35.7382
LB./10^6BTU:	0.0702	[redacted]			
LB./TON:	152.0090	119.6882	110.3147	162.5705	136.1456
TONS/YEAR: <1>	167.5900	131.9562	121.6220	179.2340	150.1005
SULFUR DIOXIDE <SO2> EMISSION RESULTS **********					
PPM, <DRY, V/V>:	176.2	173.8	169.4	136.4	164.0
PPM, <DRY, V/V,--%O2/CO2>:					
PPM, <WET, V/V>:	152.1	155			
LB./HR.:	389.7	377.4	393.6	331.4	373.0
LB./10^6BTU:	0.7	[redacted]			
LB./TON:	1484.6	1437.6	1499.5	1262.6	1421.1
TONS/YEAR: <1>	1636.7	1585.1	1653.1	1391.9	1391.4
OXIDES OF NITROGEN <NOX> EMISSION RESULTS **********					
PPM, <DRY, V/V>:	124.1	123.1	129.8	129.2	126.5
PPM, <DRY, V/V,--%O2/CO2>:					
PPM, <WET, V/V>:	107.1	109.8	117.6	116.6	112.8
PPM, <ISO STD. COND.>:					
GM/HPHR.:					
LB./HR.:	197.1	191.8	216.6	225.4	207.8
LB./10^6BTU:	0.3	[redacted]			
TONS/YEAR: <1>	473.1	805.6	909.7	946.7	783.8
PARAMETRIC FLUE GAS DATA **********					
PRESS. VELOCITY, DEL-P <IN. W.G.>:	0.3452	0.3264	0.3468	0.3652	0.3459
MOISTURE <V/V, %>:	13.66	10.79	9.40	9.76	10.90
CO2 <DRY, V/V, %>:	8.35	8.83	9.03	7.70	8.48
O2 <DRY, V/V, %>:	12.08	11.57	11.36	12.77	11.94
TEMP., STACK <%F>:	274.80	277.10	273.35	275.00	275.06
VELOCITY, <FPS>:	39.96	39.38	39.30	39.68	39.58
VOL. FLOW <10^3 ACFM>:	369.046	363.753	362.943	366.516	365.564
VOL. FLOW <10^3 DSCFM>:	222.201	218.031	233.409	243.987	229.407

AVERAGE = .057

(1) 8400 hr./year (24 hr./day x 350 days/year)
(2) Sand Dryer off

The Emission Measurement People, Inc.

TABLE 3-7<R>
SAMPLING AND ANALYTICAL DATA. BY RUN
METHODS 1-5

PLANT: MDU UNIT: 2
LOCATION: HESKET TEST LEADER: COX

RUN NUMBER:	101	102	103	104
DATE. 1988:	18	11-9-8	11-9-8	11-9-8
RUN TIME <MIN.>:	60	60	60	60
TIME START:	1121	1620	1929	849
FIELD DATA **********				
VOLUME OF SAMPLE, <DSCF>: (1)	62.612	40.872	45.506	43.143
VOLUME a METER, <ACF>: <■>	63.243	42.049	45.659	43.548
TEMP. a METER, <%F>:	53.2	59.4	49.3	51.7
PRESS. a METER, <IN.W.G.>:	3.277	1.280	1.456	1.500
PRESS. BAROM, <IN.HG.ABS>:	28.15	28.10	28.24	28.20
EXCESSIVE LEAKS <ACF>: (1)	16.00			
MOISTURE DETERMINATION: <$>				
PRESS. OF H2O VAPOR a S.G., <IN. HG.>:	0.2468	0.1336	0.1309	0.1286
TEMP. a S.G., <%F>:	39.9	25.5	25.1	24.8
VACUUM a S.G., <IN. HG.>:	4.4	3.2	3.5	4.1
VOL. a SILICA GEL, <GM.> (2)	14.1	4.8	5.1	5.0
VOL. a IMPINGERS, <ML.>:	196.0	100.0	95.0	94.0
MOLECULAR WEIGHT, WET: (3)	28.220	28.611	28.796	28.611
F0, QC ORSAT CHECK:	1.056	1.057	1.056	1.056
ORSAT CHECK GOOD?:	YES	YES	YES	YES
ISOKINETIC SMPL. RATE<%>: <$>	228.729	92.940	100.904	91.517
POINT-BY-POINT <AVG, %>:	91.205	66.326	104.239	93.127
POINT-BY-POINT <HIGH, %>:	300.000	132.900	127.659	108.216
POINT-BY-POINT <LOW, %>:	60.000	78.200	85.286	28.837
NOZZLE DIAMETER <IN.>:	0.2085	0.3015	0.3015	0.3015
RATE FACTOR <K3>:	0.9938	3.9114	4.1923	4.1923
VALID SAMPLE DATA?:	YES	YES	YES	YES
DEMONSTRATES COMPLIANCE?:	YES	YES	YES	YES
LABORATORY DATA (4) **********				
PARTICULATE WEIGHT <MG.>:	85.180	44.618	42.770	57.166
ACETONE WASH WT. <MG.>:	30.380	16.668	11.870	35.216
FILTER<S> CAKE WT. <MG.>:	54.800	27.950	30.900	21.950
BLANK ACETONE <MG.>:	1.080	0.468	0.420	0.816
SO2 TITRATION VOLUME <ML.>:	210.087	104.813	100.141	98.956
ALIQUOT FACTOR:	20.000	20.000	20.000	20.000

(1) Amount of any excessive leak above 0.02cfm or 4% of flowrate has already been subtracted from sample volume (acf), above; other results have been corrected
(2) From Dalton's Law, per protocol and Method 4
(3) See CO_2/O_2 data on Table 3-6, above
(4) See Appendix 4.5

THE EMISSION MEASUREMENT PEOPLE, INC.

2-1

TABLE
TEST RESULTS, BY RUN
METHODS 1-4, 5, CEMS, CEMS

FLUE ID: 2

RUN NUMBER:	AVERAGE
PLANT PROCESS AND PRODUCTION DATA **	*********
PRODUCTION RATE, <10^3 lb steam	525.0
FEED RATE, <Btu>: x10^6/hr.	824.9
SETPOINT # 1 <—>:	
SETPOINT # 2 <—>:	
PARTICULATE EMISSION RESULTS **	*********
GR./ACF:	0.0114
GR./DSCF:	0.0182
GR./DSCF <@ 12% CO2>:	
LB./HR:	35.7382 ✓
LB./10^6BTU:	0.0606 ✓
LB./TON:	136.1456
TONS/YEAR: <1>	150.1005 ✓
SULFUR DIOXIDE <SO2> EMISSION RESULTS **	*********
PPM, <DRY, V/V>:	164.0
PPM, <DRY, V/V,--%O2/CO2>:	
PPM, <WET, V/V>:	
LB./HR.:	373.0 ✓
LB./10^6BTU:	0.6 ✓
LB./TON:	1421.1
TONS/YEAR: <1>	1591.4 ✓
OXIDES OF NITROGEN <NOX> EMISSION RESULTS **	*********
PPM, <DRY, V/V>:	126.5
PPM, <DRY, V/V,--%O2/CO2>:	
PPM, <WET, V/V>:	112.8
PPM, <ISO STD. COND.>:	
GM/HPHR.:	
LB./HR.:	207.8 ✓
LB./10^6BTU:	0.3 ✓
TONS/YEAR: <1>	783.8 ✓
PARAMETRIC FLUE GAS DATA *****	********
PRESS. VELOCITY, DEL-P <IN. W.G.>:	0.3459
MOISTURE <V/V, %>:	10.90
CO2 <DRY, V/V, %>:	8.48
O2 <DRY, V/V, %>:	11.94
TEMP., STACK <%F>:	275.06
VELOCITY, <FPS>:	39.58
VOL. FLOW <10^3 ACFM>:	365.564
VOL. FLOW <10^3 DSCFM>:	229.407

(1) 8400 hr./year (24 hr./day x 350 days/year)
(2) Sand Dryer off

Coal - spec. Analysis

MINNESOTA VALLEY TESTING LABORATORIES, *Inc.*

NE (701) 258-9720

P.O. BOX 1873, 1411 SOUTH 12TH STREET, BISMARCK, NORTH DAKOTA 58504-1873

COAL ANALYSIS REPORT

02331

NA-DAKOTA UTILITIES CO.
ORTH FOURTH STREET
RCK, ND 58501

DATE: November 22, 1988

TION: E. F. BACKHAUS

W. O. #: 89-706

TYPE: COAL

LAB #: L-2782

P. O. #: M99388

FICATION: HESKETT PLANT
EMISSION TEST
11-9-88

ECEIVED: 11-18-88

==========2.1

ATE ANALYSIS	AS RECEIVED	DRY MATTER
MOISTURE	36.39	XXXXX
ASH	7.04	11.07
SULFUR	0.85	1.34
BTU/LB	6978	10969

Catherine Anne Phelps

Catherine Anne Phelps
Laboratory Manager

Coal - Spec. Analysis

MINNESOTA VALLEY TESTING LABORATORIES, *Inc.*

PHONE (701) 258-9720

P.O. BOX 1873, 1411 SOUTH 12TH STREET, BISMARCK, NORTH DAKOTA 58504-1873

COAL ANALYSIS REPORT

02331

MONTANA-DAKOTA UTILITIES CO.
400 NORTH FOURTH STREET
BISMARCK, ND 58501

DATE: November 22, 1988

ATTENTION: E. F. BACKHAUS

W. O. #: 89-706

SAMPLE TYPE: COAL

LAB #: L-2783

SAMPLE IDENTIFICATION: HESKETT PLANT
EMISSION TEST
11-10-88

P. O. #: M99388

DATE RECEIVED: 11/18/88

==========2.1

PROXIMATE ANALYSIS	AS RECEIVED	DRY MATTER
% MOISTURE	35.65	XXXXX
% ASH	6.91	10.73
% SULFUR	0.85	1.33
BTU/LB	7096	11028

Catherine Anne Phelps
Laboratory Manager

12/7-12/75

TABLE 6.

SUMMARY OF EMISSION AND PERTINENT PARAMETERS MEASURED OR CALCULATED DURING UNIT ONE SAMPLING ACTIVITY

Parameters Measured or Calculated	Tests of Unit One Numbered Per Order of Total Tests 5	6	7	Arith. Ave. of Unit 1 Tests
Barometer Pressure, in Hg	28.0	27.76	27.68	-
Stack Press, in H_2O	-0.55	-0.50	-0.48	-0.51
Stack dia., inches	105	105	105	105
Nozzle dia., inches	0.25	0.25	0.25	0.25
Ave.stack gas velocity, fps	52.0	52.5	51.3	51.9
Ave.stack gas temp, ^oF	347	345	345	346
Stack gas vol. rate SCFM (dry)	101799	101456	99526	100927
Sample vol., $Ft.^3$	75.78	70.49	70.3	-
Moisture collected, ml	204	199	183	-
Vol. moisture gas, %	11.6	12.2	11.6	11.8
Gas Composition				
CO_2	11.3	-	-	11.3
O_2	8.6	-	-	8.6
CO	0.2	-	-	0.2
N_2	79.9	-	-	79.9
Sample vol., SCF (dry)	74.2	67.9	66.0	-
Isokinetic eff., %	107.1	98.4	97.5	-
Filter wt, grams	0.00881	0.01319	0.00751	-
Probe wt., grams	0.02357	0.01864	0.01297	-
Total sample wt., grams	0.03238	0.03183	0.02048	-
Fuel consumption, lbs./hr.	49,000	49,500	49,500	49,333
Heat value, BTU/lb. (rc'd)	6683	6875	6869	6809
Heat input, M BTU	327	340	340	
Particulate Emission				
gr/scf (dry)	0.007	0.007	0.005	0.0063
lbs./hr.	6.1	6.1	4.3	5.5
lbs./M BTU	0.019	0.018	0.013	0.0167

Hes Kett 1

TABLE 7.

SUMMARY OF EMISSION AND PERTINENT PARAMETERS MEASURED OR CALCULATED DURING UNIT TWO SAMPLING ACTIVITY

Parameters Measured or Calculated	Tests of Unit Two Numbered Per Order of Total Tests				Arith Ave. of Unit 2 Tests (Test 1 not incl.)
	1	2	3	4	
Barometer Pressure, in Hg	27.76	28.0	28.2	28.2	-
Stack Press., in H_2O	-0.6	-0.6	-0.6	-0.6	-0.6
Stack dia., inches	162	162	162	162	162
Nozzle dia., inches	0.25	0.25	0.25	0.25	-
Ave. stack gas velocity, fps	41.3	41.8	41.8	42.0	41.9
Ave. stack gas temp., ^{o}F	309	311	308	308	309
Stack gas vol. rate SCFM (dry)	197,981	201,588	206,622	205,501	204,570
Sample vol., $Ft.^3$	94.95	87.79	83.52	83.8	-
Moisture collected, ml	270	251	217	239	-
Vol. moisture gas, %	12.6	12.6	11.4	12.3	12.1
Gas Composition					
CO_2	12.6	12.5	12.3	12.2	12.3
O_2	7.2	7.3	7.1	7.3	7.2
CO	0.1	0.1	0.1	0.1	0.1
N_2	80.1	80.1	80.4	80.4	80.4
Sample vol., SCF (dry)	88.8	82.6	79.9	80.4	-
Isokinetic eff., %	117.7	107.6	101.5	102.7	-
Filter wt., grams	0.00893	0.00892	0.01064	0.01070	-
Probe wt., grams	0.03747	0.02490	0.02252	0.02871	-
Total sample wt., grams	0.04640	0.03382	0.03316	0.03941	-
Fuel consumption, lbs./hr.	108000	108000	109000	109000	108666
Heat value, BTU/lb. (rc'd)	6915	6915	6908	6917	6913
Heat input, M BTU	747	747	753	754	751
Particulate Emission					
gr/scf (dry)	0.008	0.006	0.006	0.008	0.0067
lbs./hr.	13.6	10.4	10.6	14.1	11.7
lbs./M BTU	0.018	0.014	0.014	0.019	0.0157

Ave A = 17.64

HAZEN RESEARCH, INC.

4601 INDIANA STREET
GOLDEN, COLORADO • 80401
TELEPHONE 303/279-4501

Mr. R. T. Nelson
Montana-Dakota Utilities Company

Date: Dec. 31, 1975

Sample Received: Dec. 22, 1975
HRI Project No. 002-32
HRI Series No. 9077-6
Purchase Order M93078

Sample Designation: Unit 2 Coal, Test #4, 12/11/75

	As Received	Dry Basis
Moisture (%)	36.25	
Ash (%)	7.24	11.35
Volatile Matter (%)		
Fixed Carbon (%)		
Calorific Value (Btu/lb)	6,917	10,850
Sulfur (%)	0.63	0.98
Mineral Matter Free (Btu/lb)		12,386

Initial Deformation °F
Softening °F
Hemispherical °F
Fluid °F

By: _____
John C. Jarvis, Manager
Analytical Laboratory

mgp
cc: Environmental Research Corp.

HAZEN RESEARCH, INC.

4601 INDIANA STREET
GOLDEN, COLORADO • 80401
TELEPHONE 303/279-4501

Mr. R. T. Nelson
Montana-Dakota Utilities Company

Date: Dec. 31, 1975

Sample Received: Dec. 22, 1975
HRI Project No. 002-32
HRI Series No. 9077-5
Purchase Order M93078

Sample Designation: Unit 2 Coal, Test #3, 12/11/75

	As Received	Dry Basis
Moisture (%)	35.82	
Ash (%)	8.17	12.73
Volatile Matter (%)		
Fixed Carbon (%)		
Calorific Value (Btu/lb)	6,908	10,764
Sulfur (%)	0.96	1.49
Mineral Matter Free (Btu/lb)		12,512

Initial Deformation °F
Softening °F
Hemispherical °F
Fluid °F

By: _____
John C. Jarvis, Manager
Analytical Laboratory

jp
cc: Environmental Research Corp.

HAZEN RESEARCH, INC.

4601 INDIANA STREET
GOLDEN, COLORADO · 80401
TELEPHONE 303/279-4501

Mr. R. T. Nelson
Montana-Dakota Utilities Company

Date: Dec. 31, 1975

Sample Received: Dec. 22, 1975
HRI Project No. 002-32
HRI Series No. 9077-4
Purchase Order M93078

Sample Designation: Unit 2 Coal, Run #2, 12/11/75

	As Received	Dry Basis
Moisture (%)	35.68	
Ash (%)	7.51	11.68
Volatile Matter (%)		
Fixed Carbon (%)		
Calorific Value (Btu/lb)	6,915	10,752
Sulfur (%)	0.75	1.16
Mineral Matter Free (Btu/lb)		12,328

Initial Deformation °F
Softening °F
Hemispherical °F
Fluid °F

By: _____
John C. Jarvis, Manager
Analytical Laboratory

ngp
cc: Environmental Research Corp.

ZEN RESEARCH, INC.

4601 INDIANA STREET
GOLDEN, COLORADO • 80401
TELEPHONE 303/279-4501

R. T. Nelson
ana-Dakota Utilities Company

Date: Dec. 31, 1975

Sample Received: Dec. 22, 1975
HRI Project No. 002-32
HRI Series No. 9077-3
Purchase Order M93078

ample
esignation: Unit 1 Coal, Test #3, 12/12/75

	As Received	Dry Basis
loisture (%)	36.39	
sh (%)	6.88	10.82
olatile Matter (%)		
ixed Carbon (%)		
alorific Value (Btu/lb)	6,869	10,798
ulfur (%)	0.66	1.03
ineral Matter Free (Btu/lb)		12,248

itial Deformation °F
oftening °F
emispherical °F
uid °F

By: for John C. Jarvis, Manager
Analytical Laboratory

ivironmental Research Corp.

MONTANA-DAKOTA UTILITIES CO.

400 NORTH FOURTH STREET - BISMARCK, ND 58501 - TEL. (701) 222-7900

September 11, 1985

Dana K. Mount, P.E.
Director, Division of Environmental Engineering
North Dakota State Department of Health
1200 Missouri Ave.
P.O. Box 5520
Bismarck, ND 58502-5520

Dear Mr. Mount:

Referenced is your letter dated August 6, 1985, requesting additional information regarding the proposed change in the method of firing the existing Unit II boiler at R. M. Heskett Station with an Atmospheric Fluidized Bed Combustor, AFBC.

An analysis based on our most recent technical information, including a recent source test of R.M. Heskett Station Unit II, the results of a test burn of lignite coal at Babcock and Wilcox's 6X6 AFBC, and a comparison of resistivity curves of our Beulah lignite coal fired in our existing Unit II and in the 6X6 AFBC has been made. Montana- Dakota Utilities Co. feels that the maximum hourly particulate emission rate of the AFBC will be less then the maximum hourly particulate emission rate of the existing Unit II. Additionally, based on projected emission rates and the projected generation of the R.M. Heskett Station Unit II as an AFBC, the annual emissions of particulate matter for the year 1987, the first year of full operation for the AFBC, are predicted to be 21 tons more than the average of the 1983-1984 annual particulate emissions for the existing unit. This is due to a larger amount of electricity projected to be generated by Unit II in 1987 than the average amount of electricity generated in 1983 and 1984. However, the AFBC would only emit 13.09 tons more of particulate matter than would be emitted by the existing Unit II if it were in place in 1987.

Maximum hourly emissions of sulfur dioxide from the AFBC are predicted to be less than that of the existing Unit II. The existing Unit II will produce approximately 2045.78 lb/hr of SO_2 at the average 1983-1984 coal sulfur content of 0.925%. Because the maximum Btu input of the AFBC is lower then that of existing Unit II, and because B&W test results indicate that nominally 40%

of the sulfur will be captured by the AFBC, the proposed AFBC is projected to emit 1563.53 lb/hr of SO_2, at the 1983-1984 average sulfur content of the coal and utilizing a sulfur capture of approximately 35%. The annual emissions of SO_2 are anticipated to be equal to the average of the 1983-1984 annual emissions.

To examine the effects on the ambient air quality of the area with respect to SO_2, of the proposed AFBC conversion, the COMPLEX II air dispersion model from the US EPA UNIMAP series was utilized. The selection of the receptor points for the computer model and the various computer program options were closely coordinated with Mr. Steve Weber of the Health Department. Several runs of the computer model were made, in order to reflect a true picture of the effect the proposed conversion would have. Data on all the nearby emission sources, to include the existing Unit II and Unit I at R. M. Heskett Station and data for the AMOCO Oil Refinery sources, was obtained from the Health Department. The five highest concentrations occurring at each of the 180 receptor points were examined. This examination revealed a total of 75 exceedences of the 1-hour air quality standard for SO2. Utilizing emission factors based on the latest emission test of Heskett Unit II and the average 1983-1984 sulfur content of the coals, a similar computer run to the first was subsequently made. This computer run revealed precisely the same 1-hour air quality exceedences as the previously mentioned computer run plus one additional exceedence at receptor point 125, (738.04 micrograms vs. 688.12 micrograms.) A third model run was made replacing the existing Heskett Unit II with the proposed AFBC. The results of this computer run revealed the identical 76 exceedences of the 1-hour air quality standard for SO_2 to occur, with one exception: The 738.04 microgram concentration at receptor 125 increased to 759.66 micrograms. A fourth computer run was made to see what the indicated ambient air quality would be if R.M. Heskett Station, with or without the AFBC, did not exist. Therefore, this run only modeled the emission sources from the AMOCO Oil Refinery. This computer model revealed the exceedences of the ambient air quality standards to be identical to those that would occur if Heskett Station was in operation with or without the AFBC, with two exceptions: The predicted ambient air quality concentration at receptor point 125 was no longer high enough to be considered an exceedence, and the second highest concentration occurring at recepter point 153 decreased enough to no longer be considered an exceedence. Therefore, it can be seen that not only will the conversion of R. M. Heskett Unit II to an AFBC not have significantly different air quality impacts than the existing unit, but the existing facility has very little or no impact on the air quality exceedences that might occur in the area.

Test at B&W's 6X6 AFBC indicate that the NO_x emission rate will be 0.4 lbs/10^6 Btu. This equates to an hourly emission rate of 360.48 lbs/hr. The average emission rate for the existing Unit II is 0.463 lbs/10^6 Btu. The maximum hourly emission rate of the existing unit is 468.94 lbs./hr. Based on the projected 1987 generation for the AFBC, 1042 tons of NOx will be emitted in 1987. The average of the NO_x annual emission rate for the years 1983 and 1984 is 1039.18 tons per year. Thus, the AFBC will emit approximately 3 tons per year more than the previous average annual emissions from the existing unit.

Copies of the "print outs" of the various computer model runs have been previously forwarded to Mr. Steve Weber of the Department. Copies of the calculations to support the emission rate determinations are attached as Attachment A.

The cost of changing the method of "firing" Unit II to an AFBC is projected to be less than $8,000,000. The cost of a new unit of equal size to the existing Unit II would be approximately $95,000,000.

Based on this analysis, Montana-Dakota Utilities Co. believes that the conversion of R. M. Heskett Unit II to an AFBC does not constitute a new, rebuild, or modified unit and is not subject to New Source Performance Standards or the Prevention of Significant Deterioration program. Should you have any questions concerning the analysis or require additional information, please contact me or John Graves at 222-7900.

Sincerely,

Earl F. Backhaus

Earl F. Backhaus
Power Production Manager

EB/mp

ATTACHMENT A

Particulate Emissions
Annual

Existing Unit II
from 1983 AEI Report - 128.85 tons
from 1984 AEI Report - 128.47 tons
Average - 128.56 tons

AFBC
1987 projected generation = 490,943 MWH
Existing all loads average heat rate = 11,800 Btu/kwh
Minimum 10% heat rate improvement projected with AFBC
AFBC heat rate = .9 (11,800) Btu/kwh

490,943 MWH x .9 (11,800) Btu/kwh = $5.21381466 \times 10^{12}$ Btu/yr
current emission rate = 0.0228 lb/10^6 Btu @ 3.667% ash
83-84 average ash = 9.225%
adjust for average ash $\frac{\text{part.}}{9.225\%} = \frac{.0228/10 \text{ Btu}}{3.667}$
Part emission rate = 0.0574 lbs/10^6 Btu

$(5.21381466 \times 10^{12} \text{ Btu}) \frac{(.0574 \text{ lbs})}{10^6 \text{ Btu}} =$ [redacted] tons/yr
150

Annual Emissions Increase = 1987 AFBC - 83/84 avg existing
= 149.53 tons - 128.56 tons
= 20.97 tons

1987 Projected generation for existing Heskett Unit II - 402,881 MWH
Using the historical average heat rate of 11,800 Btu/Kwh
402,881 MWH x 11,800 Btu/kwh = 4.7539958×10^{12} Btu/yr.

1987 Emissions = 4.7539958×10^{12} Btu x 0.0574 lbs/10^6 Btu
= [redacted]
1987 AFBC - 1987 existing Unit II
149.53 - 136.44 = 13.09 tons

SO_2 Emissions
Hourly

Existing Unit II
Using calculated F factors
avg. SO_2 = 1.4565 lbs/10^6 Btu
avg. SO_2 = 1092.1 lbs/hr
Btu input = 749.81 x 10^6 Btu input

At full load of 1,012,825,000 Btu/hr
SO_2 = 1475.18 lbs/hr at 0.6667% S coal
at avg sulfur of 0.925%
SO_2 = 2045.78 lb/hr
SO_2 = 257.76 gm/sec

AFBC

$$\frac{x}{257.76 \text{ gm/sec}} = \frac{901.2 \times 10^6 \text{ Btu}}{1012.825 \times 10^6 \text{ Btu}}$$

x = 229 gm/sec

if 40% of incoming S is captured:
max theoretical emission -
0.925% S at 6947.5 Btu/lb
2(.00925) lbs SO_2 /hr x 901.2 x 10^6 Btu/hr = 2399.74 lbs SO_2/hr
6947.5 Btu/lb coal

at 40% reduction: emission = 1439.84 lbs SO_2/hr
= 181.54 gm/sec
at 34.85% reduction: emission = [1563.53 lbs SO_2/hr] 1.71 lb/10^6 Btu
= 197 gm/sec

SO_2 Emissions
Annual

Existing Unit II
From AEI report
1983 = 4634.77 tons
1984 = 4413.94 tons
Avg. = 4524.36 tons

Projected 1987 Emissions
1987 projected generation = 402,881 MWH
1987 Annual Btu = 4753995.8 x 10^6 Btu
current emission rate = 1.4565 lbs/10^6 Btu @ 0.667% S
adjust to 83/84 avg S of 0.925%

$$\frac{x}{0.925\%} = \frac{1.4565/10}{0.667\%}$$

x= 2.02 lbs/10^6 Btu

Projected emissions = 2.02 lbs/10^6 Btu x 4.754 x 10^{12} Btu
= 4801.25 tons

AFBC

Projected 1987 Emissions

1987 projected generation = 490,943 MWH

490,943 MWH x .9 (11,800) Btu/kwh = $5,213,814,66 \times 10^6$ Btu

emission rate = 1563.53 lbs SO /hr x 901.2×10^6 Btu/hr

= 1.735 lbs/10^6 Btu

Annual emissions = 5.2138×10^{12} Btu x 1.735 lbs/10^6 Btu

= 4522.98 tons

NO_x Emissions
Hourly

Existing Unit II

Mean emission rate from GCA testing (1983) = 0.463 lbs/10^6 Btu

Max Unit II rating = $1,012.825 \times 10^6$ Btu/hr

Emission = 0.463 lbs/10^6 Btu x 1012.825×10^6 Btu/hr

= 468.94 lbs/hr

AFBC

Average emission rate from B&W test data = 0.4 lbs/10^6 Btu

AFBC rating = 901.2×10^6 Btu/hr

Emissions = 0.4 lbs/10^6 Btu x 901.2×10^6 Btu/hr

= [redacted]

NO_x Emissions
Annual

Existing Unit II

From 1983 and 1984 AEI Report - 83/84 avg = 1039.18 tons

AFBC

Projected generation in 1987 = 490,943 MWH

Projected Btu = $5,213,814.66 \times 10^6$ Btu

Emissions = $5,213,814.66 \times 10^6$ Btu x 0.4 lbs/10^6 Btu

= [redacted]

Table 3. Summary of the Results of the April 11, 1991 RATA of the SO_2 CEM System on Unit 1 at the [redacted]

Run No.	Time (HRS)	SO_2 (ppm,w) RM	CEM	DIFF	SO_2 (LB/10^6BTU) RM	CEM	DIFF
1	0835-0856	398	415	17	1.101	1.119	0.018
2	0925-0946	391	419	28	1.029	1.124	0.095
3*	1015-1036	407	433	26	1.066	1.161	0.095
4	1110-1131	373	409	36	0.980	1.116	0.136
5	1200-1221	384	405	21	1.009	1.099	0.090
6	1255-1316	376	409	33	0.988	1.106	0.118
7	1345-1406	390	417	27	1.023	1.180	0.157
8	1431-1452	391	422	31	1.025	1.136	0.111
9	1520-1541	401	434	33	1.051	1.166	0.115
10	1625-1646	352	383	31	0.931	1.118	0.187
Average		384		28.454	1.015		0.114
Standard Deviation				6.150			0.047
Confidence Coefficient				1.546			0.012
Relative Accuracy (%)				7.81			12.39

* Run rejected

RM = Reference Method; CEM = Continuous Emission Monitor

Table 2. Summary of the Results of the April 11, 1991 RATA of the NO_x CEM System on Unit 1 at the Cooperative Power Association - Coal Creek Station in Underwood, North Dakota.

Run	Time	NO_x (ppm,w)			NO_x (LB/10^6BTU)		
No.	(HRS)	RM	CEM	DIFF	RM	CEM	DIFF
1	0835-0856	301	318	17	0.598	0.653	0.037
2	0925-0946	293	318	25	0.593	0.614	0.021
3*	1015-1036	302	320	18	0.611	0.623	0.012
4	1110-1131	293	311	15	0.594	0.608	0.014
5	1200-1221	296	311	15	0.598	0.607	0.009
6	1255-1316	293	309	16	0.593	0.606	0.013
7	1345-1406	293	310	17	0.591	0.602	0.011
8	1431-1452	294	310	16	0.594	0.606	0.012
9	1520-1541	287	310	23	0.580	0.606	0.026
10	1625-1646	297	315	18	0.608	0.650	0.042
Average		294		18.462	0.594		0.021
Standard Deviation				3.411			0.012
Confidence Coefficient				0.857			0.003
Relative Accuracy (%)				6.57			3.97

* Run rejected

RM = Reference Method; CEM = Continuous Emission Monitor

Table 1. Summary of the Results of the April 11, 1991 RATA of the O_2 CEM System on Unit 1 at the Cooperative Power Association - Coal Creek Station in Underwood, North Dakota.

Run No.	Time (HRS)	O_2 (% v/v,w) RM	CEM	DIFF
1	0835-0856	5.1	5.0	-0.1
2	0925-0946	5.1	5.0	-0.1
3*	1015-1036	5.1	5.0	-0.1
4	1110-1131	5.1	5.0	-0.1
5	1200-1221	5.2	5.0	-0.2
6	1255-1316	5.2	5.0	-0.2
7	1345-1406	5.1	5.0	-0.1
8	1431-1452	5.0	4.9	-0.1
9	1520-1541	5.1	5.0	-0.1
10	1625-1646	5.1	5.3	0.2
Average		5.1		-0.091
Standard Deviation				0.102
Confidence Coefficient				0.026
Relative Accuracy (%)				2.29

* Run rejected

RM = Reference Method; CEM = Continuous Emission Monitor

Table 6. Summary of the Results of the April 11, 1991 RATA of the CEM System on Unit 2 at the Cooperative Power Association - Coal Creek Station in Underwood, North Dakota.

Run No.	Time (HRS)	SO_2 (ppm,w) RM	SO_2 (ppm,w) CEM	SO_2 (ppm,w) DIFF	SO_2 (LB/10^6BTU) RM	SO_2 (LB/10^6BTU) CEM	SO_2 (LB/10^6BTU) DIFF
1	1245-1306	381	411	30	1.020	1.123	0.103
2	1355-1416	378	417	39	0.984	1.128	0.144
3	1445-1506	382	421	39	1.001	1.138	0.137
4	1535-1556	411	425	14	1.060	1.150	0.090
5*	1630-1651	377	432	55	0.976	1.163	0.187
6	1720-1741	388	418	30	1.019	1.131	0.112
7	1810-1831	388	427	39	1.009	1.143	0.134
8	1900-1921	404	430	26	1.059	1.158	0.099
9	1950-2011	400	425	25	1.039	1.156	0.117
10	2035-2056	413	425	12	1.068	1.157	0.089
Average		394		28.016	1.029		0.114
Standard Deviation				10.159			0.020
Confidence Coefficient				2.553			0.005
Relative Accuracy (%)				7.76			11.57

* Run rejected

RM = Reference Method; CEM = Continuous Emission Monitor

Table 5. Summary of the Results of the April 11, 1991 RATA of the CEM System on Unit 2 at the Cooperative Power Association - Coal Creek Station in Underwood, North Dakota.

Run	Time	NO_x (ppm,w)			NO_x (LB/10^3BTU)		
No.	(HRS)	RM	CEM	DIFF	RM	CEM	DIFF
1	1245-1306	330	346	16	0.635	0.675	0.040
2	1355-1416	313	330	17	0.625	0.652	0.027
3	1445-1506	318	336	18	0.624	0.645	0.003
4	1535-1556	345	350	5	0.681	0.676	-0.005
5*	1630-1651	322	341	19	0.638	0.673	0.035
6	1720-1741	320	341	21	0.648	0.664	0.016
7	1810-1831	326	345	19	0.652	0.666	0.014
8	1900-1921	326	345	19	0.658	0.671	0.013
9	1950-2011	335	354	19	0.668	0.683	0.015
10	2035-2056	337	354	17	0.666	0.682	0.016
Average		328		16.609	0.653		0.015
Standard Deviation				4.748			0.013
Confidence Coefficient				1.193			0.003
Relative Accuracy (%)				5.43			2.86

* Run rejected

RM = Reference Method; CEM = Continuous Emission Monitor

Table 4. Summary of the Results of the April 11, 1991 RATA of the O_2 CEM System on Unit 2 at the Cooperative Power Association - Coal Creek Station in Underwood, North Dakota.

Run No.	Time (HRS)	O_2 (% v/v,w) RM	CEM	DIFF
1	1245-1306	5.1	5.0	-0.1
2	1355-1416	5.1	5.0	-0.1
3	1445-1506	5.1	5.0	-0.1
4	1535-1556	5.3	5.0	-0.3
5*	1630-1651	5.1	5.0	-0.1
6	1720-1741	5.0	5.0	0.0
7	1810-1831	5.0	5.0	0.0
8	1900-1921	5.0	4.9	-0.1
9	1950-2011	5.1	5.0	-0.1
10	2035-2056	5.1	5.0	-0.1
Average		5.1		-0.103
Standard Deviation				0.088
Confidence Coefficient				0.022
Relative Accuracy (%)				2.45

* Run rejected

RM = Reference Method; CEM = Continuous Emission Monitor

TABLE 2. Summary of the Results of the April 12, 1991 Particulate Emission Compliance Test on the No. 1 Boiler at the Cooperative Power Coal Creek Station Located in Underwood, North Dakota.

ITEM		Run 1	Run 2	Run 3
Date of test		04-12-91	04-12-91	04-12-91
Time runs were done	(HRS)	800/ 910	936/1057	1120/1231
Steam flow	(KLB/HR)	3833.7	3832.2	3825.5
Volumetric flow				
actual	(ACFM)	2614781	2610479	2612330
standard	(DSCFM)	1551520	1559061	1570873
Gas temperature	(DEG-F)	221	220	220
Moisture content	(%V/V)	17.72	17.33	16.81
Gas composition	(%V/V,dry)			
carbon dioxide		13.50	13.40	13.60
oxygen		6.40	6.40	6.10
nitrogen		80.10	80.20	80.30
Isokinetic variation	(%)	99.2	98.8	99.0
Particulate concentration				
actual	(GR/ACF)	.00801	.00554	.00257
standard	(GR/DSCF)	.0135	.00928	.00428
Part. emission rate	(LB/HR)	179.6	124.0	57.57
Emission factor	(LB/MMBTU)	0.027	0.019	0.0085

Note: Dry catch only
Continuous soot blowing

TABLE 1. Summary of the Results of the April 10, 1991 Particulate Emission Compliance Test on the No. 2 Boiler at the Cooperative Power Coal Creek Station Located in Underwood, North Dakota.

ITEM		Run 1	Run 2	Run 3
Date of test		04-10-91	04-10-91	04-10-91
Time runs were done	(HRS)	930/1048	1255/1414	1445/1600
Steam flow	(KLB/HR)	3842.3	3835.7	3841.3
Volumetric flow				
actual	(ACFM)	2584223	2594362	2592727
standard	(DSCFM)	1544729	1552529	1543440
Gas temperature	(DEG-F)	205	211	208
Moisture content	(%V/V)	18.32	17.49	18.27
Gas composition	(%V/V,dry)			
carbon dioxide		14.00	14.00	14.10
oxygen		5.80	5.80	5.80
nitrogen		80.20	80.20	80.10
Isokinetic variation	(%)	101.0	98.9	100.1
Particulate concentration				
actual	(GR/ACF)	.0310	.0194	.0194
standard	(GR/DSCF)	.0518	.0324	.0326
Part. emission rate	(LB/HR)	686.1	430.7	431.7
Emission factor	(LB/MMBTU)	0.101	0.063	0.064

Note: Dry catch only
Continuous soot blowing during Runs 2 & 3.

INTERPOLL LABORATORIES INC.
Fuel Laboratory
(612) 786-6020

04-23-1991

Client: CPA/COAL CREEK STATION

Laboratory Log Number: 2749-25-9317

Sample Identification: COAL 4-12-91

Ultimate Analysis WT %

Parameter	Moisture & Ash Free	Moisture Free	As Received
Moisture, Total			37.68
Ash		18.96	11.81
Carbon	71.35	57.82	36.03
Hydrogen	5.08	4.12	2.57
Nitrogen	0.92	0.75	0.46
Oxygen (calculated)	20.54	16.65	10.38
Sulfur	2.11	1.71	1.07
Heating Value, BTU/LB.	12000	9725	6061

Respectfully submitted,

Gregg W. Holman
Senior Scientist
Inorganic Chemistry Department

INTERPOLL LABORATORIES INC.
Fuel Laboratory
(612) 786-6020

04-23-1991

Client: CPA/COAL CREEK STATION

Laboratory Log Number: 2749-23-9315

Sample Identification: COAL 4-10-91

Ultimate Analysis WT %

Parameter	Moisture & Ash Free	Moisture Free	As Received
Moisture, Total			37.34
Ash		19.93	12.49
Carbon	71.30	57.10	35.78
Hydrogen	5.00	4.00	2.51
Nitrogen	0.93	0.74	0.46
Oxygen (calculated)	21.42	17.16	10.75
Sulfur	1.34	1.08	0.67
Heating Value, BTU/LB.	11973	9587	6007

Respectfully submitted,

Gregg W. Holman
Senior Scientist
Inorganic Chemistry Department

9885

INTERPOLL LABORATORIES INC.
Fuel Laboratory
(612) 786-6020

04-23-1991

Client: CPA/COAL CREEK STATION

Laboratory Log Number: 2749-22-9314

Sample Identification: COAL 4-9-91

Ultimate Analysis WT %

Parameter	Moisture & Ash Free	Moisture Free	As Received
Moisture, Total			37.90
Ash		17.68	10.98
Carbon	71.31	58.70	36.45
Hydrogen	5.14	4.23	2.63
Nitrogen	0.94	0.77	0.48
Oxygen (calculated)	21.33	17.56	10.91
Sulfur	1.28	1.05	0.65
Heating Value, BTU/LB.	11942	9830	6104

Respectfully submitted,

Gregg W. Holman
Senior Scientist
Inorganic Chemistry Department

9954

INTERPOLL LABORATORIES INC.
Fuel Laboratory
(612) 786-6020

04-24-1991

Client: CPA/COAL CREEK STATION

Laboratory Log Number: 2749-21-9313

Sample Identification: COAL 4-8-91

Ultimate Analysis WT %

Parameter	Moisture & Ash Free	Moisture Free	As Received
Moisture, Total			37.97
Ash		17.82	11.06
Carbon	71.37	58.65	36.38
Hydrogen	5.04	4.14	2.57
Nitrogen	0.91	0.75	0.46
Oxygen (calculated)	21.53	17.70	10.98
Sulfur	1.14	0.94	0.58
Heating Value, BTU/LB.	11936	9809	6084

Respectfully submitted,

Gregg W. Holman
Senior Scientist
Inorganic Chemistry Department

9921

BASIN ELECTRIC POWER COOPERATIVE
BISMARCK, NORTH DAKOTA

Oct 2-3, 1991
TEST

DATE: 1(
TIME: 1⁴
PAGE:

ANTELOPE VALLEY STATION
QUALITY OF FUEL
AS BURNED E1
SEPTEMBER 01, 1991 TO SEPTEMBER 30, 1991

			AS RECEIVED							DRY BASIS				
AMPLE ID	TONS	LBS OF SAMPLE	% NA COAL	% NA ASH	MOIST %	SLFR %	BTU /LB	ASH %	#SLFR MMBTU	ASH %	BTU /LB	MAF BTU	SLFR %	VALI SAMPL
1910901	8199.00	0	0.49	5.50	34.73	0.61	6762	8.95	0.90	13.71	10360	12006	0.94	Y
1910902	8285.00	0	0.49	5.50	34.73	0.61	6762	8.95	0.90	13.71	10360	12006	0.94	Y
1910903	6154.00	0	0.49	5.50	34.73	0.61	6762	8.95	0.90	13.71	10360	12006	0.94	Y
1910904	5794.00	0	0.49	5.50	34.73	0.61	6762	8.95	0.90	13.71	10360	12006	0.94	Y
1910905	4441.00	0	0.53	6.04	35.53	0.62	6671	8.73	0.93	13.54	10348	11969	0.96	Y
1910906	7482.00	0	0.53	6.04	35.53	0.62	6671	8.73	0.93	13.54	10348	11969	0.96	Y
1910907	6326.00	0	0.53	6.04	35.53	0.62	6671	8.73	0.93	13.54	10348	11969	0.96	Y
1910908	8178.00	0	0.53	6.04	35.53	0.62	6671	8.73	0.93	13.54	10348	11969	0.96	Y
1910909	8430.00	0	0.53	6.04	35.53	0.62	6671	8.73	0.93	13.54	10348	11969	0.96	Y
1910910	7197.00	0	0.53	6.04	35.53	0.62	6671	8.73	0.93	13.54	10348	11969	0.96	Y
1910911	8360.00	0	0.53	6.04	35.53	0.62	6671	8.73	0.93	13.54	10348	11969	0.96	Y
1910912	6450.00	0	0.54	6.59	36.51	0.57	6609	8.16	0.86	12.86	10409	11945	0.89	Y
1910913	9251.00	0	0.54	6.59	36.51	0.57	6609	8.16	0.86	12.86	10409	11945	0.89	Y
1910914	9717.00	0	0.54	6.59	36.51	0.57	6609	8.16	0.86	12.86	10409	11945	0.89	Y
1910915	5140.00	0	0.54	6.59	36.51	0.57	6609	8.16	0.86	12.86	10409	11945	0.89	Y
1910916	8004.00	0	0.54	6.59	36.51	0.57	6609	8.16	0.86	12.86	10409	11945	0.89	Y
1910917	7360.00	0	0.54	6.59	36.51	0.57	6609	8.16	0.86	12.86	10409	11945	0.89	Y
1910918	6447.00	0	0.54	6.59	36.51	0.57	6609	8.16	0.86	12.86	10409	11945	0.89	Y
1910919	7577.00	0	0.58	6.29	34.75	0.57	6727	9.23	0.85	14.14	10310	12008	0.88	Y
1910920	6298.00	0	0.58	6.29	34.75	0.57	6727	9.23	0.85	14.14	10310	12008	0.88	Y
1910921	7011.00	0	0.58	6.29	34.75	0.57	6727	9.23	0.85	14.14	10310	12008	0.88	Y
1910922	6043.00	0	0.58	6.29	34.75	0.57	6727	9.23	0.85	14.14	10310	12008	0.88	Y
1910923	7663.00	0	0.58	6.29	34.75	0.57	6727	9.23	0.85	14.14	10310	12008	0.88	Y
1910924	7347.00	0	0.58	6.29	34.75	0.57	6727	9.23	0.85	14.14	10310	12008	0.88	Y
1910925	8518.00	0	0.58	6.29	34.75	0.57	6727	9.23	0.85	14.14	10310	12008	0.88	Y
1910926	7547.00	0	-	-	-	-	-	-	-	-	-	-	-	
1910927	5644.00	0	-	-	-	-	-	-	-	-	-	-	-	
1910928	6249.00	0	-	-	-	-	-	-	-	-	-	-	-	
1910929	7768.00	0	-	-	-	-	-	-	-	-	-	-	-	
1910930	7173.00	0	-	-	-	-	-	-	-	-	-	-	-	
WT AVG			0.54	6.18	35.47	0.59	6683	8.74	0.88	13.54	10357	11979	0.91	
MINIMUM			0.49	5.50	34.73	0.57	6609	8.16	0.85	12.86	10310	11945	0.88	
MAXIMUM			0.58	6.59	36.51	0.62	6762	9.23	0.93	14.14	10409	12008	0.96	

VALID TONS	181672.00
INVALID TONS	0.00
TONS DELIVERED	216053.00

1991 YEAR-TO-DATE

WT AVG			0.51	5.89	35.74	0.61	6680	8.69	0.91	13.52	10395	12021	0.95	

VALID TONS	1555723.00
INVALID TONS	0.00
TONS DELIVERED	1652739.00

SUMMARY OF RESULTS
Unit 1

Run Number		1	2	3
Stack Flow Rate - ACFM		1918715	2014860	1969587
Stack Flow Rate - DSCFM*		1154633	1224193	1146052
% Water Vapor - % Volume		19.63	18.05	21.38
% CO_2 - % Volume		14.0	12.4	13.2
% O_2 - % Volume		6.2	7.2	6.8
% Excess Air At Sampling Point		41	51	47
Particulates				
Probe, Cyclone & Filter Catch grains/dscf*	(C_{an})	0.0194	0.0233	0.0169
grains/cf at Stack Conditions	(C_{at})	0.0116	0.0141	0.0098
lbs/hr	(C_{aw})	192.002	244.624	165.692
Total Catch grains/dscf*	(C_{ao})	---	---	---
grains/cf at Stack Conditions	(C_{au})	---	---	---
lbs/hr	(C_{ax})	---	---	---
Particulate Emission Rate, front-half	lbs/million Btu	0.04	0.05	0.04
F Factor Dry, Calculated		9828	9828	9828

* 68 Deg. F., 29.92 "Hg (20 Deg. C., 760 mm Hg)

SUMMARY OF RESULTS
Unit 2

Run Number		1	2	3
Stack Flow Rate - ACFM		1564006	1751398	1797268
Stack Flow Rate - DSCFM*		938647	1046094	1085968
% Water Vapor - % Volume		18.33	18.45	17.49
% CO_2 - % Volume		13.5	13.9	13.9
% O_2 - % Volume		6.3	6.3	6.4
% Excess Air At Sampling Point		42	42	43
Particulates				
Probe, Cyclone & Filter Catch grains/dscf*	(C_{an})	0.0133	0.0129	0.0087
grains/cf at Stack Conditions	(C_{at})	0.0080	0.0077	0.0052
lbs/hr	(C_{aw})	107.206	115.372	80.789
Total Catch grains/dscf*	(C_{ao})	---	---	---
grains/cf at Stack Conditions	(C_{au})	---	---	---
lbs/hr	(C_{ax})	---	---	---
Particulate Emission Rate, front-half	lbs/million Btu	0.03	0.03	0.02
F Factor Dry, Calculated		9723	9723	9723

* 68 Deg. F., 29.92 "Hg (20 Deg. C., 760 mm Hg)

SUMMARY OF RESULTS
Unit #1

Run #	SO_2 ppm, dry	O_2 percent, dry	md	SO_2 ppm, wet	O_2 percent, wet	lbs/mmBtu
1	90.3	6.2	0.8037	72.6	5.0	0.209
2	128.5	7.2	0.8195	105.3	5.9	0.320
3	115.3	6.8	0.7862	90.6	5.3	0.277
4	105.5	7.0	0.8244	87.0	5.8	0.259
5	95.0	7.2	0.8244	78.0	5.9	0.234
6	97.5	7.2	0.8244	80.4	5.9	0.242
7	109.9	7.2	0.8201	90.1	5.9	0.273
8	104.0	6.8	0.8201	85.3	5.6	0.252
9	111.9	7.0	0.8201	91.8	5.7	0.273

F = 9828, Calculated

	Qs	lbs/hr
1	1154633	1039.2
2	1224193	1567.8
3	1146052	1317.0
4	1181079	1241.9
5	1170800	1108.6
6	1172268	1139.2
7	1185238	1298.2
8	1177330	1220.3
9	1171079	1306.1

SUMMARY OF RESULTS
Unit #1

Run #	NO_x ppm, dry	md	NO_x ppm, wet	lbs/mmBtu
1	200.6	0.8037	161.2	0.335
2	210.8	0.8195	172.8	0.377
3	214.4	0.7862	168.6	0.371
4	205.3	0.8244	169.2	0.362
5	225.7	0.8244	186.1	0.402
6	222.8	0.8244	183.7	0.397
7	218.8	0.8201	179.4	0.391
8	218.2	0.8201	178.9	0.380
9	217.7	0.8201	178.5	0.382

F = 9828, Calculated

	Qs	lbs/hr
1	1154633	1659.3
2	1224193	1848.7
3	1146052	1760.3
4	1181079	1737.1
5	1170800	1893.1
6	1172268	1871.1
7	1185238	1857.8
8	1177330	1840.4
9	1171079	1826.4

SUMMARY OF RESULTS
Unit #2

Run #	SO_2 ppm, dry	O_2 percent, dry	md	SO_2 ppm, wet	O_2 percent, wet	lbs/mmBtu
1	157.9	6.3	0.8167	129.0	5.1	0.362
2	176.9	6.3	0.8167	144.5	5.1	0.407
3	172.5	6.3	0.8155	140.7	5.1	0.397
4	174.4	6.3	0.8155	142.2	5.1	0.401
5	170.3	6.4	0.8251	140.5	5.3	0.396
6	154.4	6.4	0.8251	127.4	5.3	0.360
7	134.7	6.4	0.7999	107.7	5.1	0.313
8	117.3	6.2	0.7999	93.8	5.0	0.270
9	129.0	6.4	0.7999	103.2	5.1	0.300

F = 9723, Calculated

	Qs	SO2 lbs/hr
1	938647	1477.2
2	938647	1654.9
3	1046094	1798.5
4	1046094	1818.3
5	1085968	1843.2
6	1085968	1671.1
7	1028672	1381.0
8	1037468	1212.9
9	1032964	1328.1

SUMMARY OF RESULTS
Unit #2

Run #	NO_x ppm, dry	md	NO_x ppm, wet	lbs/mmBtu
1	221.6	0.8167	181.0	0.368
2	228.3	0.8167	186.5	0.378
3	215.2	0.8155	175.5	0.356
4	220.8	0.8155	180.1	0.365
5	222.7	0.8251	183.7	0.373
6	217.8	0.8251	179.7	0.364
7	208.2	0.7999	166.5	0.347
8	205.0	0.7999	164.0	0.339
9	203.6	0.7999	162.9	0.339

F = 9723, Calculated

	Qs	NOx lbs/hr
1	938647	1490.1
2	938647	1535.2
3	1046094	1612.8
4	1046094	1654.7
5	1085968	1732.6
6	1085968	1694.6
7	1028672	1534.3
8	1037468	1523.6
9	1032964	1506.7

Table 1. Summary of the Results of the December 19, 1991 Relative Accuracy Test Audit of the SO_2/O_2 CEM System on the No. 10 Boiler Stack Breeching at the [redacted] Dakota.

Run		SO_2 (ppm,w)			O_2 (%v/v,w)			SO_2 (LB/10^6BTU)		
No.	Time	RM	CEM	DIFF	RM	CEM	DIFF	RM	CEM	DIFF
1	0956-1017	193	196	3	4.59	4.96	0.37	.53	.53	.000
2	1036-1056	243	241	-2	4.43	4.76	0.33	.66	.65	-.010
3	1116-1136	228	205	-23	4.29	4.54	0.25	.62	.54	-.080
4	1156-1216	219	208	-11	4.45	4.78	0.33	.60	.56	-.040
5	1236-1256	241	234	-7	4.51	4.71	0.20	.65	.62	-.030
6	1316-1337	236	240	4	4.47	4.68	0.21	.64	.64	.000
7	1356-1416	217	217	0	4.45	4.66	0.21	.60	.58	-.020
8	1436-1456	188	196	8	4.52	4.75	0.23	.52	.52	.000
9	1516-1536	218	221	3	4.38	4.68	0.30	.59	.59	.000
Average		220		2.7778	4.45		0.2700	.60		0.0200
Standard Deviation				6.93			0.06			0.03
Confidence Coefficient				7.350			0.049			0.021
Relative Accuracy				4.6			7.2			6.8

RM = Reference Method

CEM = Continuous Emission Monitor

RM emission factor is based on dry F-factor of 9860 DSCF/10^6BTU

Table 2. Summary of the Results of the December 19, 1991 Relative Accuracy Test Audit of the NO_x/O_2 CEM System on the No. 10 Boiler Stack Breeching at the United Power Association Facility in Stanton, North Dakota.

Run		NO_y (ppm,w)			O_2 (%v/v,w)			NO_y (LB/10^6BTU)		
No.	Time	RM	CEM	DIFF	RM	CEM	DIFF	RM	CEM	DIFF
1	0956-1017	252	237	-15	4.59	4.96	.37	.50	.47	-.03
2	1036-1056	246	231	-15	4.43	4.76	.33	.48	.45	-.03
3	1116-1136	250	228	-22	4.29	4.54	.25	.49	.44	-.05
4	1156-1216	255	236	-19	4.45	4.78	.33	.50	.46	-.04
5	1236-1256	251	230	-21	4.51	4.71	.20	.48	.45	-.03
6	1316-1337	251	234	-17	4.47	4.68	.21	.49	.46	-.03
7	1356-1416	245	228	-17	4.45	4.66	.21	.48	.44	-.04
8	1436-1456	237	228	-9	4.52	4.75	.23	.47	.44	-.03
9	1515-1536	232	214	-18	4.38	4.68	.30	.45	.42	-.03
Average		247		17	4.45		0.2700	0.48		0.0344
Standard Deviation				3.84			0.06			0.0100
Confidence Coefficient				2.952			0.049			0.006
Relative Accuracy				8.1			7.2			8.3

RM = Reference Method

CEM = Continuous Emission Monitor

RM emission factor is based on dry F-factor of 9860 DSCF/10^6BTU

WEEK'S DAILY COAL QUALITY REPORT

AMPLE TYPE	TESTING LAB	SAMPLE DATE	PIT#	TONS BEULAH	PIT#	TONS BEULAH UPPER	PIT#	TONS BEULAH LOWER	TONS STOCKPILE	TOTAL TONS SHIPPED	MOISTURE	ASH	SULFUR	BTU	SODIUM	CALC. LBS.SO2/ MBTU
IHD	DGC	12/16/91	82	2,729			79	1,300	560	4,589	35.16	8.04	0.77	6,933	1.30	2.22
IHD	DGC	12/17/91	82	961			79	3,296	822	5,079	35.19	9.32	0.93	6,834	1.70	2.72
IHD	DGC	12/18/91	82	3,068	77	1,334			630	5,032	35.07	9.18	1.05	6,875	1.47	3.05
WEEKLY COMPOSITE AVERAGE COAL QUALITY =									2,012	14,700	35.14	8.87	0.92	6,879	1.50	2.68
Y - T - D AVERAGE COAL QUALITY =									191,888	1,024,385	35.40	8.74	0.85	6,812	2.76	2.50

Table 2-1
SUMMARY of PROCESS & EMISSION MEASUREMENT RESULTS
Utility Boiler
Minnkota Power Cooperative, Inc.

Stack/Duct ID:	Unit 1[1]
Test Condition:	>90%

Plant Process and Production Results

Generation Rate, MW:	238

Particulate Emission Results

gr./dscf:	0.0080
gr./acf:	0.0039
lbs./hr.:	39.12
lbs./10^6BTU:	0.014

Parametric (Non-Pollutant) Flue Gas Results

Pressure, Velocity, Delta P, (in. w.g.):	0.8816
Moisture, (%, w/w):	17.93
CO_2, Orsat, (%, dry, v/v):	14.97
CO_2, Orsat, (%, wet, v/v):	12.28
O_2, Orsat, (%, dry, v/v):	4.53
O_2, Orsat, (%, wet, v/v):	3.72
Temp. of Stack, (^{0}F):	350.0
Velocity, (fps):	69.02
Vol. Flow, (10^3 DSCFM):	572603.2
Vol. Flow, (10^3 ACFM):	1174148
Mass Flow, (lbs./hr.):	2521694

[1] Average of all valid test runs, see Tables 3-6 and 3-7.

Table 3-3(a)
PLANT OPERATION and PRODUCTION, by Run
Minnkota Power Cooperative, Inc.
Compliance

Plant Name:	Minnkota Power Cooperative, Inc.			
Plant Location:	Milton R. Young Station, Center, ND			
Stack/Duct ID:	Unit 1			
Run Number:	1101	1102	1103	Avg
Date, 1991:	8-28	8-28	8-28	
Time - Start of Clock:	9:05	11:05	14:25	
- End of Clock:	10:15	13:16	15:52	
Test Condition:	91.32	86.79	91.32	89.81
Plant Production Data (Power/Boiler) **********				
Gen., (Gross, KWH/hr.):	242	230	242	238
Steam Flow, (10^3lbs./hr.):	1720	1715	1721	1718.67
Air Flow, (10^3lbs./hr.):	2653	2639	2653	2648.3
Fuel Flow, (10^3lbs./hr.):	379	377	379	78.3
Oxygen, Excess, (%):	4.11	4.27	4.18	4.187
Temp., A.H. Gas Out, (^{0}F):	332	335	337	334.7
Air Pollution Control Data **********				
ESP - 1 16 TR's (2 Banks):	AB 1-8 + CD 1-8 Full Wave Except (AB 1 & 8, CD 2 & 3 at Half Wave)			
Fuel Analysis Data (as received, wet) **********				
Fuel Type:	Lignite Coal (Data from Unit 2 belt and Sampler Avg.)			
HHV, (BTU/lbs.):	6900			
Sulfur, (%, w/w):	0.7 (as received)			
Sulfur Flow, (lbs./hr.):	2600 (Reduced by Bottom Ash/Precipitator)			
Ash, (%, v/v):	9.0 (as received)			

Note: Boiler Tightness test revealed 75 gpm tube leak during tests.

Table 2-1
SUMMARY of PROCESS & EMISSION MEASUREMENT RESULTS
Utility Steam / Electric Boiler
Milton R. Young Station

Stack/Duct ID:	Unit #2 (Particulate)	Unit #2 (CEMS)
Test Condition:	>50% [1]	>50%
Plant Process and Production Results		
Production Rate, MW hr./hr.:	429.3	>50%
Total Coal Flow, 10^3lbs./hr.:	690.7	>50%
Particulate Emission Results		
gr./dscf:	0.0165	-
gr./acf:	0.0093	-
lbs./hr.:	150.679	-
lbs./10^6BTU:	0.0313	-
Sulfur Dioxide (SO_2) Emission Results		
ppm, (dry, v/v):	-	461.875
ppm, (wet, v/v):	-	375.2399
lbs./10^6BTU:	-	1.013478
Oxides of Nitrogen (NO_x) Emission Results		
ppm, (dry, v/v):	-	606.893
ppm, (wet, v/v):	-	492.967
lbs./10^6BTU:	-	0.956
Parametric (Non-Pollutant) Flue Gas Results		
Pressure, Velocity, Delta P, (in. w.g.):	0.88	N/A
Moisture, (%, w/w):	18.85	18.77
CO_2, Orsat, (%, dry, v/v):	13.5	13.55
CO_2, Orsat, (%, wet, v/v):	10.9	11.00
O_2, Orsat, (%, dry, v/v):	5.3	-
O_2, Orsat, (%, wet, v/v):	4.3	-
O_2, Inst., (%, dry, v/v):	-	5.25
O_2, Inst., (%, wet, v/v):	-	4.27
Temp. of Stack, (^{0}F):	252.267	250.29
Velocity, (fps):	63.93	-
Vol. Flow, (10^3 DSCFM):	1065.766	-
Vol. Flow, (10^3 ACFM):	1882.896	-

[1] Average of all valid test runs, see Tables 3-6 and 3-7.

	Opacity Monitor	CO_2 Monitor	SO_2 Monitor
Zero Check	0.0%	0.0%	1 ppm
Zero Reference Value	0.0%	0.0%	0 ppm
Span Check	34.2%	16.0%	858 ppm
Span Reference Value	34.4%	16.2%	854 ppm
Allowable Drift	±4%	±1.00%	±75 ppm

Zero compensation for the opacity monitor was 0.0% opacity which is within the allowable range of ±4% opacity.

The results show the monitors were in compliance with Chapter 33-15-12 of the North Dakota Air Pollution Control Rules during the inspection. A check of the computer printouts indicated that the zero and spans required for the instruments were being conducted at 0748 hours each day.

We then discussed the operation of the scrubber for Unit 2. Tower 2A was out of service. Tower 2B was operating at 240 gpm fly ash solution and 105 gpm lime solution. The pH set points ranged from 5.73 to 5.93. Four of five spray recycle pumps were in service during the inspection.

The control panel in the boiler control room indicated that Unit 2 was operating at approximately 379 megawatts (net) and 412 megawatts (gross).

A check of the ESP control room indicated that 32 of 32 transformer rectifier sets were operating at the time of the inspection.

A recent coal analysis indicated that the coal had a sulfur content of 0.69%, BTU content of 6892 BTU/lb, an ash content of 9.05%, and a sodium content of 0.67%.

Compliance Status:

A. Chapter 33-15-02 - Ambient air quality monitoring has been conducted in the past around this facility. This monitoring indicated compliance with this Chapter. Based on the operation of the air pollution control equipment at the facility, it appears that this facility is in compliance with this Chapter.

B. Chapter 33-15-12

1. Particulate Matter: Based on the operation of the electrostatic precipitator and the low opacity from the Unit 2 stack, it appears that this facility is in compliance with this Section. A Method 5 particulate

NORTH DAKOTA
STATE DEPARTMENT OF HEALTH
AND CONSOLIDATED LABORATORIES

ENVIRONMENTAL HEALTH SECTION

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FROM: Gary Helbling, ND State Health Dept.

Fax #: (701) 221-5200

Phone: (701) 221-5150

DATE: 4/8/92 **Number of pages following:** 1

Remarks:

Answers to your questions in letter dated 4/2/92.

List of Questions

1. Are the reference methods for the continuous emission monitor recertification all EPA methods?

2. On the Heskett FBC report see attached page there is a note that the production and steam feed rates are arbitrary numbers and are not valid. Is 824.9 Btu/hr typical of operations for unit two?

3. United Power Association Facility in Stanton, for the boiler No. 10 source test results dated December 19, 1991. I need a way to get Btu/hr input to establish boiler load during testing. The table presents emissions in ppm, and lb/10^6 Btu. If I had a typical stack gas flowrate I could convert the ppm to lb/hr and with lb/10^6 Btu convert to Btu/hr to determine the boiler load during testing.

4. For the Antelope Valley Source Test Data the summary of results presents a Qs and a md, and I am not sure what these numbers are. Is the Qs a coal or steam flowrate?

Answers

1. Yes, all tests were conducted in accordance with EPA reference methods

2. The coal feed rate during the test was 53.5 tons/hr (107,000 lbs/hr). The heating value of the coal was 7,037 BTU/lb, therefore, 107,000 lbs/hr x 7,037 BTU/lb = 753 x 10^6 BTU/hr

3. Unit 10 was generating 55 megawatts (MW) during the test. This equates to approximately 586 x 10^6 BTU/hr.

4. Qs = Stack gas volumetric flow rate corrected to standard conditions.

Md = Dry gas molecular weight.